

# Understanding Family Planning Outcomes in Northwestern Nigeria: Analysis and Modeling of Social and Behavior Change Factors

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## Research Article

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# Abstract

**Background:** Northwestern Nigeria faces a situation of high fertility and low contraceptive use, driven in large part by high-fertility norms, pro-natal cultural and religious beliefs, misconceptions about contraceptive methods, and gender inequalities. Social and behavior change (SBC) programs often try to shift drivers of high fertility through multiple channels including mass and social media, community-level group and interpersonal activities. This study seeks to assist SBC programs to better tailor their efforts by assessing the effects of intermediate determinants of contraceptive use/uptake and by demonstrating their potential impacts on contraceptive use, interpersonal communication with partners, and contraceptive approval.

**Methods:** Data for this study come from a cross-sectional household survey, conducted in the states of Kebbi, Sokoto and Zamfara in northwestern Nigeria in September 2019, involving 3,000 women aged 15 to 49 years with a child under 2 years. Using an ideational framework of behavior that highlights psychosocial influences, multivariate regression analyses assess associations between ideational factors and family planning outcomes, and post-estimation simulations with regression coefficients model the magnitude of effects for these intermediate determinants.

**Results:** Knowledge, approval of family planning, and social influences, particularly from husbands, were all associated with improved family planning outcomes. Approval of family planning was critical – women who personally approve of family planning were nearly three times more likely to be currently using modern contraception and nearly six times more likely to intend to start use in the next six months. Husband's influence was also critical. Women who had ever talked about family planning with their husbands were three times more likely both to be currently using modern contraception and to intend to start in the next six months.

**Conclusion:** SBC programs interested in improving family planning outcomes could potentially achieve large gains in contraceptive use—even without large-scale changes in socio-economic and health services factors—by designing and implementing effective SBC interventions that improve knowledge, encourage spousal/partner communication, and work towards increasing personal approval of family planning. Uncertainty about the time-order of influencers and outcomes however precludes inferences about the existence of causal relationships and the potential for impact from interventions.

## Background

Nigeria currently has one of the highest fertility rates in the world (World Bank, 2020), with the northwest region experiencing the highest rates within the country (National Population Commission (NPC) [Nigeria] & ICF, 2019). The 2018 Nigeria Demographic and Health Survey (NDHS) indicated that the total fertility rate in the northwest of the country was 6.6 live births per woman, and that women aged 40 to 49 years averaged 8.3 births in their reproductive lifetimes (National Population Commission (NPC) [Nigeria] & ICF, 2019). This high-fertility situation places women at greater risk of birth complications and maternal

mortality. Nigeria currently has more maternal deaths annually than any other country in the world (Roser & Ritchie, 2020) and the fourth highest maternal mortality ratio (World Health Organization, 2020).

Contraceptive use to limit or space births is not the norm in this region. In the 2018 NDHS, only 6.2% of married women in the northwest were currently using any form of modern contraception, and the majority of married women - 68.7% - reported no need for family planning for either spacing or limiting (National Population Commission (NPC) [Nigeria] & ICF, 2019). Much of this absence of demand for family planning can be attributed to social norms for high fertility, pro-natal cultural and religious beliefs, misconceptions about contraceptive methods, and gender inequalities.

### *Role of high parity norms*

In this region, the desire for large families is extensive, reflected in a mean ideal number of children of 7.5 (National Population Commission (NPC) [Nigeria] & ICF, 2019). This is nearly three children more than the ideal in the south of the country (Babalola et al., 2017). Even among high parity couples, the desire to continue having children prevails. According to the 2018 NDHS, 61.6% of women with six or more children in this region wanted more children. Among men with six or more children, that percentage was even higher; 89.1% desired more (National Population Commission (NPC) [Nigeria] & ICF, 2019).

Social norms driving high fertility in the northwest are tied in part to perceptions of its social advantages, such as signaling greater wealth and status, ensuring the survival of family names, and broadening social networks and influence. Large family size is believed to both represent and engender wealth, influence, respect, and fame (C. O. Izugbara & Ezeh, 2010). Further, large families are perceived to have economic benefits, such as serving as social insurance for parents as they age and contributing household labor or income from market-based employment (C. O. Izugbara & Ezeh, 2010). Son preference may further drive high fertility (Sinai, Anyanti, Khan, Daroda, & Oguntunde, 2017).

### *Role of religion*

In the north, where the majority of the population is Muslim, religious beliefs drive high fertility (Babalola et al., 2017; Duzé & Mohammed, 2006; C. O. Izugbara & Ezeh, 2010; Sinai et al., 2017). Izugbara and Ezeh (2010) note that many women believe that high fertility honors Allah. Specifically, one way “to serve God with fertility is to give birth to several children who will worship Him and secure the future of Islam” (C. O. Izugbara & Ezeh, 2010). Similarly, Obasohan (2015) highlights the cultural belief that God places children in the womb and “until they are given birth to, you do not stop.”

### *Role of contraceptive myths*

Further affecting high fertility rates in northwestern Nigeria are misconceptions and negative perceptions about family planning use, such as beliefs that contraceptives are dangerous to a woman’s health (FP2020, 2019; Gueye, Speizer, Corroon, & Okigbo, 2015; P. Hutchinson et al., 2018), that they can harm a woman’s womb (Ankomah, Oladosun, & Anyanti, 2011; Gueye et al., 2015; Measurement Learning and Evaluation Project, National Population Commission (NPC) Nigeria, & Data Research and Mapping Consult

Ltd, 2015), that they can inhibit subsequent fertility (Gueye et al., 2015; P. Hutchinson et al., 2018) or that they can cause cancer (C. O. Izugbara & Ezeh, 2010).

### *Role of gender inequalities*

Fertility in northwestern Nigeria is also driven by gender power imbalances, fostered by patriarchal social structures in which women have limited autonomy over most decisions, including those affecting marriage, health and fertility (Adanikin, McGrath, & Padmadas, 2019; Sinai et al., 2017). Men are often the final decision-makers on important household matters, including those related to “household purchases, health of family members, timing of pregnancies, family size, and education of children” (Babalola, Kusemiju, Calhoun, Corroon, & Ajao, 2015). As the decision-makers on family size, men ultimately determine contraceptive use through their fertility desires and approval or disapproval of contraception (Schwandt, 2011; Sinai et al., 2017).

Exacerbating power differentials are the low levels of female education and patterns of early marriage. In the northwest, nearly two thirds of adult women have no formal education, and only 29% are considered literate (National Population Commission (NPC) [Nigeria] & ICF, 2019). Forced and early child marriage is common (Wolf, Abubakar, Tsui, & Williamson, 2008), and many girls are married as young as 12. The median age at first marriage is approximately 15.9 years. The median age for men, in contrast, is 25.3 years, revealing considerable age differences, and hence power differentials (National Population Commission (NPC) [Nigeria] & ICF, 2019). In this context, women are valued largely for their reproductive functions (Sinai et al., 2017; Wolf et al., 2008).

From a woman’s perspective, “fertility is one mechanism by which women can impart some control over marital situations that are largely beyond their control” (C. O. Izugbara & Ezeh, 2010). High parity is perceived as a mechanism to ensure marital stability, and protection and financial support from their spouse (Obasohan, 2015; Wolf et al., 2008). Wives often see having many children as a way to discourage husbands from taking on other wives (C. O. Izugbara & Ezeh, 2010), which can affect a wife’s standing within the polygynous familial structure (C. Izugbara, Ibisomi, Ezeh, & Mandara, 2010). In polygynous marriages, resources and wealth are generally distributed to wives based on the number of children they have, both on a daily basis and at the husband’s death, thereby limiting incentives to use contraception (C. O. Izugbara & Ezeh, 2010). Researchers have identified conjugal relationship dynamics as explaining 11% of the variation in contraceptive use between northern Nigerian states and southern Nigerian states (Babalola & Oyenubi, 2018). Further, low fertility can have dire consequences for women as husbands “may cite limited childbearing as an excuse to marry additional women and to divorce their existing wives” (C. O. Izugbara & Ezeh, 2010).

