The Causal Effect of Improved Access to Postpartum Family Planning: Evidence from a Field Experiment in Urban Malawi

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Abstract

We conduct a randomized controlled trial that identifies the causal impact of a comprehensive intervention to improve access to family planning and reproductive health care on postpartum contraceptive use, birth spacing, and other measures of women's well-being in urban Malawi. A total of 2,143 married women aged 18-35 and who were either pregnant or had recently given birth were randomly assigned to either an intervention arm or a control arm. Women assigned to the intervention arm received a package of services over a two-year intervention period. Services included: 1) a brochure and up to six home visits from trained family planning counselors; 2) free transportation to a high-quality family planning clinic; and 3) financial reimbursement for family planning services, consultations, and referrals for services. Preliminary findings show a 3.46 to 3.26 percentage point increase in postpartum contraceptive use in the treatment group after one year of exposure to the intervention and a 5.06 percentage point increase in long-acting contraceptive use after two years of exposure to the intervention. We also find that exposure to our family planning intervention improves measures of sexual well-being and satisfaction for women in the treatment group. Finally, we find that the odds of short birth spacing among women in the treatment group was up to 54 percent lower after two years of exposure to the intervention (OR: -0.455 – -0.405) than women in the control group.

Introduction

Motivation

The World Health Organization (WHO) guidelines recommend that a woman wait at least 24 months after a live birth before attempting the next pregnancy (1,2). Poorly spaced births may contribute to higher rates of mortality for both mothers and infants, increase the risk of low birth weight and premature birth for infants, and make mothers more susceptible to anemia and puerperal endometritis (3,4) . In low- and middle-income countries, an estimated 25 percent of birth intervals do not meet the WHO's 24-month recommended guideline for adequate birth spacing (5). This gap between recommended spacing and realized spacing highlights the importance of postpartum family planning (PPFP), whereby the use of contraception, particularly modern methods, to supplement maternal reliance on postpartum breastfeeding and lactational amenorrhea may provide women with greater means to space births, decrease unwanted pregnancies, and improve child and maternal health outcomes.

Throughout Sub-Saharan Africa (SSA), the unmet need for PPFP is high. Given that ideal family size is higher among women in Sub-Saharan Africa than in other parts of the world, demand for and use of family planning stems from a desire to space births rather than limit births; nevertheless, an estimated 8 million women in Sub-Saharan Africa have an unmet need for limiting future births (6). Improving access to PPFP may help SSA women and couples to meet their desired fertility and to

avert unintended pregnancies and unwanted births (7,8). Previous studies have shown that women from disadvantaged backgrounds form one of the largest groups that lack access to reproductive health services and have an unmet need for modern family planning—that is, they are sexually active and want to delay or stop childbearing but are not using a modern contraceptive method (9–11). Women in developing countries often do not have access to basic information about sexuality, contraception, and sexually transmitted infections. Among those women who report awareness, many tend to harbor misperceptions or possess only superficial information about these issues (12,13).

The continued high unmet need for and lack of access to PPFP highlights a need to mobilize efforts towards meeting postpartum women's family planning and fertility goals. On the supply side, many of the propositions to meet this need have been centered around neonatal clinics, with both ante- and post-partum interventions targeting women when they are in a centralized location. Interventions that aim to influence demand (sexual and reproductive health behavior change, informing women and couples about the benefits of family planning) and supply (improving access to contraceptives and services) of family planning have become increasingly common in developing countries. These interventions have targeted key populations in a variety of ways, from education and awareness programs in schools to multicomponent, community-based campaigns (14,15).

More recently, the number of family planning interventions that have undergone more rigorous impact evaluation has increased to assess the effects of family planning on fertility, health behavior, and health outcomes. However, findings from community-level social programs such as the MCH-FP Extensions project in Matlab, Bangladesh and the Navrongo experiment in Ghana have also shown that contraceptive use declines considerably following the discontinuation of family planning services (16–19). While not all of the studies focused on postpartum women, these results suggest that increased access to high quality family planning services, particularly for new mothers, need to be expanded beyond the neonatal clinic. To this end, few randomized control trials have been conducted[1] to assess the causal impact of family planning in low-income countries, and even fewer impact evaluations have been conducted to determine the extent to which such family planning interventions may affect downstream health and economic development outcomes. To date, not many impact evaluations have sought to identify family planning and reproductive health program effectiveness at the individual or household level, and apart from the frequently cited Matlab project and a recent study by Ashraf et al (21), no randomized control trial to our knowledge has attempted to causally identify the impact of family planning and birth spacing on both immediate and longer term health and economic outcomes in Sub-Saharan Africa.

Objectives

To address these gaps in the evidence, we conducted a field experiment that identifies the causal impact of improved access to family planning on contraceptive use, fertility, maternal and child health (MCH) outcomes, and measures of economic well-being. The study population was married postpartum women aged 18-35 in Lilongwe, Malawi. As part of the trial, each woman in the study was randomly assigned to either the treatment or control arm. A woman who was assigned to the intervention arm received a two-year long family planning intervention that included:

[1] Even the most widely recognized family planning program evaluation, the Matlab MCH-FP projects, did not randomly assign participating villages, and no report was found documenting the mechanism used to assign villages to regional clusters for program treatment (20).

1. a family planning information package and up to six private counseling visits at her home with trained family planning counselors;
2. a free transportation (taxi) service to a family planning clinic with low waiting times; and
3. financial reimbursement for family planning services, including out of pocket expenditures related to family planning care and treatments that are received at the family planning clinic (e.g. medications, contraceptive methods, consultation fees, exam fees, treatment of contraceptive-related side effects), and free over-the-phone consultations and referral services from a doctor in the event that she experienced contraindications or side effects related to her use of family planning.

The package was specifically designed to reduce key cost barriers and increase financial and geographic accessibility of family planning services, particularly for the treatment of contraceptive-related side effects and contraindications, for postpartum women in urban Malawi (22,23).

Short-term outcomes of interest include knowledge of family planning and modern contraceptive use. Intermediate outcomes include fertility outcomes (parity, birth spacing), changes in desired fertility, unmet need for family planning, and outcomes associated with maternal and child health, including safe pregnancy, child birth height and weight, and nutritional status. Long-term outcomes include educational attainment (matriculation rates, years of schooling completed), labor market outcomes (employment status, female labor supply), and income earned for the women in the study. Results from this study seek to fill the current knowledge gaps on the effectiveness of family planning interventions by directly identifying the impact of an increase in access to family planning on fertility and health outcomes. More generally, findings from this study may also provide evidence to suggest that the benefits of improving access to family planning are likely to extend beyond the health domain by also improving economic well-being and contributing to poverty alleviation.

Background

Context: Malawi

In spite of declining birth rates and improvements to maternal health care, the total fertility rate, or the average number of births per woman, remains relatively high in Malawi. In 2017, the average total fertility rate in Malawi was 4.2 births per woman, which was slightly above the average in Sub-Saharan Africa of 4.9, but almost twice the average total fertility rate of 2.7 births per woman in South Asia and more than twice the average total fertility rate of 2.2 births per woman in Latin America and the Caribbean (24,25). In addition, estimates from the 2015-16 Malawi Demographics and Health Survey (MDHS) show that the contraceptive prevalence rate in Malawi was 45.2 percent among all women of reproductive age (ages 15-49) and 59.2 percent among married women of reproductive age. These estimated contraceptive prevalence rates are a significant increase from the 32.6 percent and 46.1 percent prevalence rates for all women and married women, respectively, from the 2010 MDHS; nevertheless, unmet need for family planning has remained high, with an estimated 18.7 percent of women in Malawi reporting to have an unmet need for spacing or limiting births (25). Injectable contraceptives were the most popular method in Malawi in 2010 and were used by 22.5 percent of women, followed by IUDs and female sterilization at 9 percent and 8.3 percent, respectively (25). The method mix of women has not changed significantly over time among married women in Malawi, as injectable contraceptives, IUDs, and female sterilization remain the most popular methods among married women and are used by 30 percent, 11.5 percent, and 10.9 percent, respectively (25).

When compared to antenatal care, utilization of postpartum maternal health care services remains low in Malawi. While 97.6 percent of pregnant women received antenatal care from a skilled professional between 2012 and 2017, 57.6 percent of new mothers did not receive any postnatal care within the immediate postpartum period (within 48 hours following a birth) (25). While a range of maternal health programs have attempted to combine PPFP with existing maternal health services, these programs continue to face difficulties in reaching significant portions of the population. Prior studies have shown that women in Malawi, and in Sub-Saharan Africa more generally, face a range of barriers to accessing high quality postpartum care, including: 1) informational barriers (lack of awareness or knowledge of postpartum care options); 2) physical barriers (distance to care, long travel times to health facilities, high cost of transport, poor access to effective transport options); and 3) barriers that impede effective service provision (long waiting times at clinics, user fees for services, lack of availability of services and supplies, poorly trained service providers, among others) (26). Additionally, women and children often receive postnatal care from different locations and through different providers, which often compels a woman to make the choice to seek care for her child at the expense of her own care (27). These barriers to access are common to interventions that aim to increase access to and utilization of postpartum health care services, including PPFP, and are key barriers that we aimed to address when designing our intervention.

Addressing Barriers to Contraceptive Use

Our family planning intervention is designed to address key barriers that women in urban Malawi face when seeking and accessing reproductive health services. When considering family planning within the larger context of maternal and reproductive health, we identified both barriers to access that are particular to family planning care-seeking behavior and utilization in addition to more common barriers to access (e.g. geographic barriers, financial accessibility constraints, etc.) (28). Fear of contraceptive-related side effects has been identified as one of the most commonly cited barriers to family planning utilization and continuation and is consequently a key contributing factor to unmet need for family planning, particularly in Malawi where hormonal methods of contraception, such as the injectable contraceptive (Depo-Provera), are the most widely used (22,23,29). In recognizing the role of contraceptive-related side effects on uptake and continuation, we include family planning counseling sessions that specifically focus on informing women in the treatment group about side effects and that aim to address myths and misperceptions around contraception. In addition, we provide women in the treatment group with access to free over-the-phone consultations with a doctor, a service that women may utilize in the event that they may experience contraceptive-related side effects.

PPFP Interventions

Postpartum contraceptive use is unique in that women are amenorrheic following their delivery and often may delay returning to contraceptive use for a period after the birth. This implies that the goals of PPFP interventions must not only consider the role of PPFP on family planning use but also on the time that it takes for women to return to consistent use family planning methods. Unlike any other time in a woman's reproductive life, postpartum women may rely on their state of amenorrhea as a form of natural family planning and can extend the duration of amenorrhea through exclusive and intensive breastfeeding (known as the lactational amenorrhea method or LAM). However, reliance on this method can be problematic as women are often uncertain as to whether they are indeed amenorrheic (27). This uncertainty implies that the objectives for PPFP should consider the extent to

which women can complement or substitute LAM with methods of family planning during the postpartum period in order to minimize unwanted pregnancy and optimally space births.