### *Family Planning Demand*

In northwestern Nigeria, decisions about contraceptive use are inextricably linked to this complex interaction of high fertility desires, social norms, and contraceptive myths, as well as economic factors

such as financial security, income streams, and the costs of health services (Ankomah et al., 2011; Babalola & Oyenubi, 2018; Okigbo, Speizer, Domino, & Curtis, 2017; Speizer & Lance, 2015).

This work examines several family planning outcomes and their relationships with theorized determinants of contraceptive use. It builds upon an ideational model of contraceptive use (Babalola, John, Ajao, & Speizer, 2015; Kincaid, 2000; Kincaid & Do, 2006; Krenn, Cobb, Babalola, Odeku, & Kusemiju, 2014), which in turn builds upon other behavior change theories, including the diffusion of innovations (Rogers, 2003), the theory of planned behavior (Ajzen, 1991), social cognitive theory (Bandura, 1986, 1994), and the transtheoretical model (Prochaska & DiClemente, 1994). These behavioral models highlight the roles of multiple direct and indirect influencers of behaviors, including intentions, environmental constraints, skills, attitudes, norms, identity, emotion and self-efficacy, with the first three factors believed to be necessary and sufficient for a behavior to occur while the latter five factors influence the strength and direction of intentions (Fishbein et al., 2001).

This study focuses in particular on several key components of these theories that may be of particular relevance for the design and implementation of behavior change programs in northwestern Nigeria that seek to influence contraceptive use, including interpersonal discussions between couples, approval of family planning, and contraceptive knowledge.

#### *Interpersonal communication among couples*

We focus on the role of communication among couples about family planning because of its established association with a greater likelihood of contraceptive use in certain contexts (Ankomah et al., 2011; Okigbo et al., 2017; Shattuck et al., 2011). Nonetheless, contraceptive discussions are not the norm in this region (C. Izugbara et al., 2010), and discussions about family planning with young or unmarried persons are often considered inappropriate (Adebayo et al., 2011). The Nigerian Urban Reproductive Health Initiative (NURHI) reported that less than a third of married women in northern Nigeria discussed family planning with spouses at least once within the past six months (Measurement Learning and Evaluation Project et al., 2015).

While husbands influence fertility decisions, most issues of reproductive health are considered a woman's domain (Schwandt, 2011; Sinai et al., 2017). Hence, a woman is expected to be the one to initiate conversations about family planning (Kibira et al., 2020; Schwandt, 2011), even though these conversations come with risk for her. Trepidation about discussing family planning inhibits many couples from discussing family planning and introducing the topic with a husband ((Sinai et al., 2017).

#### *Approval of family planning*

We focus as well on approval of contraception – or its absence – as a facilitator of contraceptive use, as shown in previous studies (Bongaarts, Cleland, Townsend, Bertrand, & Das Gupta, 2012; Okigbo, McCarragher, Gwarzo, Vance, & Chabikuli, 2014). In northern Nigeria, strong cultural and religious forces limit the acceptability of modern contraception among large swaths of the population. A 2003 study of

married men in northern Nigeria found that nearly two thirds of men disapproved of the concept of contraception (Kabir, Iliyasu, Abubakar, & Maje, 2003), a finding mirrored by others (Duze & Mohammed, 2006).

While many studies have looked at the role of contraceptive approval in affecting contraceptive decisions, particularly by partners (Etukudo, 2015; Okigbo et al., 2014), few studies have looked specifically at the determinants of approval itself. Because contraceptive use must fit within a person's values, approval is a necessary (but not sufficient) condition for use. Its examination in the context of decisions about contraceptive use is therefore critical. Stages of change theories, such as the transtheoretical model, consistently highlight the process of developing a positive attitude toward an intended behavior as a prerequisite to engaging in the behavior (Kincaid, 2000; Lesthaeghe & Vanderhoeft, 2001; Prochaska & DiClemente, 1994). For actions with significant negative associations, behavior change programs necessarily must work to improve attitudes towards the behavior. Achieving improved acceptance of contraception remains an important intermediate goal of those programs.

### *Contraceptive Intentions*

We also focus on contraceptive intentions as an outcome because of the strong role that they play in major behavioral theories, although measurement of intentions often conflates the time order between intentions and contraceptive use. As with approval, we treat intentions as a necessary but not sufficient condition for contraceptive use; women are unlikely to inadvertently begin using contraception and hence intent is a necessary condition. Understanding the factors associated with this necessary step are critical for understanding contraceptive uptake.

Northern Nigeria has persistently low contraceptive intentions because the majority of fertility-aged women desire to become pregnant (Avidime et al., 2010; National Population Commission (NPC) [Nigeria] & ICF, 2019). Even though intentions to use are low, previous analyses have shown that they are malleable and can be influenced by greater self-efficacy, reductions in contraceptive myths, and social influences (Babalola, John, et al., 2015). In other contexts, intentions to use postpartum family planning (PPFP) have been shown to be associated with past use, acceptability of use, and of partner acceptability of contraception (Eliason et al., 2013).

### *Objective*

This paper contributes to the extant literature on contraceptive use in a high-fertility environment by quantifying the importance of the myriad factors highlighted in behavior change theories, not just on contraceptive use but also on intermediate determinants of contraceptive use, including contraceptive intentions, interpersonal communication, social influences, and approval. This paper recognizes the importance of these intermediate determinants in previous reviews of contraceptive use in Nigeria but notes that they have seldom been studied as outcomes themselves, a key aim of this paper. Further extending previous analyses, this paper models how social and behavior change programs may effectively change contraceptive behaviors by targeting these myriad influences.

# Methods

## Data

Data for this study were collected as part of an ongoing evaluation conducted by the USAID-funded Breakthrough RESEARCH project (B-R) of the Breakthrough ACTION / Nigeria (B-A/N) project, which operates in 11 states of Nigeria and the Federated Capital Territory (FCT) of Abuja and is also funded by USAID. B-A/N is an integrated social and behavior change program targeting family planning, malaria and maternal, newborn, and child health and nutrition. The B-A/N program has three core components: 1) advocacy outreach to opinion leaders and community influencers at State and Local Government Area (LGA) levels; 2) direct engagement of community members through household visits and community dialogues directed at target populations, with referrals for services as needed; and, 3) complementary integrated SBC messaging through mass, mid-media and mobile phones.

Data were collected through face-to-face household interviews with women aged 15 to 49 years with a child under 2 years in the northwestern states of Kebbi, Sokoto and Zamfara in September 2019, prior to B-A/N program implementation. The data are representative of populations within B-A/N programming areas, but not across the states at large.

## Sampling

We conducted a two-stage cluster-sample, cross-sectional survey of women with a child under 2 years. The sampling frame for the study population was generated through community screening conducted in 108 clusters/wards across the three States (36 wards/clusters per State), which were selected using digital maps and grid sampling methodology. Within each sampled cluster/ward, a community screening tool was used to identify all women with a child under 2 years in the study areas. The survey sample size was determined based on the Breakthrough RESEARCH evaluation design, with three comparison groups. (Hewett et al., 2019). Sample size estimation allowed for a 10% non-response rate, a power criterion of 0.80, an alpha coefficient of 0.05, and varying intra-cluster correlations and minimal detectable differences for priority outcomes of the evaluation. Based on this estimation, a sample size of approximately 3,000 women with a child under 2 years was estimated for survey inclusion. At the first sampling stage, we selected 108 enumeration areas (EAs) from program wards within the three states (36 enumeration areas per state) using digital maps and a grid sampling methodology. At the second sampling stage, all households within each sampled EA were enumerated to randomly select households with a resident woman who had a child under 2 years.

## Data collection and questionnaires

Randomly selected eligible women were asked to respond to an interviewer-directed questionnaire. Fieldwork was conducted in September 2019 over a 4-week period prior to B-A/N implementation. Interviewer training occurred during the one-week period prior to data collection. This training reviewed the study objectives, protocol and instruments, fieldwork procedures and ethical considerations. All

interviewers participated in a questionnaire pilot exercise that tested skip patterns, checked questionnaire translation (Hausa), and assessed question appropriateness and sequence.