Interventions that target postpartum women and aim to increase postpartum contraceptive use can be classified into three broad categories. The first category of interventions are antepartum interventions that often seek to reach women during antenatal care. These interventions can be effective as they aim to anchor behavioral change prior to delivery. The second category of interventions are postpartum interventions that target women at different times during the postpartum period through counseling and service outreach. The final category, which our study falls into, are interventions that target women both during the antenatal as well as postnatal periods. These interventions seek to both promote postpartum contraceptive use during the antenatal period through counseling as well as support women in achieving their contraceptive preferences during the postpartum period.

Antepartum Interventions

Studies of family planning service provision during the antenatal period have typically focused on integrating family planning counseling into previously established antenatal health services. Possibly the most pertinent lesson to be learned from the antenatal family planning literature is the importance of multiple counseling sessions. Multiple studies have attempted to increase contraceptive use through low intensity counseling and found few, if any, impacts. Akman et al. (2010) approached women in Turkey with a single 30-minute family planning counseling during third trimester prenatal care and found no significant difference between in modern postpartum contraceptive use 6 to 9 months following the study, concluding there was little advantage to the counseling relative to an educational leaflet (30). Similarly, Smith et al. (2002) used a cross-country study in Scotland, South Africa, and China to test the effect of a 20-minute antenatal counseling session and found no evidence of a differential in pregnancy rates or contraceptive rates during the first year after birth across all three countries (31). In contrast, studies that utilized multiple counseling sessions showed promising results. A trial by Adanikin et al. (2013) in Nigeria evaluated outcomes for women in the treatment group, who received multiple family planning counseling sessions during the prenatal period, against the standard of care, where women received one family planning counseling session and found that 57 percent of women in the treatment group reported using contraceptives at the 6 month follow up compared to 35 percent of women in the control group (32).

Postpartum Interventions

While our study does not focus exclusively on the provision of family planning to women during their postpartum period, we draw insights from prior PPFP interventions that have been conducted in low- and middle-income countries. Postpartum interventions can generally be classified into two categories: interventions that target women after the birth but before they are discharged from a health facility or place of delivery (immediate PPFP interventions), and interventions that target women following their discharge from their place of delivery.

Results from PPFP interventions prior to discharge have been positive. Foreit et al. (1993) conducted a study at the Peruvian Social Security Institute where they provided women with family planning counseling and an opportunity to have a postpartum IUD (PPIUD) inserted prior to discharge. Results from this study showed that 25 percent of women in the treatment group opted for the PPIUD to be inserted before discharge; moreover, the contraceptive prevalence rate in the treatment group was 13

percentage points higher than in the control group six months postpartum (33). Saeed et al. (2008) offered women in Pakistan a 20-minute counseling session and an educational leaflet prior to discharge and found that contraceptive prevalence in the treatment group was 57 percent between 4 and 9 weeks postpartum, compared to a 6 percent contraceptive prevalence rate in the control arm (34). Sayed and Mosley (1976) offered a similar package of services to women in Lebanon and found that contraceptive use in the treatment group was 37 percent at 4-9 weeks postpartum and 18 percent in the control group (35), while Tawfik et al. (2014) provided women with family planning services in before discharge in Afghanistan and found that pregnancy at 18 months postpartum was 19 percent lower in the treatment group than in the control group, indicating that the impact of PPFP interventions can also contribute to reducing the risk of shortly-spaced pregnancies.

Several intervention studies have also aimed to expand access to PPFP by conducting home visits as a means to promote family planning utilization. Alvarado et al. (1999) used this approach in Chile by conducting home visits and offering PPFP and breastfeeding counseling information to women. The study found no significant increase in contraceptive use as a whole but did find an impact on the overall of contraceptive method mix (36). This effect of counseling on the postpartum method mix suggests that PPFP may facilitate new mothers to better realize their contraceptive preferences. However, as was the case with antepartum FP interventions, the intensity of the intervention plays an important role in postpartum contraceptive use and outcomes. Bashour et al. (2008) conducted four postnatal home visits with women in Syria and added family planning counseling in the last visit; results from this study showed that the single PPFP counseling session did not have an effect on PPFP use or other PPFP outcomes (37).

Studies have also been conducted to evaluate the impact of timing of service provision on PPFP outcomes. Bolam et al. (1998) distributed PPFP services to women either before, after, or both before and after discharge from their facility of delivery and found that women who received family planning before discharge had consistently higher contraceptive use six months postpartum (38). This suggests that targeting women directly after birth while they are primed to receive information about their child may be more effective than waiting until after she is discharged from care. However, since many women do not deliver in facilities, pre-discharge interventions may fail to reach those underserved populations who may benefit from services the most (26).

"Before and After" Interventions

The evidence supporting both antenatal and postpartum interventions suggest that combining the two treatments may result in the most effective programs. Vernon et al (1993) piloted this approach in Honduras by providing women with antenatal educational pamphlets as well as postpartum individualized counseling and found that contraceptive use among women who received both interventions was 38 percentage points higher than women who received only one of the interventions (39). More recently, Abdel-Tawab et al. (2008) adopted a similar approach by introducing PPFP messages during antenatal care followed by home visits that included family planning counseling. The authors observed a 17 percentage point higher contraceptive uptake rate 6 months postpartum (40). Similarly, Ahmed et al. (2015) offered a package of PPFP services in Bangladesh and found similar results for contraceptive use; in addition, the authors also found that pregnancies in the first year declined as a result of the program (41).

A comparable study to ours is the intervention conducted by Sebastian et al. (2012), who conduct home counseling visits and follow-up postpartum care with pregnant women in Uttar Pradesh, India.

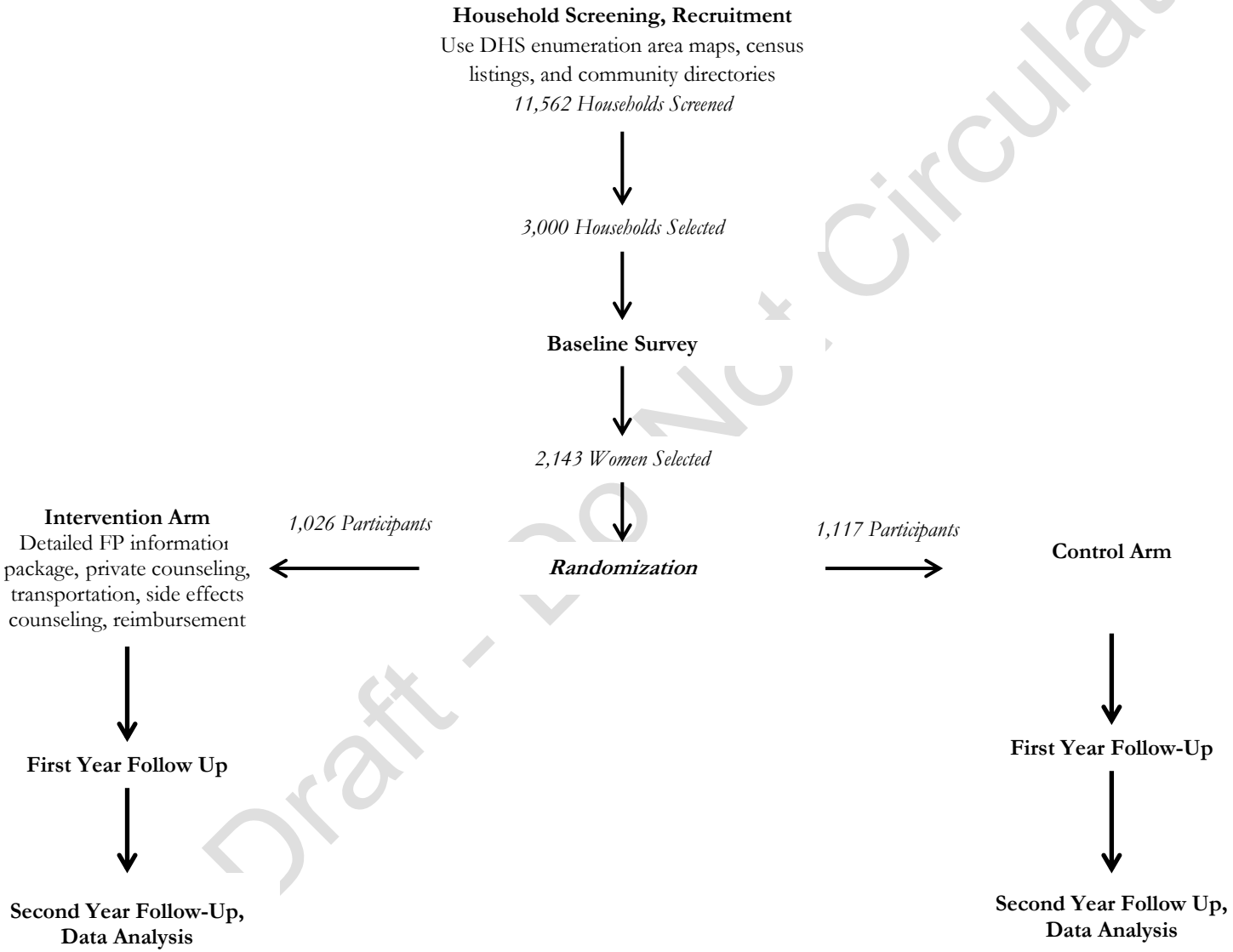
Findings from this study show that women in the treatment group demonstrated increased awareness of healthy birth spacing and increased their utilization of postpartum contraception 9 months following their delivery (42). Our intervention design is motivated by this approach. By opting for home-based counseling visits before and after birth as well as addressing transportation and financial barriers to care, we adopt a holistic approach towards improving access.

Study Design

This study is a two-armed randomized control trial that consists of a baseline survey that was implemented from September 2016 to January 2017, followed by implementation of the two-year family planning intervention starting in November 2016, two months after the start of the baseline. Two follow-up surveys were conducted one and two years after the baseline survey, respectively. Data collection for the first follow-up survey began in August 2017 and was completed in February 2018, and data collection for the second follow-up survey began in August 2018 and was completed in February 2019. This paper presents findings on first-stage outcomes related to contraceptive use from the baseline, first-year follow-up survey, and second-year follow up survey.

Figure 1 outlines the general framework of the entire field experiment.

Figure 1: Experimental Framework



Study Sample

For the study, we recruited women who, at the time of the baseline survey:

1. Were married
2. Were either currently pregnant or had gave birth within 6 months from the time of the baseline screening
3. Were between the ages of 18 to 35
4. Lived in the city of Lilongwe

Women who successfully met these criteria and consented to participate in the study were recruited. In addition, no two eligible women were enrolled from the same household. If multiple women from the same household were potentially eligible to be recruited based on the four inclusion criteria above, the youngest eligible woman from the household was chosen to participate. In addition, we ensured that eligible women who were selected for the study were sufficiently distant (at least 5 households apart) from each other, which served to reduce any spillover effects.