There were two questionnaires administered to survey participants. The household questionnaire collected information on usual resident household members and household assets and characteristics. The female questionnaire asked respondents about their demographics, reproductive history, contraceptive use, media exposure, gender norms, and ideations related to family planning. Interviews were conducted in Hausa, the predominant local language. The overall response rate among women with a child under two years was 99%.

## **Variables**

### *Outcomes*

Several family planning-related outcomes are the focus of our study. We identified women as current users of modern contraception if they reported that they were currently using an intrauterine device (IUD), injectables, implants, pill, male condom, female condom, lactational amenorrhea method (LAM), spermicide, diaphragm, or emergency contraception or if they reported having been sterilized or that their husband had received a vasectomy. In addition to examining current use of modern contraception, we look at several family planning intermediate outcomes such as intentions to use contraception in the next six months, discussions with partner about contraception and number of children to have, and approval of family planning. Each of these are treated as binary variables. Intentions were measured as positive responses to the question, “Do you intend to begin using a contraceptive method in the next six months?” These questions were only asked of current non-users of family planning. Approval of family planning was measured as a positive response to the question, “Do you personally approve of using contraception for spacing births?” No similar question was asked about approval of family planning for limiting births or use of family planning more generally. Contraceptive discussions were measured as positive responses to the question, “Have you ever talked with your husband/partner about using modern contraception?” and “Have you ever talked with your husband/partner about the number of children to have?”

### *Explanatory Variables*

The SBC interventions of the Breakthrough Action / Nigeria project are guided by an ideational theory of behavior change (Babalola, John, et al., 2015; Kincaid, 2000; Krenn et al., 2014), which amalgamates the components of multiple behavior change theories and traces the effects of social and behavior change interventions (e.g., mass media, social media, interpersonal communication) through a set of core psychosocial influences that affect contraceptive behaviors and intentions. The ideational theory groups factors into three domains: cognitive (knowledge, beliefs, values, perceived risks and norms), emotional (self-efficacy) and social influences. We use this theory as a guide to variable selection for our behavioral models, as depicted in Table 1.

Contraceptive knowledge was measured as a woman's identification of the benefits of contraceptive use for children and for the woman herself, such as better growth, nutrition and overall health for children and giving a woman "a chance to rest after childbirth." We also included in our knowledge measure agreement with statements such as "Side effects from using contraception are normal and usually go away in a few months," "A woman's body is not ready for childbirth until she is 18," and "Women over 35 have a higher risk of complications during pregnancy and shortly after birth." An index of knowledge was created from the score of the first principal component using the *polychoricpca* command in Stata (Kolenikov & Angeles, 2009). The sample was then divided into halves as those who had knowledge scores above and below the median. In a similar manner, we constructed an index of incorrect knowledge and belief in common contraceptive myths based on agreement with statements such as "contraceptives can cause cancer" and "women who use contraceptives may become promiscuous," and again grouped women into two halves of low and high levels of belief in contraceptive myths.[1]

We included one measure of contraceptive beliefs – agreement with the statement that "Couples who use a modern contraception have better quality of life" - and two measures of values – agreement with the statements that "it is important that husbands and wives discuss contraception" and "do you personally approve of using contraception for spacing births?" As discussed previously, we also examined approval as an outcome but included it in the contraceptive use, intentions and discussions models to assess how approval as an intermediate factor influences these other outcomes.

Two norms variables were included in our models, including one injunctive norm – agreement with the statement "Religious leaders should speak publicly about modern contraception." and one descriptive norm – agreement with the statement that "Most couples in my community use modern methods for spacing."

An important objective of the analysis was to assess a woman's level of autonomy to make decisions about her own fertility and contraceptive use. We included two measures of social influence. First, we examined the family planning decision-making process as responses to the question, "Who decides if you use a contraceptive method? Is it mainly your decision, mainly your partner's decision or do you both decide together?" Binary variables were created for "mainly the respondent's decision" and "joint decision-making" relative to decision-making by the husband/partner. Secondly, we included information on specific influencers based on responses to the question, "Who else influences your decision to use family planning?" For this, we included dummy variables for husband/partner, mother, mother-in-law and health provider because these were the responses most commonly cited by women. We also included one measure of self-efficacy—self-reported confidence that a woman can use modern contraception.

Additional variables included both respondent's and husband's education, parity, maternal age, and whether or not a woman was currently breastfeeding. To test for whether or not fertility and contraceptive use is spurred by competition amongst wives, we included variables for whether or not a husband has other wives, categorized as only one wife, one other wife or three or more wives.

We measured wealth using an asset-based measure constructed from ownership of key consumer durables and then compiled into an index using principal components analysis (Filmer & Pritchett, 1998). Households were then categorized into quintiles from poorest to wealthiest.

## Analysis

We use multivariate mixed-effects logistic regression model, with clustering at the ward-level, to assess the effects of ideational factors and socio-economic factors on our set of contraceptive outcomes. We specifically test for the effects of beliefs, knowledge, values, perceived risks, norms, social influences and self-efficacy on use of and intention to use modern contraception, as well as to discuss fertility goals and family planning with one's husband and to approve of family planning. We also test for whether contraceptive behaviors differ based on couple dynamics, including who decides about family planning and how many wives the husband has.

While we believe that certain intermediate components of the ideational framework – intentions, discussions, and approval – are likely endogenous to our models, affected by common unobservables such as underlying fertility desires, we are left with few analytical strategies for addressing these potential sources of bias. Our data are cross-sectional, which eliminates the possibility afforded by longitudinal models of differencing out time invariant unobservables that can yield confounded estimates. Instrumenting for our endogenous intermediate determinants would also be unlikely to be successful since we would face difficulties identifying instrumental variables that are uniquely associated with these intermediate outcomes but not contraceptive use, i.e., instrumental variables that are not also associated with common unobservables. Propensity score matching approaches would suffer from similar limitations from confounding on unobservables (Wooldridge 2015).

In post-estimation analysis, we predict the likelihood of each outcome for different values of the covariates in our ideational model using the *margins* command in Stata 16. For example, we predict the likelihood of modern contraceptive use based on whether or not a woman approves of contraception for spacing or has ever had a conversation with her husband about family planning based on her level of contraceptive knowledge, controlling for other model covariates. We also model marginal effects - for example the difference in likelihood of a woman using contraception – for different values of each model's covariates. These allow us to show the effects of improvements in determinants of contraceptive outcomes, including scenarios that are likely to be the targets of SBC programs, e.g., what would contraceptive prevalence be if everyone understood the health benefits of contraceptive use and held no contraceptive myths, if everyone approved of family planning, or if everyone felt confident to be able to use family planning. Although these are hypothetical scenarios, they allow us to show the potential – and limitations – of SBC programs.

[1] The complete list of myths included: “use of some contraceptives can make a woman permanently infertile,” “contraceptives can harm a woman's womb,” “contraceptives can reduce a man's sexual urge,” “contraceptives can reduce a woman's sexual urge,” “contraceptives can cause cancer,” “contraceptives

can give you deformed babies,” “women who use contraception end up with health problems,” and “women who use contraceptives may become promiscuous.”

## Results

### *Sample*

The sample included 3,000 women with a child born within two years of the survey interview (Table 2). The majority of these women, 73.9%, reported having no education. The majority of husbands, 58.3%, also reported no education but more than twice as many husbands as women had a secondary higher level of education – 25.0% versus 10.6%. Median parity was 3 children although 14.3% of women had 7 or more children. Because the sample consists of women with a child under the age of two years, the sample skews to younger aged women, and nearly all (93.0%) were currently breastfeeding.

Of the 3,000 women, 13.3% (N=393) were currently using modern contraception while an additional 14.7% (N=333) intended to begin using in the next six months (Table 3). Discussions with husbands about fertility and contraceptive use were rare. Only 7.4% had ever discussed with their husbands the number of children to have while less than a quarter, 22.5%, had ever discussed contraception. Only 43% of women reported that they approved of family planning for spacing births

Knowledge of specific benefits of contraception varied by benefit. Only 12.0% of women said that contraception provided no benefits for children, but nearly a third said that it promoted better overall health for the child and allowed for more attention by the mother. Better education and more opportunities for the child were cited by only one in fifteen women. Similarly, only 11.7% of women cited no benefits of contraception for the woman herself, while approximately two-thirds reported that contraception allows a woman to get rest after a birth. Only 15.5% of women noted that contraception reduces unwanted pregnancies. Only four out of ten women acknowledged that women over the age of 35 are at higher risk of pregnancy complications, and slightly more than one quarter of women agree that a woman's body is not ready for childbirth until she is 18.