In addition, one member from the recruited woman's household was identified and selected to respond to sections in the baseline and follow-up surveys that inquired about household expenditures, assets, and consumption. The household member whom we selected for this part of the study:

1. Was over 18 years old.
2. Was a resident of the same household from which the woman respondent described above was selected.
3. Claimed to be knowledgeable about the household's financial status, consumption, and expenditure

The household member who successfully met these inclusion criteria and who consented to participate in this part of the study will be recruited to participate.

Finally, we collected child anthropometric data (height, weight, and anemia status) at baseline and will do so again at the two follow-ups. The children who were selected from the household for this part of the study:

1. Were under the age of 6.
2. Were identified as the biological or adopted children of the woman who was recruited for the main part of the study.
3. Resided in the same household as the eligible woman.

Children who successfully met these inclusion criteria and whose mothers consented to them participating in this part of the study were recruited to participate.

Randomization

Following the baseline survey, women who consented to participate in the study were individually randomized into one of two experimental arms: an intervention arm or a control arm. A woman who was assigned to the intervention arm was presented with a family planning intervention package that included 1) a detailed family planning information brochure on the benefits of family planning and healthy birth spacing as well as six private counseling sessions with a trained family planning counselor, 2) a free transportation service to our partner family planning clinic, the Good Health Kauma Clinic in Lilongwe, and 3) free medical consultation and a referral service from a doctor to seek care in the event that she experiences side effects. Women were randomized to intervention and control groups such that intervention assignment was balanced according to the following baseline characteristics: neighborhood/household cluster, distance to the nearest family planning clinic, number of living

children, months since last live birth, current use of family planning, age of marriage, educational attainment, and household wealth.

The Intervention

Women assigned to the intervention arm were offered the following three intervention components over a two-year period:

Transportation Component

Women were offered a free transportation service from their homes to the Good Health Kauma Clinic. The transportation service was provided by a driver who was hired and trained by our local implementation partner in Malawi, Innovations for Poverty Action (IPA Malawi). Women received the driver's phone number and were instructed to contact the driver to transport them to the Good Health Kauma Clinic during the clinic's normal working hours, which are between 8 AM and 5 PM from Monday to Saturday. The driver maintained a daily schedule of the women who requested his services, and women were instructed to notify the driver at least one day before they wished to go to the clinic to make sure that the driver was able to transport them. The driver also provided one day's advanced notice to the Good Health Kauma Clinic to inform them of how many women from the study could be expected to attend the clinic on the following day. The Good Health Kauma Clinic assured the project team that women in the intervention arm who come for services would not have to wait more than 1 hour before being seen by a medical professional. In addition, one of our female field managers from IPA Malawi accompanied the driver at all times. While all women in the intervention arm were presented with pictures of the field team (and could therefore recognize our team members), the presence of another woman in the vehicle served to minimize potential stigma associated with a woman traveling alone in the company of another man.

Counselling Component

Women who are assigned to the intervention arm were also offered free, private family planning counseling sessions over the two-year intervention period. Counseling sessions were provided by trained counselors and included a risk assessment for clinical methods and detailed information on methods switching, side effects associated with each method, the benefits of contraception, birth spacing, and dual protection. Consultations were designed to promote informed choice by discussing common misperceptions that surround family planning and use of modern contraceptives. Women received a detailed information brochure on birth spacing and side effects and also received counseling on both modern and natural family planning methods, including fertility-awareness methods (Standard Days Method, Cycle Beads). Strategies on how to communicate family planning messages with partners and on how to increase partner awareness were conveyed during sessions. Counseling sessions were scheduled to last no more than one hour per session and were administered in a private room by a counselor who was trained to provide family planning and reproductive health services. Counselors were hired and trained by IPA Malawi, and we enlisted the support of the Malawi RHD and several international NGOs who work on family planning, including Population Services International (PSI), Banja La Mtsogolo (BLM) and FHI360, to help us develop training materials, brochures and flyers, and other counseling resources. We also collaborated with the Malawi RHD, BLM, and PSI to assist with the counselor training. Women in the intervention arm received a total of six counseling sessions, one comprehensive 90-minute session just after administration of the baseline (within one month) and five shorter 45-minute follow-up sessions that were spaced out over

the two-year intervention period. The first session introduced women to the range of available family planning methods and counselled women on side effects. At this first session, counselors also informed women in the intervention arm about the transport service (described above) and side effects management service (described below) that were available to them and provided women with the necessary information on how to access these services. Counselors also provided their phone numbers to women and were on call over the course of the study period to respond to any questions and concerns.

Financial Reimbursement Component

Finally, women who were assigned to the intervention arm were financially reimbursed for any out of pocket expenditures that they incurred for receiving family planning care at the Good Health Kauma Clinic. Costs that were reimbursed at the Good Health Kauma Clinic included costs related to the procurement of family planning medications and contraceptive methods, family planning consultation fees, lab test fees, and exam fees. The reimbursement allowance for each woman was in the amount of 17,500 MKW ($25.00 USD) and could be redeemed by the woman over multiple visits at the Good Health Kauma Clinic over the two-year intervention period. For every family planning service that the woman received, the cost of the service was deducted from her 17,500 MKW reimbursement allowance.

In addition, women who were assigned to the intervention arm and who experience any side effects due to contraceptive use over the course of the two-year intervention period received a series of services for the treatment of side effects. In the event that a woman in the intervention arm experienced a side effect or contraindication, she could contact a trained Obstetrician-Gynecologist at the Kamuzu College of Medicine in Lilongwe, via telephone and would receive advice on how she can best seek care. The doctor would conduct a preliminary telephone consultation and would refer the woman over the phone to seek care at their nearest public clinic, public hospital, or the Good Health Kauma Clinic. All women in the intervention arm also received an "emergency package" during the first counseling visit from the counselor (see above). This "emergency package" consisted of a) a transport voucher, equivalent to an estimated 6,500 MWK ($9.28 USD) and b) a mobile phone credit scratch-off card for the mobile provider of their choice, equivalent 500 MWK ($0.72 USD). This "emergency package" was given to all women in the intervention arm, regardless of whether they took up any intervention component or not and regardless of whether they experienced a side effect or not. The counselor informed the woman that, in addition to the other side effects management services mentioned above, the woman could use the "emergency package" that she was given to cover: 1) any phone airtime costs that she used to have a consultation with one of the doctors who are on call, and 2) any emergency transport costs (taxi) she incurred to travel to a health facility where she can receive treatment for her contraceptive-related side effects. The transport voucher could be presented to any taxi driver in the city of Lilongwe, and the taxi driver would, in turn, redeem the voucher at the IPA Malawi office in exchange for cash equivalent to the cost of the trip. The woman was asked to keep receipts of any costs she incurred at the health facility so that she could be reimbursed later. Costs for which the woman could be reimbursed included: costs of medications and lab tests, costs of additional consultations at the health facility, and costs of switching or discontinuing methods. The maximum reimbursement amount that a woman was eligible to receive for the treatment of family planning related side effects or contraindications is 35,000 MWK ($50.00 USD) over the two-year intervention period. The reimbursement could apply to covering the cost for treatment for side effects for all family planning methods used by the woman and regardless of where the method or treatment was procured.

All reimbursements for an incurred cost were distributed as closely as possible to the time that the reimbursable cost was incurred.

Control Arm

Women who are assigned to the control arm received a package of publicly available literature and information on the benefits of family planning as well as information about their nearest family planning clinic. This information package was delivered to all women at the time of the baseline interview. Women in the control arm were only be re-contacted by the research team at follow-up.

Follow-Up

At the designated one-year and two year follow-up periods, the entire study sample of women were resurveyed so as to create a panel of individual women in which each woman and household would be observed over three time periods. The first follow-up survey was completed with 1,773 women in February 2018, and the second follow-up survey was completed with 1,515 in February 2019. This paper presents findings on first-stage outcomes related to contraceptive use from the baseline, first-year follow-up survey, and second year follow-up survey.

In each follow-up round, we collected survey data on short-term, intermediate, and longer-term outcomes of interest, including:
Attitude/Knowledge of Family Planning, including: knowledge of family planning; knowledge of birth spacing and timing; and perceptions toward contraception (including intentions to use).
Contraceptive Use, including: changes in contraceptive prevalence; changes in method mix; and adherence to methods (compliance, discontinuation).
Pregnancy and Fertility Outcomes, including: pregnancy status; parity; delivery in a facility; months since last birth; wantedness of last birth; and intentions to become pregnant in future.
Child Anthropometric Outcomes, including child height, weight, and anemia status for all children born after the start of the intervention.
Sexual and Marital Satisfaction: Our study also examines the role of contraceptive use on a couple's sexual pleasure and functioning is an overlooked and under-studied channel in the literature on women's family planning decision-making. Prior studies have found that a woman's contraceptive choice is strongly based on the perceived and actual impact of utilization on their sexual well-being and satisfaction (43,44). These perceptions have been shown to impede contraceptive use and continuation, and particularly among barrier methods such as condoms which are often perceived to limit sexual pleasure during intercourse (45). Women and men alike prefer to sex to be spontaneous, unplanned, and uninterrupted, thereby making long acting methods such as the injectable, implant, and IUD appealing. These methods offer protection against pregnancy while both minimizing the obstructive nature of contraceptives (particularly for men) and maintaining what is often referred to as "sweetness" in Southern Africa (43). Given the key role that spousal approval plays in women's contraceptive use, women in Malawi must also factor the impact of their choice of contraceptive method on their partners' sexual pleasure and satisfaction (in addition to their own) into their decision-making (43,46,47). Taken together, the role of sexual satisfaction and spousal dynamics cannot be overlooked by any interventions that aim to promote contraceptive use.
Women's Anthropometric Outcomes, including height, weight, and anemia status.
Women's and Children's Educational Attainment, including time spent in school; type of school (public or private) attended, and the highest educational qualification achieved

Weeks Worked, Income, and Women's Employment, including women's time use (time spent on childcare versus household and income-generating activities) and sources of household income.
Household Assets and Wealth, including changes in asset ownership over time.
Expenditures, in particular changes in food expenditures and durable expenditures over time.