Contraceptive myths appear to be held by a large number of women. Nearly half of women believe that contraception can leave a woman permanently infertile, can harm a woman's womb, can reduce both a man's and a woman's sexual urge, can cause cancer, can cause deformed babies, can cause health problems, and can lead a woman to become promiscuous.

Women were asked about their attitudes towards family planning. Nearly 6 out of 10 women believed that couples who use family planning have a better quality of life, and almost half believed that most couples in their community use modern contraception for spacing births. Approximately half of women believe that religious leaders should speak publicly about family planning.

There was modest evidence for women's autonomy in decision-making. Nearly 60% of women strongly agreed that a woman should play a role in household decision-making, and nearly 70% agree that it is

important that couples discuss contraception. That being said, less than a quarter of women said that decisions about family planning were solely theirs, which was a higher percentage than those who said that the decision was mainly their partners (21.7%). The majority, 54.2%, said that such decisions are made jointly with their partner. When it comes to major household purchases, the majority, 58.4%, said that such decisions were solely the husband's.

Self-efficacy to use contraception was low. Only 37.5% of women said that they were confident that they could use modern contraception even if their husband disapproved, even though nearly half, 49.1%, felt confident that they could convince their husbands about using contraception.

In terms of influencers, 30.7% of women reported that their partner influences the contraceptive use decision, while only 3.4% and 4.7% reported that their mother-in-law and their mother respectively influenced the decision. A small percentage, 3.8%, said that they were influenced by a health provider.

The majority of modern contraceptive users (77.2%) said that the reason for using a method was that they wanted to space their births (Table 4). Only 10.2% were using contraception for limiting the number of births. The most common reasons why women were not using family planning are that fertility outcomes are "Up to God," that there is opposition to family planning, either by the husband (21.1%) or the respondent (17.9%), or that the woman was currently breastfeeding (23.1%). Distance and cost were not cited as important barriers.

### *Multivariate Regression*

Regression analysis supported previous studies indicating that ideational factors – across cognitive, emotional and social ideational domains – are associated with better family planning outcomes in northwestern Nigeria (Table 5-9). Several factors – knowledge, contraceptive discussions with husband, and approval of family planning, showed the strongest associations across all of the outcomes. The presentation of results below focuses on the adjusted predicted probabilities in the tables.

### **Results by outcome**

The use of modern contraception appeared to be driven largely by cognitive factors – knowledge, approval, and beliefs. Women who had greater family planning knowledge were 1.61 times (14.5% versus 9.0%) more likely than those with poor family planning knowledge to be using modern contraception while women holding contraceptive myths were only 76% as likely as those not holding such myths (11.1% versus 14.6%) to be using modern contraception (Table 5). Women who approved of family planning for spacing were 2.94 times (15.6% versus 5.3%) more likely to be using modern contraception than those who did not approve, while women who believe that couples who use family planning have a better quality of life were 1.53 times (13.8% versus 9.0%) more likely than those who do not believe FP users have a better quality of life (Table 7). Women with greater self-efficacy to use contraception were 1.32 times (14.5% versus 10.9%) more likely to be using modern contraception, although it is not possible to determine whether self-efficacy helped drive contraceptive use or self-efficacy was developed through

the process of using modern contraception. While only 3.8% of women were influenced by health providers, these women were 1.47 times (18.8% versus 12.8%) more likely to be using modern contraception. Norms – as measured by the variables in our model - did not appear to matter to contraceptive use.

The factors driving intentions to use modern contraception largely mirror those for current use (Table 6). Women who approved of family planning were nearly six times (20.6% versus 3.5%) more likely to intend to start using contraception in the next six months, while women believing contraceptive myths were only 67% as likely as women who did not hold contraceptive myths (10.5% versus 15.8%). Confidence to use family planning helped as well; women who expressed confidence were 1.48 times (15.9% versus 10.8%) more likely to intend to start. Unlike for current contraceptive use, the effects of social influences on contraceptive intentions, however, appeared to be negligible.

The likelihood of discussions with husbands – both about the number of children to have and use of family planning – was associated with factors across the entire ideational spectrum (Tables 7 and 8). Again, knowledge and approval were important. Women who approved of family planning were 2.6 times more likely to discuss children (10.0% versus 3.8%) and family planning (28.8% versus 11.0%). Women with high knowledge were 1.66 times more likely to discuss children (8.8% versus 5.3%) and 1.35 times (24.0% versus 17.8%) more likely to discuss family planning. Self-efficacy to use family planning was also associated with both outcomes. The influence of mothers – but not mothers-in-law – was also observed for both outcomes. Health provider influence was associated with a 1.24 times (27.2% versus 21.9%) greater likelihood of discussing family planning with one's husband.

Because approval of family planning was strongly associated with modern contraceptive use, intentions to use, and discussions with husband, it is critical to understand the factors driving approval (Table 9). Unsurprisingly, greater knowledge and fewer contraceptive misconceptions were both associated with a greater likelihood of approval. Women above the median in contraceptive knowledge were 1.13 times (51.6% versus 45.6%). Women with contraceptive misconceptions were only 80% as likely as (43.0% versus 53.9%) to approve of family planning as women without such misconceptions. Other norms and values also mattered. Women who believed that it is important for couples to discuss family planning were 1.29 times (51.8% versus 40.0%) more likely to approve of family planning, while women who believe that religious leaders should speak about family planning were 1.18 times (52.3% versus 44.5%) more likely. This was the only effect of religious leaders in all of the analyses.

### **Cross-cutting results**

The influence of husbands appeared to be largely through family planning discussions and contraceptive decision-making. For example, women who had ever discussed family planning with their husbands were 3.2 times (21.2% versus 6.5%) more likely to be currently using family planning, 2.7 times (26.2% versus 9.6%) more likely to intend to use family planning, and 1.6 times (69.3% versus 44.0%) more likely to approve of family planning as women who had never had such discussions (Tables 5,6, 9 respectively).

Regression results further indicate that it is not simply the involvement of the husband that matters but rather that the husband needs to be involved in a joint decision-making process with the wife. Couples who make family planning choices together tended to have better family planning outcomes for all of the outcomes studied relative to couples in which unilateral decisions were made by the husband. For example, a woman who decides jointly with her husband about family planning was predicted to be 1.6 times more likely to be currently using modern contraception relative to a woman whose husband makes the decision himself – 14.5% versus 9.1% (Table 5). Similarly, predicted intentions to use family planning for a woman who makes family planning decisions with her husband were 3.7 percentage points higher – 13.1% versus 9.4% - than for a woman whose husband decides unilaterally (Table 6). All outcomes, including discussions about children and family planning and approval of family planning, were higher for women who make joint decisions with their husbands relative to women whose husbands make family planning decisions unilaterally. Notably, women who have complete autonomy about family planning decisions are at least as likely to intend to use modern contraception in the next 6 months (16.9% relative to 13.1%) (Table 6) and to approve of family planning (51.6% versus 49.5%) (Table 9) as women who make joint family planning decisions.

We found little evidence that competition amongst wives drives high fertility (Tables 5-9). Specifically, controlling for other factors, the number of co-wives a woman has was not statistically related to current use of contraception, discussions about children and family planning nor approval of family planning. However, women in polygynous structures with three or more wives were 1.5 times more likely to intend to begin using family planning in the next 6 months, contrary to the competition hypothesis. Evaluation of this important motivator of fertility, however, was not the main focus of data collection.

We also found that, once ideational factors were controlled for, other variables, such as household wealth, women's schooling, parity and husband's education, were not significantly associated with these family planning outcomes.