Results

Baseline Recruitment and Randomization

Field activities for the baseline survey (wave 1) for the Malawi Family Planning Study (MFPS) began with field staff hires, training, and piloting of the survey instrument in July 2016 and continued through August 2016. Official data collection for the baseline survey began in September 2016, and the last respondents were interviewed at the end of January 2017. During the five-month baseline survey period, 11,562 households were approached, and women in these households were screened based on the pre-defined eligibility criteria; that is, 1) they lived in Lilongwe, 2) they were between the ages of 18-35, 3) they were married, and 4) they were either pregnant or up to 6 months postpartum at the time of the screening. Based on the eligibility screening, 2,370 women (20.5 percent) of women in these households were eligible to participate in the study. Of these 2,370 women, 2,208 women (93.1 percent) agreed to go through the consent form with the enumerator, and 2,078 women (94.1 percent) of the women who agreed to go through the consent form consented to participate and were subsequently enrolled in the study. This consenting sample of 2,078 women constitutes 87.7 percent of the eligible sample. Of these 2,078 women, 2,055 women (98.8 percent) completed the baseline survey and were eligible to be randomized into the intervention or control groups. From this baseline sample, 985 women were randomly assigned to the intervention group while the remaining 1,070 women were randomly assigned to the control group. In addition to the 2,055 women who were selected for the main study, 88 women were interviewed as part of a preliminary pilot study to test the feasibility of the survey instruments and implementation of the intervention. As part of the intervention rollout, these 88 respondents were also randomized into treatment (N = 41) and control (N = 47) groups. The final analytic sample for the baseline survey is comprised of 2,143 eligible women, of whom 1,026 women were randomized into the treatment group, while 1,117 women were randomized into the control group. Figure 2 below presents the screening, recruitment, and randomization process.

Figure 2: Flowchart of Recruitment and Final Sample

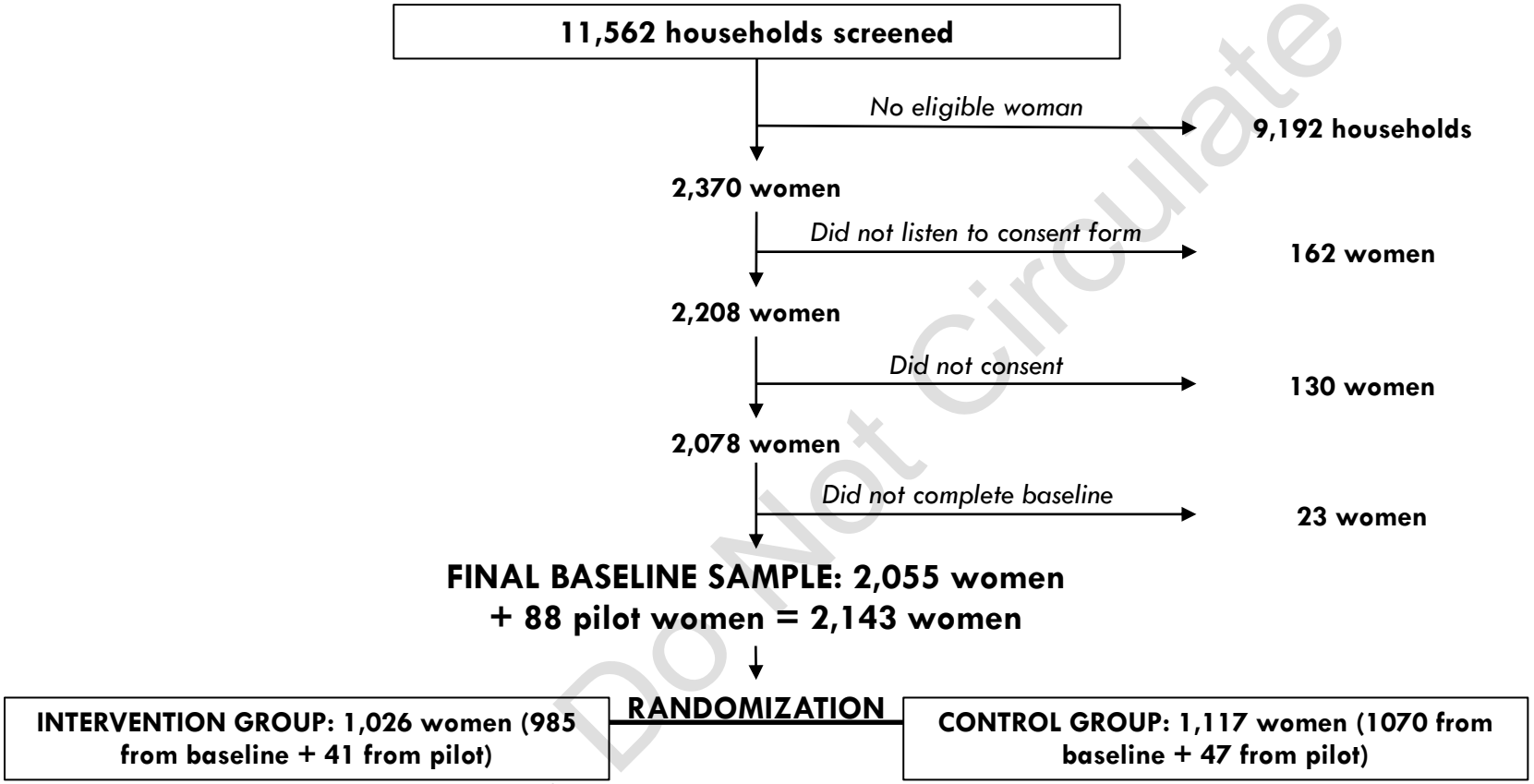


Table 1 presents descriptive statistics from the baseline data collection on the final sample of 2,143 women who were selected for the study. Additional descriptive statistics on the baseline sample are presented in the Appendix.

Table 1: Baseline Descriptive Statistics

Variable	Mean
Household Variables (HH Questionnaire)	
Household Characteristics	
Number of members in HH	3.98
Has electricity (1 = yes)	0.160
Share toilet? (1 = yes)	0.831
Has a TV? (1 = yes)	0.201
Has a fridge? (1 = yes)	0.059
Cooking in home? (1 = yes)	0.156
Owns a cell phone (1 = yes)	0.765
Own a car / truck? (1 = yes)	0.018
Own a bicycle? (1 = yes)	0.309
Follow-Up Information	
Photo of respondent? (1 = yes)	0.847
Photo of household? (1 = yes)	0.798
Plans to move in next 6 months (1 = yes)	0.194
Woman Variables (Woman Questionnaire)	
Respondent Background	
Age of respondent (years)	24.58
Ever attended school (1 = yes)	0.986
Can read in English? (1 = yes)	0.561
Can read in Chichewa? (1 = yes)	0.826
Reproduction	
Ever given birth? (1 = yes)	0.896
Total number of births	1.86
Total number of children alive	1.74
Currently pregnant (1 = yes)	0.516
Months pregnant	5.60
Wanted to get pregnant at that time (1 = yes)	0.556
Had a miscarriage, stillbirth, abortion (1 = yes)	0.134
Contraception	
Among non-pregnant, current use FP (1 =yes)	0.492
Among pregnant, ever use of FP (1 = yes)	0.692
Last amount spent on FP (MWK)	250.02
Waiting time for FP (mins)	37.85
Travel time (mins)	31.9
Travel distance for FP (km)	3.59
Counselled on FP in last pregnancy (1 = yes)	0.058
N	**2,143**

Variable	Mean
Woman Questionnaire Cont'd	
Pregnancy and PNC	
Menstrual cycle returned (1 =yes)	0.64
Birthweight from health card (kg)	3.22
Had sex since birth (1 =yes)	0.484
Months after birth before sex	2.22
Breastfed child (1 = yes)	0.994
Still breastfeeding (1 = yes)	0.993
Age of youngest child (days)	90.5
Marriage and Sexual Activity	
Husband living with woman?	0.972
Husband have other wives?	0.037
How old when live with man?	18.9
How old when first had sex?	17.4
Fertility Preferences	
Want more children?	0.569
Ideal no. of boys	1.43
Ideal no. of girls	1.44
Ideal no. of children	3.19
Heard FP on radio?	0.395
Does husband know of FP use?	0.956
W8: Husband Background	
Husband ever attend school?	0.976
Husband works?	1.00
Covered by health insurance?	0.023
W12: Labor and Employment	
Woman works?	0.243
Husband works?	1.00
Time Use	
Not busy enough (1 = yes)	0.532
Children with her while worked?	0.743
Respondent took care while worked?	0.830
Woman and Child Anthropometrics	
Woman height (cm)	154.9
Woman weight (kg)	60.1
Woman anemia status (g/dl)	11.05
Child under 5 height (cm)	73.7
Child under 5 weight (kg)	9.31

Intervention Monitoring

Rollout of the multi-component family planning intervention to women assigned to the intervention group began shortly after the launch of the baseline survey in September 2016. Six family planning counselors (registered nurses and midwives with prior counseling experience in family planning) were identified in mid-September 2016 and were trained through October 2016 to administer six counseling sessions in women's homes over a two year intervention period. The counselors were first trained by the MFPS management team in field enumeration techniques, mapping and tracking of clients (women assigned to the intervention group), electronic data collection, and field monitoring. The counselors were then trained in the provision of family planning counseling services from a master trainer from the Malawi Reproductive Health Directorate (RHD), with collaboration and support from the Malawi Ministry of Health (MOH). Counselor training topics included: 1) return to fertility; 2) healthy spacing and timing of pregnancies (HTSP); 3) the links between birth spacing and maternal and child health outcomes; 4) contraceptive methods, including their uses, relative effectiveness, side effects and contraindications, and other related information; 5) myths and misconceptions associated with family planning; and 6) partner engagement and family planning communication strategies. Training materials (counselling flip charts, family planning demo kits, brochures and flyers, etc.) were provided by the RHD, and a family planning brochure that covered the four topics described above was developed in collaboration with the RHD. Counseling of clients in the intervention group began in November 2016 and concluded in March 2018, at which time counselors may have completed up to six visits with each client.

In addition to hiring six counselors, the MPFS management team hired and trained a licensed taxi driver in October 2016 to assist with the implementation of the transportation component of the intervention. The taxi driver was contracted to be dedicated to the project and, in particular, was responsible for working with the management team to respond to clients' transport needs to and from the Good Health Kauma Clinic, or any other clinic or hospital of the client's choosing. In October 2016, the management team also identified an obstetrician at the Kamuzu College of Medicine to be the "medical doctor on call." The obstetrician was asked to be responsible for: 1) answering any calls from clients; 2) providing any support or consultation services over the phone, to the best of his ability; and 3) referring any clients who may be experiencing health concerns, particularly those related to their use of family planning, to the management team for follow-up.

Counseling activities with women in the intervention group concluded in March 2018; however, other intervention activities (providing transportation to women to visit the Kauma Clinic for services, providing financial reimbursements to women for any family planning services that they obtain) will continue until February 2019.

Randomization Balance

Field activities for the Year 1 follow-up survey (wave 2) for the MFPS began with field staff hires, training, and piloting of the follow-up survey instrument in July 2017 and continued through August 2017. Official data collection for the baseline survey began in August 2017, and the last respondents were interviewed at the end of February 2018.