### *Modeling impacts of changing ideational factors*

To estimate what SBC programs can potentially achieve, we used the marginal effects from the regression analysis results to simulate the magnitude of improvements in family planning outcomes that could be achieved in a world with improved ideation, that is, for example, if everyone had correct knowledge and held no contraceptive myths, or if everyone had positive beliefs surrounding family planning, or if everyone approved of family planning. We look at these impacts across the different domains of the ideational model – knowledge and risk perceptions, beliefs, values, norms, emotional (self-efficacy) and social influences.

Values, specifically approval of family planning, appeared to have the largest impacts in general. For example, if all women approved of family planning for spacing, the regression models indicate that contraceptive use could increase by 10.6 percentage points (from 13.4%), intentions to use contraception in the next six months could increase by 19.6 percentage points (from 14.7%), and the likelihood of discussing family planning with one's husband could increase by 24.8 percentage points (from 22.5%)

(Figure 1). These are sizable impacts since they would result in a near doubling of contraceptive use and a more than 133% increase in contraceptive intentions, clearly desirable effects for SBC programs. Achieving ideal knowledge and dispelling contraceptive myths amongst women could also have potentially large impacts, being associated with a greater likelihood of using contraception of 8.8 percentage points, a greater likelihood of intending to use contraception of 7.0 percentage points and increased approval of family planning of 17.5 percentage points. Social influences were far from negligible, influencing each outcome by 9 percentage points or more. Norms and beliefs tended to have the smallest impacts.

The above simulations examine the individual influences on family planning outcomes from marginal changes in each of the ideational framework's subdomains. We can also look at combinations of marginal effects, including what could be achieved as SBC programs achieved successive improvements in each of these subdomains. We examine the following scenarios: (1) if every woman had correct knowledge and held no contraceptive myths, (2) if every woman had ideal cognitive factors (e.g., high knowledge, positive beliefs, and values and norms supporting family planning), (3) if every woman had perfect cognitive and emotional factors (e.g., self-efficacy), and (4) if every woman had perfect cognitive, emotional and social factors (**Figure 2**). These show how SBC could achieve impacts on contraceptive outcomes of many multiples. In a world of perfect ideation, for example, modern contraceptive use might reach as high as 63% of married women, intentions to use might reach 81.6% of non-users, discussions with husbands about the number of children to have and family planning might reach 32.3% and 69.2% respectively, and approval of family planning for spacing births could reach as high as 95% of women. Therefore, SBC programs that are able to shift these ideational factors.

## Discussion

Countries such as Nigeria are beset by long-standing patterns of high fertility, which can affect the health of mothers and their children. This study contributes to the evidence base for the design of family planning social and behavior change programs in high-fertility contexts in the following ways. First, it shows that commonly targeted family planning outcomes (e.g., modern contraceptive use, intentions to use modern contraception) are affected by ideational factors across a broad spectrum of cognitive, emotional and social domains. Several of these factors, such as improved knowledge of the benefits of contraception, increased approval of family planning and greater frequency of family planning discussions with husbands – are influential across many family planning outcomes. Approval of family planning represents an important barrier to use, and SBC programs that can overcome this barrier are likely to achieve important gains in contraceptive use. In this sample, we found that, even though only 43.2% of women approve of contraceptive use for spacing births, approval was associated with a nearly three-fold greater likelihood of contraceptive use and that approval itself could be significantly influenced by communications programs geared towards improving family planning knowledge and dispelling of contraceptive myths. Contraceptive knowledge was also a cross-cutting influencer. Knowledge worked not just through increased approval but also through its relationship with contraceptive discussions. Women above the median in contraceptive knowledge were 1.66 times more likely to have discussed

fertility goals and 1.35 times more likely to have discussed family planning with husbands than women below the knowledge median. In turn, women who had discussed family planning with husbands were approximately three times more likely to be using modern contraception or to intend to use modern contraception.

Second, this work highlights that husbands are critical to family planning behaviors, even though family planning is often considered to be the woman's domain. Couples in which family planning decisions are made jointly had better family planning outcomes across all outcomes studied relative to couples in which the husband is the sole decider. This is clearly an area where SBC programs can have impact, and SBC programs could maximize effectiveness by specifically engaging spouses in family planning promotion activities. Research elsewhere has noted the positive effects of male engagement (Babalola, Kusemiju, et al., 2015; Blake & Babalola, 2002; Shattuck et al., 2011). As noted by one set of researchers, "the attitudes of men toward family planning can affect their partner's contraceptive attitudes, even when spousal communication about reproductive health is not the norm" (Babalola, Kusemiju, et al., 2015). One shortcoming of this research is the absence of data from husbands regarding their knowledge, beliefs values and attitudes in order to inform SBC programs and family planning messaging for this key group.

Third, this work has provided support for the influence of other stakeholders in the family planning process. The influence of health providers, while cited by only a few women, was associated with a 1.41 times greater likelihood of using family planning, although the time order of involvement of health providers—*ex ante* before a woman made the decision to use family planning or as part of the decision about methods during a family planning visit at a health facility—is indeterminate. More research is needed on how best to engage health providers in family planning promotion activities and to identify key contact points that could increase their influence on birth spacing decisions. This would need to correspond with ongoing efforts to ensure sustainability of the quality of family planning services (Speizer, Calhoun, et al., 2019; Speizer, Guilkey, et al., 2019).

Fourth, previous studies in Nigeria have evidenced how gender equitable attitudes and greater female autonomy are associated with a greater likelihood of contraceptive use (Ejembi, Dahiru, & Aliyu, 2015; Okigbo et al., 2018) while polygynous marital structures are associated with a lesser likelihood of use (Ejembi et al., 2015). We have found limited evidence that polygynous family structures are associated with differences in family planning outcomes. We caution, however, that our data collection was not intended to measure the effects of polygynous family structures. Women were asked solely how many wives in total her husband had. We did not identify which wife – first, second, third – a woman was, nor how many children co-wives had, which could potentially bear upon the incentives that a woman faces when making choices about family planning use.

Fifth, many studies have stressed the need to support women and girls' economic and social empowerment, largely through increasing the school enrollment of girls, which could both improve women's health literacy and strengthen employment prospects for girls and women. We were unable to detect strong differences in outcomes by education levels. However, it is likely that such differences were

already accounted for in the ideational factors. Women with a secondary or higher level of education were 31 percentage points (86.6% versus 55.4%) more likely to believe that couples who use family planning have a better quality of life, 26 percentage points (90.8% versus 64.8%) more likely to agree that it is important for couples to discuss contraception, and 35.3 percentage points (78.9% versus 43.6%) more likely to be above the median in contraceptive knowledge relative to women with no education. Through these ideational factors, education can serve as an important conduit for making better reproductive health choices.

Finally, we were unable to identify a strong direct influence of religious leaders on family planning decisions, although admittedly our data did not permit detailed analyses of such influences. No women reported that religious leaders influence their contraceptive use decisions, and only half of women believe that religious leaders should speak publicly about family planning. That belief was not associated with any of the family planning outcomes under study with the exception of contraceptive approval. Women who agreed with that statement were 18% more likely to approve of family planning. The influence of religious leaders may therefore logically flow through the values that women hold regarding family planning. Previous studies have highlighted the importance of religious leaders and have noted that exposure to family messages from religious leaders was positively associated with contraceptive use (Adedini et al., 2018). Previous researchers have also emphasized “the need to empower religious leaders to be advocates for family planning and to emphasize the positive position of Islamic religious tenets on contraception through multiple channels (Babalola & Oyenubi, 2018). Subsequent work will evaluate more fully the impact of religious leaders on contraceptive outcomes.

This study faced several important limitations. First, no information was available on the supply side of the contraceptive use decision, which necessitates the assumption that supply-side factors (e.g., prices, access, quality) are not correlated with other covariates in the models, e.g., that family planning norms, attitudes and values do not differ across different supply environments. To the extent that such ideational factors tend to be better in areas with higher quality family planning services, which would likely directly affect contraceptive uptake, our estimates of the effects of these ideational factors may be over-stated. Many studies have incorporated supply-side characteristics into demand analyses for family planning (Angeles, Guilkey, & Mroz, 1998; Guilkey, Hutchinson, & Lance, 2006; Guilkey & Hutchinson, 2011; P. Hutchinson, Lance, Guilkey, Shahjahan, & Haque, 2006), and future work will hopefully add this dimension to the northwestern Nigerian context.