During the first year follow-up survey period, a total of 2,092 women (which includes the full sample of 2,055 women from the main study and an additional 88 women that were interviewed at baseline as part of the pilot phase of the study, but not including 51 women who withdrew from the study prior to the start of the year 1 follow-up survey) were selected for follow up at their homes. Field enumerators visited women's homes up to three times to complete the survey. In the event that

respondents were unavailable for a home visit, field enumerators would complete an abbreviated version of the survey with women over the phone.

Table 2 presents a balance table of baseline characteristics by treatment group; additional variables on which balance was assessed are presented in the Appendix. Women in the treatment group lived slightly further away from a health service provider and paid slightly more in transport costs to seek care. On average, however, the two groups were balanced across a wide range of variables.

Table 2: Balance Table of Key Baseline Covariates by Treatment Group

	(1) Treatment	(2) Control	(3) Difference
Current Use of FP (1 = Yes)	0.494	0.491	0.033
Ever Use of FP (1 = Yes)	0.708	0.661	0.048**
Woman's Age (Years)	24.66	24.51	0.142
Total Number of Children	1.773	1.706	0.066
Average Education Level (1-3)	1.439	1.449	-0.010
Woman Works (1 = Yes)	0.100	0.093	0.007
Age of Sexual Debut (Years)	18.90	18.82	0.080
Counseled During Last Pregnancy	0.046	0.069	-0.023**
Distance to provider (km)	3.381	3.375	0.016
Transport Cost (MWK)	314.614	187.400	127.214**
Observations	**2,137**		

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Attrition – Year 1 Follow-Up

During the six month midline survey period, a total of 2,092 women, which includes the full sample of 2,055 women from the main study and an additional 88 women from the pilot sample, but excludes 51 women who withdrew from the study prior to the start of the midline survey, were selected for follow up at their homes. Field enumerators visited women's homes up to three times to complete the survey. In the event that respondents were unavailable for a home visit, field enumerators would complete an abbreviated version of the survey with women over the phone. A total of 1,773 women, or 84.7 percent of women who were eligible for follow-up, were successfully contacted and re-interviewed at midline. Of the 319 women who did not complete a midline survey over the six month follow-up period, 2 women were found to have died from causes that were unrelated to any study-related activities, 93 women were found to have moved to locations outside of Lilongwe and were uncontactable by phone, 43 women moved to locations within Lilongwe but were unable to be found at their new locations and were also uncontactable by phone, 172 women were found to be unavailable at their homes and were uncontactable by phone, and 9 women were contacted but refused to participate in the midline survey.

During the six month endline survey period, a total of 2,090 women, which includes the full sample of 2,055 women from the main study and an additional 88 women from the pilot sample, but excludes 51 women who were withdrawn from the study prior to the start of the endline survey and 2 women who had died from causes unrelated to the study between the midline and endline surveys, were

selected for follow up at their homes. A total of 1,669 women, or 79.8 percent of women who were eligible for follow-up, were successfully contacted and re-interviewed at endline. Of the 421 women who did not complete an endline survey over the six month follow-up period, 2 women were found to have died from causes that are unrelated to any study-related activities, 191 women were found to have moved to locations outside of Lilongwe (our study site) and were uncontactable by phone, 90 women moved to locations within Lilongwe but were unable to be found at their new locations and were also uncontactable by phone, 111 women were found to be unavailable at their homes and were uncontactable by phone, and 27 women were contacted but refused to participate in the endline survey.

Appendix Table 1 presents a balance table of baseline characteristics by treatment group for those women who completed the study and those women who did not. Women who were unavailable for re-interview were marginally younger, had slightly fewer children, and had less experience using contraception than those women who were available for re-interview, though none of these factors were significantly different at the 5 percent level.

First Year ITT

Intent to Treat: Contraceptive use

Table 3 presents unadjusted and adjusted intent-to-treat (ITT) estimates of the intervention's impact on contraceptive use at the first year follow up. Table 4 presents the OLS results for the full sample. It is accompanied by Appendix Table 2 that displays the heterogeneous treatment effects on contraceptive use broken down by women's pregnancy status, age, or education at baseline.

Table 3: ITT Estimates for the Effect of the Intervention on Contraceptive Use at One Year

VARIABLES	Current Use of FP (OLS)	Current Use of FP (OLS)
Treatment	0.0342**	0.0326**
	(0.0017 – 0.0666)	(0.0013 – 0.0640)
Woman's Age		-0.010**
		(-0.017 – -0.003)
Total No. of Children		0.014
		(-0.013 – 0.041)
Age of Sexual Debut		0.004
		(-0.003 – 0.012)
Education - Secondary		-0.008
		(-0.054 – 0.038)
Education - Higher		0.156***
		(0.083 – 0.299)
Constant	0.818***	0.810***
	(0.786 – 0.850)	(0.615 – 1.006)
Observations	1657	1649
R-squared	**0.002**	**0.037**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

In the first year, we observe a 3.42 and 3.26 percentage point increase in contraceptive use in the treatment group in the unadjusted and adjusted models, respectively. The effect seems to be largely driven by women who were postpartum at baseline, and who are therefore more likely to not be amenorrheic at the one year follow-up, and women who had obtained secondary education. At the first year, the intervention seems to have little effect on women who were pregnant at baseline (and who may be more likely to still be amenorrheic following their delivery) and women who only have primary education, suggesting that there may be an information threshold for such an intervention to be effective.

Long Acting Contraceptive Use

Multiple studies on PPFP interventions have shown that such interventions may impact the contraceptive method mix of women assigned to the treatment group (33,36,48). If such interventions increase access to long-acting contraceptives (LAC), they provide women with a wider range of options to take control of their birth choices. If this shift towards long-acting methods persists over

time, then we may observe a reduction in closely spaced births even in the absence of changes in the contraceptive prevalence.

Table 4: ITT Estimates for the Effect of the Intervention on Long Acting Method Use at One Year

VARIABLES	Current Use of LAC (OLS)	Current Use of LAC (OLS)
Treatment	0.0222	0.0158
	(-0.0228 – 0.067)	(-0.0226 – 0.058)
Woman's Age		-0.009**
		(-0.018 - -0.000)
Total No. of Children		0.031*
		(-0.002 – 0.064)
Age of Sexual Debut		0.000
		(-0.008 – 0.009)
Education - Secondary		0.009
		(-0.0312 – 0.0496)
Education - Higher		0.048
		(-0.076 – 0.050)
Constant	0.173***	0.241**
	(0.137 – 0.209)	(0.057 – 0.425)
Observations	1657	1649
R-squared	**0.001**	**0.030**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

The main results for the first year ITT on long acting contraceptive use are presented in Table 4 and are accompanied by the heterogeneous treatment effects in Appendix Table 3. In these analyses, we identify a woman as using a long-acting method if she signals that she is using male or female sterilization, an IUD, or an implant as her method of contraceptive.

In the first year, we do not observe any significant effects of the intervention on long acting method use. However, all of our reported coefficients are greater than zero, suggesting that there may be an effect with increased power and sample size, which we would obtain as more women who were pregnant at baseline transition out of postpartum amenorrhea and would therefore be at risk for a subsequent pregnancy. We do observe that the number of children that a woman had at baseline seems to have a positive effect on the use of long acting contraceptive methods. This possibly shows that as

women approach their ideal number of children, their preferences in contraceptives shifts towards long acting methods.

Sexual Satisfaction

Women and couples in Malawi value "sweetness" and spontaneity in their sex life (43). A lack of access to PPFP may create uncertainty and place a cost on women, which in turn may affect her sexual experience. To this end, expanding access to PPFP may have a secondary positive effect of enhancing the women's sexual satisfaction.

The first year ITT results for sexual satisfaction are presented in Table 5 and are accompanied by a subgroup analysis in Appendix Table 4. We find that women assigned to the treatment group report a 0.23 to 0.25 point higher sexual satisfaction score, which is reported on a scale of 1 to 10, with 1 being extremely unsatisfied with one's sex life and 10 being extremely satisfied, compared to women in the control group . In the subgroup analysis, we find significant impacts of the intervention on women's sexual satisfaction among women who were above 25 years old at baseline and among women who had only acquired primary education at baseline. In women who were over 25 years old at baseline, we find an increase in sexual satisfaction by 0.44 points. Of women that had only acquired primary education at baseline, we find a 0.21 point increase in their sexual satisfaction score.

Table 5: ITT Estimates for the Effect of the Intervention on Sexual Satisfaction at One Year

VARIABLES	Sexual Satisfaction (OLS)	Sexual Satisfaction (OLS)
Treatment	0.232**	0.248**
	(0.0265 – 0.438)	(0.0422 – 0.438)
Woman's Age		-0.042*
		(-0.085 – 0.001)
Total No. of Children		0.079
		(-0.075 – 0.232)
Age of Sexual Debut		0.0723*
		(0.002 – 0.143)
Education - Secondary		0.252*
		(-0.033 – 0.537)
Education - Higher		0.930***
		(0.301 – 1.560)
Constant	7.801***	7.242***
	(7.619 – 7.984)	(5.859 – 8.625)
Observations	1622	1614
R-squared	**0.002**	**0.031**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Marital Satisfaction

Table 6: ITT Estimates for the Effect of the Intervention on Marital Satisfaction at One Year

VARIABLES	Marital Satisfaction (OLS)	Marital Satisfaction (OLS)
Treatment	-0.035	-0.046
	(-0.219 – 0.148)	(-0.240 – 0.147)
Woman's Age		-0.027
		(-0.072 – 0.018)
Total No. of Children		0.020
		(-0.147 – 0.187)
Age of Sexual Debut		0.054**
		(0.00 – 0.108)
Education - Secondary		0.170
		(-0.051 – 0.391)
Education - Higher		0.029
		(-0.762 – 0.821)
Constant	8.617***	7.889***
	(8.415 – 8.820)	(7.072 – 8.706)
Observations	1567	1559
R-squared	**0.000**	**0.027**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 6 presents the first year ITT results for marital satisfaction and is accompanied by the subgroup analysis in Appendix Table 5. During the first year, we find no significant effect of the intervention on women's reported marital satisfaction.

Second Year ITT

We now present preliminary results from the second year follow-up.

Current Contraceptive use

Table 7 displays the second year ITT effects on contraceptive use and is accompanied by the subgroup analysis in Appendix Table 6. In the second year, we find that the effects from the first year do not persist; in particular, we find a catch-up effect in contraceptive use over time among women in the control group relative to women in the treatment group. These results are consistent with the findings of the multiple analyses of the Matlab evaluation which found relative increases in contraceptive use from family planning interventions to be largely temporary (49,50).