Second, this study has identified associations and not necessarily causal influences. This is a limitation faced by much of the ideational literature and is largely tied to the cross-sectional nature of the data collection, which relies upon retrospective recall of events in which the time order of influencers and behaviors is unclear. The ideational theory posits causal relationships but what has been established here, and in nearly all similar studies with a few exceptions (P. L. Hutchinson & Meekers, 2012), are correlations. Using data that reflect a snapshot in time with retrospective information, it is virtually impossible to establish the time-order of events (e.g., when was knowledge attained – before, during or after uptake of modern contraception?) and to eliminate issues of reverse causality. Many ideational

factors, for example, may actually be self-determined through the process of using family planning. Through use, individuals may gain greater knowledge, develop greater self-efficacy to use contraception, develop more accurate perceptions of risk, become more likely to discuss family planning with husbands, and develop values such as believing that couples who use family planning have a better quality of life. Many possibilities exist to explain the associations. In this paper, we have spent a good bit of time examining the influence of discussions between husbands and wives on family planning outcomes. Ideally, SBC programs would provide health information to couples, the couples would discuss fertility goals, and then they would make an informed choice to adopt a contraceptive method or not. But our reference period is whether or not a woman has ever had a discussion with her husband about family planning. We do not know for certain if the discussion preceded contraceptive use or if it occurred subsequently. In the former case, causality could perhaps be inferred. Discussions resulted in uptake of family planning. In the latter case, causality would not be present; discussions with husbands and contraceptive uptake would simply be co-occurring events. Hence, it is impossible to distinguish between the *ex-ante* influences of these variables from the *ex-post* changes that arise from the process of using modern contraception. Assuming that these ideational factors represent unidirectional causal influences may overstate their effects on family planning outcomes.

We recommend that future researchers more fully explore both experimental designs to control for unobservable factors that may simultaneously influence ideational factors and the outcomes they are hypothesized to affect. We also recommend panel data collection, which may better tease out the time-order of events. Ideational factors, measured at one wave of data collection, could then be linked to changes in family planning outcomes – use of modern contraception and intentions to use – in subsequent waves, lending greater credence to causal pathways (P. L. Hutchinson & Meekers, 2012).

## Conclusion

High fertility and low contraceptive use in northwestern Nigeria are influenced by numerous factors, including social norms for high fertility, pro-natal cultural and religious beliefs, misconceptions about contraceptive methods, and gender inequalities. This study has shown that better family planning outcomes are associated with a variety of theorized drivers of family planning behaviors, including personal approval of modern contraception, communication with spouse/partner, correct knowledge of contraceptive benefits, accurate risk perceptions, and self-efficacy to use contraception. The implication is that well-designed social and behavior change programs that target these potential drivers can have large potential benefits. Our analysis showed that improving contraceptive knowledge and risk perceptions alone could increase modern contraceptive use by approximately 8.8 percentage points and approval of modern contraception by 17.5 percentage points. The latter effect would propel further improvements in contraceptive use. Women, however, do not make family planning decisions in a vacuum, and this analysis has further shown the important effects of social influences from husbands, family members, and health care providers. To bolster the effects of SBC messaging on women's behaviors, SBC programs would do well to target those latter groups in addition to targeting the women users themselves.

# Abbreviations

B-A/N: Breakthrough ACTION/Nigeria; EA: Enumeration Area; FP: Family Planning; IUD: Intrauterine Device; LAM: lactational amenorrhea method; LGA: Local Government Area; NPC: National Population Commission; NDHS: Nigeria Demographic and Health Survey; Obs: Observations; SBC: Social and Behavior Change; USAID: United States Agency for International Development.

# Declarations

## Author contributions

PLH, PCH, EWJ, and MO contributed to the design of the study. PLH, UA, and EWJ analyzed and interpreted the data. PH drafted the manuscript. PLH, PCH, EWJ, UA, DA and MO contributed to writing the manuscript. All authors read and approved the final manuscript.

## Ethics approval

Ethical approval for this study was obtained from the National Health Research Ethics Committee (NHREC) in Nigeria [NHREC/01/01/2007- 02/09/2019] and the Tulane University Institutional Review Board (IRB) in Louisiana, USA [2019-1047]. Written informed consent to participate in the survey was obtained from all willing participants for the household and female questionnaires. Each participant signed or marked her thumbprint on the consent form to signify willingness to participate. All study methods were carried out in accordance with relevant guidelines and regulations along with the approval.

## Consent for publication

Not applicable

## Competing interests

The authors declare that they have no competing interests.

## Availability of data and materials

The data for this study are available from the corresponding author: Paul Hutchinson, phutchin@tulane.edu

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## Tables

Table 1. Ideational Variables

Dimension	Domain	Likert-scale statement or question	Definition (from Kincaid et al)
Cognitive	Knowledge	<ul style="list-style-type: none"> <li>- Contraception benefit for children?</li> <li>- Contraception benefits for self?</li> <li>- Side effects from using contraception are normal and usually go away in a few months.</li> <li>- A woman's body is not ready for childbirth until she is 18.</li> <li>- Women over 35 have a higher risk of complications during pregnancy and shortly after birth.</li> </ul>	
	Beliefs (attitude)	<ul style="list-style-type: none"> <li>- Couples who use a modern contraception have better quality of life.</li> </ul>	Beliefs about an object or behavior
	Values (attitude)	<ul style="list-style-type: none"> <li>- Do you personally approve of using contraception for spacing births?</li> <li>- It is important that husbands and wives discuss contraception.</li> </ul>	Values that specify its positive or negative consequences

Dimension	Domain	Likert-scale statement or question	Definition (from Kincaid et al)
	Contraceptive Myths	<ul style="list-style-type: none"> <li>- Use of some contraceptives can make a woman permanently infertile.</li> <li>- Contraceptives can harm a woman's womb.</li> <li>- Contraceptives can reduce a man's sexual urge.</li> <li>- Contraceptives reduce a woman's sexual urge.</li> <li>- Contraceptives can cause cancer.</li> <li>- Contraceptives can give you deformed babies.</li> <li>- Women who use contraception end up with health problems.</li> <li>- Women who use contraceptives may become promiscuous.</li> </ul>	-
	Subjective Norms	<ul style="list-style-type: none"> <li>- People will call you bad names if they know you use contraception.</li> <li>- q326 Religious leaders should speak publicly about modern contraception.</li> <li>- Most couples in my community use modern methods for spacing.</li> </ul>	What an individual thinks others expect him/her to do as well as what an individual thinks other people are doing (social norms)
Emotional	Self-efficacy	<ul style="list-style-type: none"> <li>- How confident are you to convince your husband/partner to use modern FP?</li> <li>- How confident are you to use a modern method even if your partner disagrees?</li> </ul>	Beliefs in one's capability to organize and execute the course of action required to manage prospective situations.

Dimension	Domain	Likert-scale statement or question	Definition (from Kincaid et al)
Social	Social influence	<ul style="list-style-type: none"> <li>- Who decides if you use a contraceptive method? (self alone, partner, both)</li> <li>- Besides yourself, who else influences your decision to use family planning? (husband, mother-in-law, mother, health care provider)</li> </ul>	Encompasses all interpersonal processes by which other people persuade someone to behave a certain way, as well as influence that occurs by social modeling by others

Table 2. Sample Characteristics of women with a child born in the previous two years

<b>Variable</b>	<b>% Freq.</b>	<b>N</b>
<b>Maternal education (highest level attended)</b>		
None	73.9	2,209
Primary	4.8	153
Secondary or higher	10.6	330
Islamic	10.7	308
Total	100.0	3,000
N	3,000	
<b>Maternal age (in years)</b>		
15-24 years	40.6	1,231
25-34 years	45.4	1,365
35-49 years	14.0	404
Total	100.0	3,000
N	3,000	
<b>Husband's Education (highest level attended)</b>		
None	58.3	1,704
Primary	6.1	192
Secondary	12.4	377
Tertiary	12.6	366
Islamic	10.7	310
Total	100.0	2,949
N	2,949	
<b>Household wealth index</b>		
First (Poorest)	20.9	715
Second	20.3	597
Third	20.1	582
Fourth	19.0	489
Fifth (least Poor)	19.6	617
Total	100.00	3,000

<b>Variable</b>	<b>% Freq.</b>	<b>N</b>
N	3,000	
<b>Parity</b>		
None	1.3	21
1	19.3	612
2	17.5	562
3	15.7	499
4	13.0	377
5	11.7	328
6	7.3	202
7+	14.3	399
Total	100.0	3,000
Median No. of Children	3	3,000
Currently breastfeeding?		
No	7.0	182
Yes	93.0	2,416
Total	100.0	2,598
N	2,598	

Table 3. Family Planning Outcomes and Ideational Factors

	Pct.	[95% Conf	Interval]	N
<b>Outcomes</b>				
Currently using modern contraception†	13.3%	9.5%	17.2%	3000
In the next 6 months, do you plan to start using a modern method?	14.7%	10.7%	18.7%	2571
Ever talked to husband about the ideal number of children	7.4%	5.4%	9.5%	3000
Ever talked with partner about using family planning	22.5%	17.1%	27.8%	3000
<b>Knowledge of contraceptive benefits for children</b>				
No benefits	12.0%	8.2%	15.7%	3000
Better growth	59.9%	52.8%	67.1%	3000
Better nutritional status	30.7%	23.1%	38.2%	3000
Better overall health	32.6%	25.3%	39.9%	3000
Better survival chance	15.3%	9.7%	21.0%	3000
More attention by mother	27.6%	20.9%	34.3%	3000
Better education	6.5%	3.7%	9.3%	3000
More opportunities	6.7%	2.3%	11.2%	3000
<b>Knowledge of contraceptive benefits for a woman</b>				
No benefits	11.7%	7.8%	15.6%	3000
Woman gets rest after birth	66.9%	59.8%	73.9%	3000
Better health and nutrition	35.9%	28.7%	43.1%	3000
Beauty and youthfulness	25.2%	18.2%	32.2%	3000
Fewer pregnancy complications	15.7%	9.7%	21.7%	3000
Reduce unwanted pregnancies	15.5%	8.4%	22.6%	3000
Fewer children to educate	3.4%	1.1%	5.7%	3000
Family has more money	2.2%	0.5%	3.9%	3000
<b>Knowledge</b>				
A woman's body is not ready for childbirth until she is 18	27.2%	20.0%	34.4%	3000
Women over 35 have a higher risk of complications during pregnancy	40.1%	32.5%	47.7%	3000

	Pct.	[95% Conf	Interval]	N
<b>Contraceptive Myths</b>				
Use of some contraceptives can make a woman permanently infertile.	28.3%	22.5%	34.2%	3000
Contraceptives can harm a woman's womb	28.5%	23.0%	34.0%	3000
Contraceptives can reduce a man's sexual urge	14.7%	10.8%	18.7%	3000
Contraceptives can reduce a woman's sexual urge	15.5%	11.5%	19.5%	3000
Contraceptives can cause cancer	18.6%	13.9%	23.3%	3000
Contraceptives can give you deformed babies.	18.3%	14.1%	22.6%	3000
Women who use contraception end up with health problems	32.5%	27.0%	38.0%	3000
Women who use contraception may become promiscuous	14.7%	10.8%	18.6%	3000
<b>Norms</b>				
Religious leaders should speak publicly about modern contraception	49.5%	42.3%	56.7%	3000
Most couples in my community use modern methods for spacing births	46.3%	38.1%	54.5%	3000
<b>Belief</b>				
Couples who use modern contraception have a better quality of life	58.7%	51.2%	66.3%	3000
<b>Value</b>				
It is important that husbands and wives discuss contraception	69.5%	62.6%	76.4%	3000
Approve of using contraception for spacing	43.2%	36.3%	50.1%	3000
<b>Social Influences: Who else influences FP use decision?</b>				
No one else	60.1%	53.1%	67.0%	3000
Partner	30.7%	23.9%	37.5%	3000
Mother-in-law	3.4%	2.0%	4.8%	3000
Mother	4.7%	2.6%	6.8%	3000
Health provider	3.8%	2.1%	5.5%	3000
<b>Self-Efficacy</b>				
Strongly agree that a woman should play a role in making decisions about the household	58.7%	50.0%	67.4%	3000

	Pct.	[95% Conf	Interval]	N
Confident to convince your husband to use FP	49.1%	42.2%	56.0%	3000
Confident to use modern contraception	37.5%	30.7%	44.2%	3000
<b>Autonomy</b>				
Who decides if you use a contraceptive method?				
Mainly your decision	24.1%	18.7%	30.4%	3000
Mainly your partner's decision	21.7%	16.4%	28.1%	3000
Both decide	54.2%	47.1%	61.2%	3000
Who usually decides about major household purchases?				
Respondent	8.5%	4.8%	14.4%	3000
Spouse	58.5%	49.5%	66.9%	3000
Both	28.1%	21.2%	36.3%	3000
Other	0.9%	0.6%	1.5%	3000
Don't know	4.0%	1.7%	9.0%	
<b>Exposure to family planning messages in last 12 months</b>				
Television	1.4%	0.7%	2.2%	3000
Radio	9.3%	5.1%	13.5%	3000
Other media	1.9%	-1.3%	5.1%	3000
Any media	10.4%	6.1%	14.8%	3000

† Modern methods included: IUD, injectables, implants, pill, male condom, female condom, female sterilization, male sterilization, lactational amenorrhea method (LAM), spermicide, diaphragm or emergency contraception or if they reported having been sterilized or that their husband had received a vasectomy. Lactational amenorrhea method (LAM) was excluded.

Table 4. Reasons for Use and Non-Use of Contraception

	Pct.	[95% Conf	Interval]	N
<b>Reasons for Using Contraception</b>				
- Prefer to wait before having another child	77.2%	66.1%	88.3%	429
- Partner wants to use contraception	32.4%	20.8%	43.9%	429
- Does not want more children	10.2%	5.0%	15.4%	429
- Health providers says shoud use	6.7%	3.2%	10.3%	429
- Protect against STIs	1.0%	-0.1%	2.1%	429
<b>Reasons for Not Using Contraception</b>				
- Up to God	24.7%	18.7%	30.7%	2,571
- Breastfeeding	23.1%	16.2%	30.0%	2,571
- Husband opposes	21.1%	15.9%	26.3%	2,571
- Respondent opposes	17.9%	12.6%	23.2%	2,571
- Wants more children	13.4%	8.5%	18.3%	2,571
- Fear of infertility	8.0%	5.1%	11.0%	2,571
- Interferes with body	5.9%	3.2%	8.7%	2,571
- Health concerns/Fear of side effects	2.9%	1.5%	4.3%	2,571
- Costs too much	0.5%	0.2%	0.8%	2,571
- Difficult to get transport	0.4%	0.1%	0.8%	2,571
- Distance to health facility	0.4%	0.0%	0.8%	2,571

Table 5. Mixed-Effects Logistic Regression: Current Modern Contraceptive Use

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Predicted Probability	RRR	
Maternal Education						
None	1.000			0.127		
Primary	0.797	0.403	1.574	0.513	0.115	0.908
Secondary or higher	1.485	0.831	2.651	0.181	0.148	1.171
Islamic	1.507	0.611	3.721	0.373	0.149	1.178
Maternal Age						
15-24 years	1.000			0.138		
25-34 years	0.885	0.570	1.374	0.586	0.131	0.953
35-49 years	0.800	0.418	1.530	0.500	0.126	0.914
Husband's education						
None	1.000			0.122		
Primary	0.980	0.474	2.025	0.956	0.121	0.991
Secondary	1.556	0.903	2.683	0.111	0.146	1.196
Tertiary	1.450	0.776	2.711	0.244	0.142	1.164
Islamic	1.374	0.569	3.320	0.480	0.139	1.139
Wealth						
Poorest	1.000			0.145		
Second	0.711	0.366	1.380	0.314	0.127	0.872
Third	0.420	0.207	0.852	0.016	0.101	<b>0.693</b>
Fourth	0.926	0.458	1.875	0.832	0.141	0.971
Least Poor	0.909	0.439	1.881	0.797	0.140	0.963
Number of wives						
Sole wife	1.000			0.133		
2 wives	0.954	0.614	1.482	0.835	0.131	0.981
3+ wives	1.053	0.488	2.271	0.895	0.136	1.021
Parity						
<2	1.000			0.116		