Table 7: ITT Estimates for the Effect of the Intervention on Contraceptive Use at Two Years

VARIABLES	Current Use of FP (OLS)	Current Use of FP (OLS)
Treatment	0.0213	0.0195
	(-0.0168 – 0.0594)	(-0.0190 – 0.0580)
Woman's Age		0.001
		(-0.004 – 0.006)
Total No. of Children		0.008
		(-0.006 – 0.022)
Age of Sexual Debut		0.003
		(-0.006 – 0.013)
Education - Secondary		0.0215
		(-0.0238 – 0.067)
Education - Higher		0.0449
		(-0.061 – 0.151)
Constant	0.842***	0.602***
	(0.805 – 0.0878)	(0.405 – 0.799)
Observations	1513	1507
R-squared	**0.001**	**0.029**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Long Acting Contraceptive Use

Table 8 displays the second year ITT effects on contraceptive use and is accompanied by the subgroup analysis in Appendix Table 7. Unlike the first year ITT, we find that long acting contraceptive use to

have increased by 5.07 percentage points among women in the treatment group, although the effect is only statistically significant to the 10 percent level. When assessing our subgroup findings, we observe a statistically significant increase in long acting contraceptive use by 6.05 percent among older women. It is possible that this effect is mostly seen in the older age group because they are closer to achieving their ideal number of children than younger women and therefore have a higher demand for long-acting methods of contraception. If this were true, our finding would suggest that the primary effect of the intervention as it pertains to the use of long acting contraceptives would be that of a facilitating mechanism to help women reach their *a priori* established fertility preferences rather than an intervention that itself changes women's fertility preferences. More specifically, our intervention may have helped women better match their stated and realized preferences by reducing barriers to access to long acting contraceptives; however, the actual demand for long acting contraceptives is likely to be determined by factors that are exogenous to the intervention. Additional analysis of the intervention impact is warranted to better disentangle these channels.

Table 8: ITT Estimates for the Effect of the Intervention on Long Acting Method Use at Two Years

VARIABLES	Current Use of LAC (OLS)	Current Use of LAC (OLS)
Treatment	0.0507*	0.0460
	(-0.0065 – 0.108)	(-0.0126 – 0.105)
Woman's Age		-0.013**
		(-0.002 – -0.002)
Total No. of Children		0.034**
		(0.002 – 0.067)
Age of Sexual Debut		0.005
		(-0.003 – 0.012)
Education - Secondary		-0.014
		(-0.071 – 0.043)
Education - Higher		-0.075
		(-0.224 – 0.0745)
Constant	0.234***	0.179
	(0.196 – 0.273)	(-0.0619 – 0.420)
Observations	1513	1507
R-squared	**0.003**	**0.034**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Sexual Satisfaction

Table 9 presents the second year ITT effects on sexual satisfaction and are accompanied by the subgroup analysis in Appendix Table 8. Unlike in the first year, we do not find an effect on sexual satisfaction.

Table 9: ITT Estimates for the Effect of the Intervention on Sexual Satisfaction at Two Years

VARIABLES	Sexual Satisfaction (OLS)	Sexual Satisfaction (OLS)
Treatment	-0.429	-0.287
	(-2.110 – 1.251)	(-1.905 – 1.331)
Woman's Age		-0.092
		(-0.374 – 0.189)
Total No. of Children		-0.207
		(-1.111 – 0.697)
Age of Sexual Debut		0.142
		(-0.199 – 0.483)
Education - Secondary		-1.435
		(-3.273 – 0.403)
Education - Higher		-0.903
		(-6.513 – 4.706)
Constant	9.846***	7.092***
	(8.654 – 11.04)	(2.960 – 11.23)
Observations	1513	1507
R-squared	**0.000**	**0.024**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Marital Satisfaction

The second year ITT effects on marital satisfaction are presented in Table 10 with the subgroup analysis presented in Appendix Table 9. We continue to find insignificant results on the full sample. However, upon further analysis, we do find a significant decrease in marital satisfaction among women who were post-partum at baseline and even though all other results are insignificant, we do find negative coefficients. If the true marital satisfaction did decrease, it may offer an explanation for the drop off in sexual satisfaction. Although inconclusive, these results serve as a word of precaution that PPFP interventions must be designed with relationship power structures and power dynamics in mind to avoid negative consequences such as domestic violence.

Table 10: ITT Estimates for the Effect of the Intervention on Marital Satisfaction at Two Years

VARIABLES	Marital Satisfaction (OLS)	Marital Satisfaction (OLS)
Treatment	-0.463	-0.497
	(-1.419 – 0.492)	(-1.439 – 0.445)
Woman's Age		-0.025
		(-0.184 – 0.134)
Total No. of Children		0.043
		(-0.501 – 0.587)
Age of Sexual Debut		0.160
		(-0.039 – 0.359)
Education - Secondary		-0.514
		(-1.329 – 0.301)
Education - Higher		-1.499*
		(-3.086 – 0.089)
Constant	9.095***	5.408***
	(8.271 – 9.918)	(1.445 – 9.372)
Observations	1394	1389
R-squared	**0.001**	**0.019**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Pregnancy and Short Birth Intervals:

A key objective of this intervention was to provide women with additional means to time and space future birth, which may lead to improved health outcomes for mother and children. In accordance with the WHO guidelines, we consider a woman to have a short birth interval if she had two pregnancies within the period of the study or if she conceived again within 24 months of the index birth that made her eligible for the study (1). We report the results for pregnancy likelihood at the second year follow-up and short birth intervals in Tables 11 and 12. Table 11 presents unadjusted and adjusted intent-to-treat (ITT) estimates of the intervention's impact on pregnancy rates at the second year follow up and is accompanied by the subgroup analysis in Appendix Table 10. In acknowledging that the eligible sample was comprised of both pregnant and postpartum women at baseline, Table 12 takes the analysis a step further and presents unadjusted and adjusted intent-to-treat (ITT) estimates of the intervention's impact on the prevalence of short birth intervals at the second year follow up and is accompanied by the subgroup analysis in Appendix Table 11.

Table 11: ITT Estimates for the Effect of the Intervention on Pregnancy Likelihood at Two Years

VARIABLES	Pregnancy (OLS)	Pregnancy (OLS)
Treatment	-0.0156	-0.0156
	(-0.0355 – 0.00424)	(-0.0348 – 0.0036)
Woman's Age		-0.000
		(-0.004 – 0.003)
Total No. of Children		-0.001
		(-0.011 – 0.009)
Age of Sexual Debut		0.001
		(-0.003 – 0.005)
Education - Secondary		-0.017
		(-0.039 – 0.036)
Education - Higher		-0.003
		(-0.093 – 0.089)
Constant	0.041***	0.002
	(0.0281 – 0.0529)	(-0.072 – 0.075)
Observations	1513	1507
R-squared	**0.002**	**0.016**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 11 shows that we cannot find a significant association on the likelihood of pregnancy at the two month in the entire sample, however the magnitude of the coefficient shows that there was a 1.56 percentage point decrease in the likelihood of pregnancy at two years among treatment women. We can however find significant associations among women who were not pregnant at baseline and women who have only obtained a primary education; in particularly we were able to identify a 2.8 to 3.1 percentage point decrease in the likelihood of pregnancy in the second year.

Table 12: ITT Estimates for the Effect of the Intervention on Short Birth Intervals at Two Years

VARIABLES	Short Birth Intervals (Logit)	Short Birth Intervals (Logit)
Treatment	-0.455***	-0.404**
	(-0.769 – -0.141)	(-0.715 – -0.093)
Woman's Age		0.028
		(-0.059 – 0.114)
Total No. of Children		-0.035
		(-0.298 – 0.228)
Age of Sexual Debut		-0.002
		(-0.094 – 0.090)
Education - Secondary		-0.344*
		(-0.691 – 0.003)
Education – Higher		-0.350
		(-1.626 – 0.925)
Constant	-2.554	-1.419
	(-2.873 – -2.235)	(-2.941 – 0.102)
Observations	1513	1467

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: For both columns, the unit of observation is a woman. Odds ratios from a logistic regression are presented with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 12 reports the odds ratios of short birth intervals and presents the most important results of the study. We find that women in the treatment group have a 54 to 59 percent lower odds of having a short birth interval compared to women assigned to the control group. In analyzing the heterogeneous treatment effects, the change seems to be rather homogeneous across subgroups. These results seem indicate that targeting barriers to access to PPFP is likely to be an effective strategy to increase women's control over birth spacing and decrease the number of poorly timed births. Theoretically, this decrease in poorly spaced births will have positive health outcomes for mothers and children, which we aim to analyze using data from the second year follow-up (results pending).

Discussion

Through this study, we find results that suggest improvements in access to family planning have strong and significant effect on first stage outcomes (contraceptive use, adoption of long-acting methods, sexual satisfaction) as well as intermediate stage outcomes (short birth intervals, likelihood of pregnancy at two years). In particular, we find a 3.42 to 3.26 percentage point increase in contraceptive use in the first year. However, we find that the effect on contraceptive use does not persist past the

first year as use among women in the control group also increased over time. While this causal estimate seems to contribute to the existing literature on PPFP, the dissipation of the effect following the second year is consistent with the results from the Matlab program in Bangladesh (49,50). In reconciling our findings with the existing evidence, it is difficult to interpret the absolute magnitude of our causal estimate given baseline contraceptive use in our study sample was significantly higher than baseline use from other studies. With this said, we continue to find a 5.06 percentage point increase in long-acting contraceptive use. This finding is consistent with prior studies that show the positive impact of PPFP interventions on postpartum contraceptive method mix (36,48).

Our preliminary findings from the one-year follow-up also show a significant causal impact of the family planning intervention on women's sexual satisfaction, however the result again seems to disappear upon second year follow up. The implications of this result demonstrates a need for a more comprehensive examination and measurement of the potential multidimensional welfare benefits of family planning, where a woman's perceived utility of and preferences for family planning may not be simply a function of "averting losses", i.e. minimizing or averting adverse outcomes (i.e. unwanted or mistimed pregnancies), but rather also a function of "maximizing gains," where family planning is also likely to contribute positively to her welfare beyond just the fertility domain.

In the second year follow up, we find a significant decrease in short birth intervals (inter-birth intervals of less than 24 months), with odds ratios indicating a decrease in the relative risk of closely spaced births by almost half. This causal estimate demonstrates that increased access to family planning can have a positive impact on a woman's control over birth spacing and fertility choices. Having shown the causality between PPFP and proper birth spacing, further avenues of research are now available through this study, such as examining if the decrease in short intervals leads to better health and socioeconomic outcomes for women and their children. These avenues are presently being explored.

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Competing Interests

The authors declare that no competing interests exist.

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Appendix

Table 1: Balance Table of Key Baseline Covariates Comparing Women Lost to Follow up

	All Participants		Remaining Participants		Lost to Follow-up		Difference
	Treatment (N=1,021)	Control (N=1,115)	Treatment (N=723)	Control (N=791)	Treatment (N=298)	Control (N=324)	
Ever Use of FP (1 = Yes)	0.708	0.661	0.808	0.761	0.709	0.688	0.021
Woman's Age (Years)	24.66	24.51	24.97	24.86	23.88	23.63	0.246
Total Number of Children	1.773	1.706	1.855	1.809	1.579	1.467	0.112
Average Education Level (1-3)	1.439	1.449	1.481	1.457	1.332	1.425	-0.092*
Woman Works (1 = Yes)	0.100	0.093	0.101	0.101	0.095	0.075	0.02
Age of Sexual Debut (Years)	18.90	18.82	19.02	18.75	18.66	18.95	-0.288
Counseled During Last Pregnancy	0.046	0.069	0.053	0.069	0.030	0.069	-0.038*
Distance to provider (km)	3.381	3.375	3.304	2.871	2.895	3.960	-1.065
Transport Cost (MWK)	314.614	187.400	206.7	178.9	225.4	166.7	58.724

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Table 2: ITT Estimates for the Effect of the Intervention on Contraceptive Use at One Year

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Treatment	0.0134	0.0522*	0.0317	0.026	-0.000	0.0713***
	(-0.033 – 0.060)	(-0.001 – 0.112)	(-0.012 – 0.075)	(-0.027 – 0.079)	(-0.049 – 0.048)	(0.021 – 0.122)
Woman's Age	-0.012**	0.0045	-0.016	-0.005	-0.008	-0.016***
	(-0.02 – -0.001)	(-0.005 – 0.014)	(-0.031 – -0.000)	(-0.015 – 0.005)	(-0.019 – 0.003)	(-0.027 – 0.006)
Total No. of Children	0.0041	-0.039**	0.0277	0.004	0.0042	0.0469**
	(-0.037 – 0.045)	(-0.073 – -0.004)	(-0.010 – 0.065)	(-0.034 – 0.417)	(-0.031 – 0.040)	(0.007 – 0.087)
Age of Sexual Debut	0.0042	-0.006	0.0130	0.0006	-0.003	0.0156**
	(-0.008 – 0.061)	(-0.016 – 0.005)	(-0.007 – 0.033)	(-0.007 – 0.008)	(-0.012 – 0.006)	(0.003 – 0.029)
Education - Secondary	-0.036	0.006	-0.011	-0.005		
	(-0.102 – 0.030)	(-0.053 – 0.064)	(-0.072 – 0.049)	(-0.090 – 0.080)		
Education - Higher	0.236	0.073	0.175	0.150*		
	(0.137 – 0.335)	(-0.027 – 0.173)	(0.115 – 0.235)	(-0.009 – 0.309)		
Constant	0.950***	0.724***	0.834***	0.559***	1.221	0.582***
	(0.663 – 1.236)	(0.527 – 0.922)	(0.452 – 1.217)	(0.168 – 0.951)	(0.966 – 1.476)	(0.345 – 0.819)
Observations	832	817	990	659	913	694
R-squared	**0.058**	**0.040**	**0.046**	**0.072**	**0.043**	**0.077**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 3: ITT Estimates for the Effect of the Intervention on Long Acting Method Use at One Year

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.0106	0.0169	0.0655	0.0301	0.0303	0.0012
	(-0.052 – 0.073)	(-0.038 – 0.071)	(-0.057 – 0.070)	(-0.014 – 0.074)	(-0.035 – 0.955)	(-0.055 – 0.057)
Woman's Age	-0.012**	-0.007	-0.022***	0.000	-0.011*	-0.005
	(-0.023 – -0.001)	(-0.023 – 0.008)	(-0.038 – -0.001)	(-0.017 – 0.018)	(-0.217 – 0.000)	(-0.019 – 0.099)
Total No. of Children	0.061**	0.016	0.050**	0.0136	0.045**	0.000
	(0.011 – 0.111)	(-0.036 – 0.067)	(0.010 – 0.090)	(-0.023 – 0.050)	(0.010 – 0.080)	(-0.063 – 0.064)
Age of Sexual Debut	-0.000	0.001	-0.001	0.003	0.005	-0.006
	(-0.014 – 0.014)	(-0.011 – 0.014)	(-0.019 – 0.016)	(-0.067 – 0.013)	(-0.009 – 0.019)	(-0.020 – 0.093)
Education - Secondary	0.058*	-0.028	0.020	-0.000		
	(-0.008 – 0.125)	(-0.097 – 0.042)	(-0.043 – 0.083)	(-0.058 – 0.057)		
Education - Higher	0.083	0.054	0.149	-0.057		
	(-0.130 – 0.296)	(-0.114 – 0.222)	(-0.072 – 0.369)	(-0.191 – 0.077)		
Constant	0.393***	0.159	0.586***	-0.145	0.749***	0.162
	(0.167 – 0.620)	(-0.094 – 0.412)	(0.291 – 0.881)	(-0.591 – 0.302)	(0.126 – 0.216)	(-0.082 – 0.406)
Observations	832	817	990	659	913	694
R-squared	**0.055**	**0.038**	**0.061**	**0.036**	**0.050**	**0.043**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 4: ITT Estimates for the Effect of the Intervention on Sexual Satisfaction at One Year

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Treatment	0.204	0.276	0.121	0.436***	0.205**	0.290
	(-0.173 – 0.582)	(-0.115 – 0.668)	(-0.120 – 0.362)	(0.122 – 0.749)	(0.005 – 0.405)	(-0.072 – 0.652)
Woman's Age	-0.030	-0.070**	-0.021	-0.078	-0.051**	-0.016
	(-0.143 – 0.084)	(-0.138 – -0.002)	(-0.132 – 0.089)	(-0.181 – 0.026)	(-0.102 – -0.000)	(-0.087 – 0.059)
Total No. of Children	0.023	0.214**	-0.103	0.200**	0.098	0.012
	(-0.462 – 0.509)	(0.033 – 0.396)	(-0.431 – 0.225)	(0.012 – 0.388)	(-0.099 – 0.295)	(-0.244 – 0.268)
Age of Sexual Debut	0.042	0.113*	0.022	0.107*	0.074	0.063
	(-0.080 – 0.164)	(0.005 – 0.221)	(-0.075 – 0.118)	(-0.005 – 0.220)	(-0.030 – 0.178)	(-0.028 – 0.154)
Education - Secondary	0.233	0.286	0.375*	0.063		
	(-0.233 – 0.699)	(-0.152 – 0.723)	(-0.026 – 0.776)	(-0.377 – 0.504)		
Education - Higher	0.835	1.038	1.055*	0.883**		
	(-0.244 – 1.913)	(0.055 – 2.021)	(-0.215 – 2.326)	(0.0832 – 1.683)		
Constant	8.114***	6.641***	7.618***	7.972**	6.154***	7.381***
	(6.320 – 9.908)	(4.679 – 8.602)	(5.038 – 10.20)	(5.187 – 10.76)	(4.151 – 8.157)	(5.355 – 9.408)
Observations	813	801	968	646	890	683
R-squared	**0.028**	**0.060**	**0.027**	**0.079**	**0.031**	**0.037**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 5: ITT Estimates for the Effect of the Intervention on Marital Satisfaction at One Year

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Treatment	-0.060	-0.041	-0.199	0.174	-0.091	-0.014
	(-0.408 – 0.288)	(-0.324 – 0.243)	(-0.518 – 0.120)	(-0.081 – 0.428)	(-0.432 – 0.249)	(-0.383 – 0.355)
Woman's Age	-0.007	-0.021	-0.065	-0.031	-0.043	0.006
	(-0.114 – 0.099)	(-0.076 – 0.035)	(-0.159 – 0.028)	(-0.112 – 0.051)	(-0.099 – 0.014)	(-0.074 – 0.086)
Total No. of Children	-0.123	0.035	-0.088	0.101	0.024	0.005
	(-0.532 – 0.286)	(-0.139 – 0.210)	(-0.341 – 0.165)	(-0.109 – 0.311)	(-0.190 – 0.238)	(-0.283 – 0.294)
Age of Sexual Debut	0.051	0.037	0.0373	0.071	0.0671	0.049
	(-0.042 – 0.145)	(-0.051 – 0.124)	(-0.046 – 0.121)	(-0.024 – 0.166)	(-0.015 – 0.149)	(-0.039 – 0.137)
Education - Secondary	0.151	0.093	0.126	0.346*		
	(-0.207 – 0.509)	(-0.254 – 0.439)	(-0.130 – 0.382)	(-0.046 – 0.737)		
Education - Higher	-0.014	0.088	0.204	-0.048		
	(-1.055 – 0.509)	(-1.021 – 1.97)	(-1.042 – 1.450)	(-1.045 – 0.949)		
Constant	6.769***	8.443***	8.663***	8.352***	9.663***	7.115***
	(5.293 – 8.246)	(6.734 – 10.15)	(6.541 – 10.78)	(6.381 – 10.32)	(7.927 – 11.40)	(5.752 – 8.478)
Observations	792	767	923	636	853	665
R-squared	**0.030**	**0.057**	**0.039**	**0.058**	**0.028**	**0.043**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 6: ITT Estimates for the Effect of the Intervention on Contraceptive Use at Two Years

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Treatment	0.0112	0.0309	0.0019	0.0401	0.0240	0.0014
	(-0.041 – 0.064)	(-0.026 – 0.088)	(-0.054 – 0.058)	(-0.013 – 0. 093)	(-0.027 – 0.075)	(-0.055 – 0.058)
Woman's Age	-0.003	0.000	0.0085	-0.009	-0.003	0.0029
	(-0.015 – 0.009)	(-0.011 – 0.012)	(-0.008 – 0.025)	(-0.022 – 0.004)	(-0.010 – 0.004)	(-0.008 – 0.013)
Total No. of Children	0.0001	0.0271	0.0142	0.0018	0.0161	0.0003
	(-0.046 – 0.048)	(-0.008 – 0.063)	(-0.024 – 0.053)	(-0.022 – 0.026)	(-0.003 – 0.036)	(-0.046 – 0.046)
Age of Sexual Debut	0.0076	0.0027	0.0034	0.0018	-0.000	0.0101
	(-0.004 – 0.020)	(-0.010 – 0.016)	(-0.022 – 0.029)	(-0.009 – 0.012)	(-0.011 – 0.011)	(-0.007 – 0.027)
Education - Secondary	0.0253	0.0172	0.034	-0.005		
	(-0.020 – 0.070)	(-0.067 – 0.101)	(-0.016 – 0.083)	(-0.083 - 0.072)		
Education - Higher	0.0116	0.0754	0.0252	0.0459		
	(-0.193 – 0.216)	(-0.079 – 0.230)	(-0.150 – 0.192)	(-0.145 – 0.236)		
Constant	0.627***	0.604***	0.461**	0.792	0.691***	0.508***
	(0.288 – 0.967)	(0.390 – 0.819)	(0.098 – 0.824)	(0.394 – 1.189)	(0.442 – 0.940)	(0.262 – 0.754)
Observations	750	757	903	604	845	622
R-squared	**0.044**	**0.043**	**0.050**	**0.073**	**0.047**	**0.053**

* p<.1, ** p<.05, *** p<.01

Notes: For both columns, the unit of observation is a woman. The results are OLS / linear probability model results with confidence intervals each estimate. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and robust standard errors are presented.

Table 7: ITT Estimates for the Effect of the Intervention on Long Acting Method Use at Two Years

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.0203	0.0643	0.0358	0.0605**	0.0604	0.0175
	(-0.063 – 0.103)	(-0.024 – 0.153)	(-0.044 – 0.116)	(0.000 - 0.121)	(-0.021 – 0.142)	(-0.060 – 0.095)
Woman's Age	-0.013	-0.020**	-0.034	0.006	-0.017**	-0.005
	(-0.031 – 0.004)	(-0.036 – -0.003)	(-0.049 – -0.019)	(-0.014 – 0.026)	(-0.029 – 0.004)	(-0.019 – 0.009)
Total No. of Children	0.0676**	0.045*	0.064	0.003	0.0518***	-0.006
	(0.013 – 0.122)	(-0.004 – 0.095)	(0.011 – 0.117)	(-0.033 – 0.038)	(0.014 – 0.089)	(-0.062 – 0.050)
Age of Sexual Debut	0.002	0.013**	0.003	0.010	0.009*	-0.003
	(-0.087 – 0.100)	(0.001 – 0.0247)	(-0.014 – 0.020)	(-0.001 – 0.021)	(0.00 – 0.019)	(-0.015 – 0.008)
Education - Secondary	0.012	-0.031	0.014	-0.055		
	(-0.074 – 0.098)	(-0.096 – 0.033)	(-0.048 – 0.076)	(-0.136 – 0.026)		
Education - Higher	-0.073	-0.064	0.049	-0.225***		
	(-0.278 – 0.132)	(-0.250 – 0.123)	(-0.193 – 0.291)	(-0.327 – -0.124)		
Constant	0.196	0.181	0.656***	-0.459	0.419***	0.144
	(-0.071 – 0.464)	(-0.131 – 0.492)	(0.273 – 1.039)	(-1.090 – 0.171)	(0.110 – 0.728)	(-0.164 – 0.452)
Observations	750	757	903	604	845	622
R-squared	**0.057**	**0.049**	**0.074**	**0.073**	**0.052**	**0.049**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 8: ITT Estimates for the Effect of the Intervention on Sexual Satisfaction at Two Years

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Treatment	0.787	-1.258	-0.409	0.235	-0.942	0.296
	(-1.593 – 3.167)	(-3.096 – 0.581)	(-2.544 – 1.726)	(-1.323 – 1.793)	(-3.359 – 1.474)	(-1.615 – 2.208)
Woman's Age	-0.187	-0.005	0.417	-0.302	0.022	-0.299
	(-0.685 – 0.311)	(-0.384 – 0.374)	(-0.419 – 1.253)	(-0.731 – 0.127)	(-0.262 – 0.307)	(-0.764 – 0.165)
Total No. of Children	-0.113	-0.253	-1.127	0.456	-0.69	0.759
	(-2.384 – 2.157)	(-1.047 – 0.540)	(-3.123 – 0.868)	(-0.258 – 1.169)	(-1.733 – 0.353)	(-0.633 – 2.152)
Age of Sexual Debut	0.247	0.002	0.116	0.108	0.240	0.173
	(-0.387 – 0.881)	(-0.404 – 0.407)	(-0.552 – 0.784)	(-0.017 – 0.385)	(-0.170 – 0.651)	(-0.287 – 0.633)
Education - Secondary	-1.971*	-0.873	-2.518	0.0681		
	(-4.340 – 0.399)	(-3.486 – 1.740)	(-5.59 – 0.549)	(-1.667 – 1.803)		
Education - Higher	-3.444*	0.626	-1.497	-0.083		
	(-7.081 – 0.192)	(-7.065 – 8.316)	(-10.82 – 7.827)	(-2.158 – 1.991)		
Constant	7.031	7.647**	-1.958	11.31**	1.370	8.898**
	(-2.310 – 16.37)	(0.269 – 15.03)	(-14.66 – 10.74)	(0.567 – 22.04)	(-3.970 – 6.711)	(1.356 – 16.44)
Observations	750	757	903	604	845	622
R-squared	**0.035**	**0.033**	**0.038**	**0.037**	**0.041**	**0.041**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 9: ITT Estimates for the Effect of the Intervention on Marital Satisfaction at Two Years

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.464	-0.703*	-0.825	-0.033	-1.076	-0.087
	(-2.049 – 1.121)	(-1.528 – 0.122)	(-2.038 – 0.389)	(-1.295 – 1.230)	(-2.792 – 0.640)	(-1.296 – 1.123)
Woman's Age	-0.410*	0.193	0.030	-0.124	-0.047	-0.014
	(-0.831 – 0.012)	(-0.042 – 0.428)	(-0.125 – 0.186)	(-0.503 – 0.256)	(-0.235 – 0.141)	(-0.222 – 0.194)
Total No. of Children	1.504	-0.589**	-0.187	0.386	-0.053	0.327
	(-0.601 – 3.609)	(-1.133 – -0.044)	(-1.130 – 0.757)	(-0.225 – 0.997)	(-0.723 – 0.616)	(-0.548 – 1.202)
Age of Sexual Debut	0.519**	-0.050	0.208*	0.121	0.203**	0.114
	(0.0134 – 1.024)	(-0.311 – 0.212)	(-0.027 – 0.443)	(-0.163 – 0.404)	(0.006 – 0.400)	(-0.328 – 0.556)
Education - Secondary	-0.263	-0.488	-1.295*	0.676		
	(-2.002 – 1.477)	(-2.181 – 1.205)	(-2.601 – 0.010)	(-0.845 – 2.198)		
Education - Higher	-1.433	-0.627	-2.249*	-0.250		
	(-4.663 – 1.797)	(-3.096 – 1.842)	(-4.776 – 0.278)	(-2.691 – 2.191)		
Constant	5.284	5.474***	3.352	8.672*	3.102**	4.940
	(-2.881 – 13.45)	(3.433 - 7515)	(-1.535 – 8.239)	(-1.761 – 19.11)	(0.735 – 5.469)	(-3.218 – 13.10)
Observations	688	701	815	574	771	578
R-squared	**0.039**	**0.047**	**0.042**	**0.045**	**0.032**	**0.026**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 10: ITT Estimates for the Effect of the Intervention on Likelihood of Pregnancy at Two Years

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.002	-0.037***	-0.019*	-0.009	-0.031**	0.004
	(-0.025 – 0.029)	(-0.063 – 0.010)	(-0.041 – 0.002)	(-0.044 – 0.026)	(-0.055 – -0.006)	(-0.025 – 0.038)
Woman's Age	0.003	-0.002	-0.004	0.002	0.001	-0.002
	(-0.003 – 0.010)	(-0.007 – 0.003)	(-0.011 – 0.003)	(-0.007 – 0.011)	(-0.003 – 0.005)	(-0.007 – 0.003)
Total No. of Children	0.003	-0.008	0.000	0.000	-0.003	0.008
	(-0.024 – 0.029)	(-0.020- 0.005)	(-0.011 – 0.011)	(-0.016 – 0.016)	(-0.014 – 0.009)	(-0.013 – 0.029)
Age of Sexual Debut	-0.001	0.002	0.003	0.001	-0.002	0.006*
	(-0.007 – 0.005)	(-0.004 – 0.009)	(-0.006 – 0.012)	(-0.004 – 0.006)	(-0.005 – 0.002)	(-0.001 – 0.013)
Education - Secondary	-0.011	-0.022*	-0.023**	-0.008		
	(-0.040 – 0.017)	(-0.046 – 0.002)	(-0.043 – 0.002)	(-0.048 – 0.032)		
Education - Higher	0.031	-0.022	-0.003	-0.003		
	(-0.141 – 0.203)	(-0.123 – 0.079)	(-0.120 – 0.114)	(-0.140 – 0.134)		
Constant	-0.021	0.0166	0.036	0.003	0.045	-0.097
	(-0.166 – 0.124)	(-0.070 – 0.104)	(-0.142 – 0.214)	(-0.216 – 0.222)	(-0.059 – 0.149)	(-0.216 – 0.216)
Observations	750	757	903	604	845	622
R-squared	**0.052**	**0.044**	**0.032**	**0.056**	**0.036**	**0.042**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. The results presented are from OLS / linear probability models with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.

Table 11: ITT Estimates for the Effect of the Intervention on Short Birth Intervals at Two Years

	Pregnancy Status At Baseline		Age at Baseline		Education at Baseline	
	Pregnant	Not Pregnant	18-25	26-35	Primary	Secondary
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.168	-0.764**	-0.375**	-0.453	-0.282	-0.450
	(-0.706 – 0.371)	(-1.373 – -0.155)	(-0.751 – 0.001)	(-1.147 – 0.242)	(-0.810 – 0.247)	(-1.160 – 0.260)
Woman's Age	0.025	-0.020	0.040	0.287**	0.034	0.033
	(-0.090 – 0.140)	(-0.161 – 0.121)	(-0.086 – 0.166)	(0.004 – 0.571)	(-0.074 – 0.142)	(-0.102 – 0.167)
Total No. of Children	0.054	0.140	-0.096	0.028	-0.043	0.014
	(-0.378 – 0.485)	(-0.225 – 0.505)	(-0.587 – 0.395)	(-0.464 – 0.521)	(-0.397 – 0.311)	(-0.385 – 0.413)
Age of Sexual Debut	0.052	-0.027	0.019	-0.018	-0.002	-0.007
	(-0.081 – 0.184)	(-0.117 – 0.063)	(-0.141 – 0.179)	(-0.143 – 0.108)	(-0.092 – 0.088)	(-0.152 – 0.138)
Education - Secondary	-0.300	-0.228	-0.475**	0.088		
	(-0.750 – 0.151)	(-0.916 – 0.461)	(-0.886 – -0.064)	(-0.711 – 0.887)		
Education - Higher	-0.419	0.163	-0.404	-0.372		
	(-2.540 – 1.702)	(-1.73 – 2.054)	(-2.477 – 1.668)	(-2.791 – 2.048)		
Constant	-2.288*	-0.410	-2.606	-5.617	-2.457**	-1.568
	(-4.717 – 0.142)	(-2.832 – 2.013)	(-5.865 – 0.653)	(-12.49 – 1.261)	(-4.665 – -0.249)	(-4.661 – 1.525)
Observations	668	645	822	472	784	554

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.5$

Notes: For both columns, the unit of observation is a woman. Odds ratios from a logistic regression are presented with 95 percent confidence intervals in parentheses. The reference group in the adjusted model is women with primary school education. Regressions include woman-level controls such as educational attainment of the woman (primary as the reference, secondary, and higher), age of the woman, number of births, and whether the woman works. Cluster fixed effects are included, and standard errors are clustered at the area level.