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Predicted Probability	RRR	
2	1.174	0.668	2.064	0.577	0.124	1.070
3	1.599	0.878	2.912	0.125	0.141	1.212
4	1.984	1.026	3.837	0.042	0.153	<b>1.316</b>
5+	1.467	0.783	2.747	0.231	0.136	1.171
Currently Breastfeeding						
No	1.000				0.155	
Yes	0.624	0.388	1.003	0.052	0.129	0.833
IPC: Ever talked with Husband about FP						
No	1.000				0.065	
Yes	9.333	6.023	14.461	0.000	0.212	<b>3.244</b>
KNOWLEDGE: Knowledge Index						
Low	1.000				0.090	
High	2.887	1.674	4.977	0.000	0.145	<b>1.610</b>
BELIEF: Couples who use FP have a better quality of life						
No	1.000				0.090	
Yes	2.590	1.207	5.560	0.015	0.138	<b>1.526</b>
VALUE: Approve of FP for Spacing						
No/DK	1.000				0.053	
Yes	7.836	3.948	15.550	0.000	0.156	<b>2.937</b>
VALUE: Important for couples to discuss FP						
No					0.129	
Yes	1.090	0.550	2.159	0.806	0.133	1.035
CONTRACEPTIVE MYTHS						
Low	1.000				0.146	
High	0.513	0.338	0.779	0.002	0.111	<b>0.759</b>
NORM: Religious leaders should speak about FP						

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Predicted Probability	RRR
Disagree/DK	1.000			0.148	
Agree	0.695	0.426	1.134	0.145	0.867
NORM: Most couples in the community use FP					
No	1.000			0.128	
Yes	1.129	0.689	1.850	0.630	1.050
SELF-EFFICACY: Women should be involved in household decision-making					
No	1.000			0.142	
Yes	0.791	0.503	1.244	0.310	0.912
SELF-EFFICACY: Confident to use FP if partner opposes					
No	1.000			0.109	
Yes	1.926	1.227	3.023	0.004	1.323
SOCIAL: Husband influences FP decisions					
No	1.000			0.127	
Yes	1.340	0.882	2.037	0.171	1.124
SOCIAL: Mother-in-law influences FP decisions					
No	1.000			0.132	
Yes	2.263	0.847	6.048	0.103	1.353
SOCIAL: Mother influences FP decisions					
No	1.000			0.135	
Yes	0.566	0.265	1.207	0.140	0.788
SOCIAL: Health provider influences FP decisions					
No	1.000			0.128	
Yes	2.771	1.382	5.555	0.004	1.466
SOCIAL: Who decides if you use a contraceptive method?					
Mainly partner's decision	1.000			0.091	
Mainly your decision	1.497	0.704	3.185	0.295	1.212
Both decide together	2.811	1.472	5.365	0.002	1.589

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Predicted Probability	RRR
MEDIA: Exposure to FP messages on TV					
No	1.000			0.133	
Yes	1.095	0.462	2.596	0.837	0.138
MEDIA: Exposure to FP messages on radio					
No	1.000			0.129	
Yes	1.509	0.889	2.563	0.127	0.152
Media: Exposure to FP messages elsewhere					
No	1.000			0.132	
Yes	1.849	0.398	8.598	0.433	0.167
Intervention area:					
Vertical	1.000			0.120	
Integrated	1.553	0.764	3.156	0.224	0.143
Intercept	0.001	0.000	0.003	0.000	
/lnsig2u	0.527	0.025	1.030		
sigma_u	1.302	1.012	1.674		
rho	0.340	0.238	0.460		
LR test of rho=0					
chibar2(01)=	98.36				
Prob>=chibar2=	0.000				
Number of Obs	2912				
Number of Groups	108				
Random effects	Gaussian				
Integration Method	mvaghermite				
Wald chi2(40)	307.260				
Prob>chi2	0.000				

Table 6. Mixed-Effects Logistic Regression: Intention to Use Modern Contraception in the next 6 months

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
Maternal Education						
None	1.000			0.138		
Primary	0.620	0.281	1.368	0.237	0.114	0.826
Secondary or higher	1.024	0.472	2.224	0.951	0.140	1.009
Islamic	0.743	0.294	1.879	0.530	0.123	0.890
Maternal Age						
15-24 years	1.000			0.138		
25-34 years	1.035	0.631	1.697	0.892	0.140	1.013
35-49 years	0.635	0.305	1.321	0.224	0.115	0.834
Husband's education						
None	1.000			0.133		
Primary	0.567	0.252	1.275	0.170	0.105	0.790
Secondary	1.652	0.916	2.981	0.095	0.160	1.209
Tertiary	0.869	0.409	1.845	0.714	0.125	0.945
Islamic	1.153	0.472	2.816	0.754	0.140	1.057
Wealth						
Poorest	1.000			0.146		
Second	1.077	0.570	2.034	0.820	0.150	1.028
Third	0.788	0.399	1.557	0.494	0.133	0.914
Fourth	0.730	0.351	1.519	0.401	0.129	0.887
Least Poor	0.659	0.294	1.475	0.310	0.124	0.852
Number of wives						
Sole wife	1.000			0.130		
2 wives	1.218	0.764	1.941	0.408	0.141	1.080
3+ wives	3.149	1.281	7.743	0.012	0.197	<b>1.512</b>
Parity						
<2	1.000			0.116		

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
2	1.302	0.713 2.378	0.390	0.130	1.115
3	1.556	0.798 3.034	0.195	0.139	1.195
4	0.837	0.378 1.855	0.661	0.108	0.927
5+	2.139	1.107 4.133	0.024	0.157	1.348
Currently Breastfeeding					
No	1.000			0.115	
Yes	1.565	0.844 2.903	0.155	0.138	1.197
IPC: Ever talked with Husband about FP					
No	1.000			0.096	
Yes	10.839	6.525 18.005	0.000	0.262	<b>2.737</b>
KNOWLEDGE: Knowledge Index					
Low	1.000			0.124	
High	1.379	0.857 2.218	0.185	0.141	1.137
BELIEF: Couples who use FP have a better quality of life					
No	1.000			0.127	
Yes	1.198	0.602 2.382	0.607	0.136	1.074
VALUE: Approve of FP for Spacing					
No/DK	1.000			0.035	
Yes	21.570	11.299 41.176	0.000	0.206	<b>5.905</b>
VALUE: Important for couples to discuss FP					
No	1.000			0.108	
Yes	1.813	0.914 3.597	0.089	0.139	1.277
CONTRACEPTIVE MYTHS					
Low	1.000			0.158	
High	0.365	0.234 0.568	0.000	0.105	<b>0.665</b>
NORM: Religious leaders should speak about FP					

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
Disagree/DK	1.000			0.120	
Agree	1.498	0.889	2.524	0.129	1.176
NORM: Most couples in the community use FP					
No	1.000			0.118	
Yes	1.660	1.013	2.721	0.044	<b>1.228</b>
SELF-EFFICACY: Women should be involved in household decision-making					
No	1.000			0.143	
Yes	0.817	0.500	1.335	0.419	0.925
SELF-EFFICACY: Confident to use FP if partner opposes					
No	1.000			0.108	
Yes	2.524	1.616	3.943	0.000	<b>1.477</b>
SOCIAL: Husband influences FP decisions					
No	1.000			0.128	
Yes	1.580	0.991	2.519	0.055	1.194
SOCIAL: Mother-in-law influences FP decisions					
No	1.000			0.135	
Yes	1.032	0.301	3.537	0.960	1.012
SOCIAL: Mother influences FP decisions					
No	1.000			0.134	
Yes	1.551	0.604	3.980	0.362	1.180
SOCIAL: Health provider influences FP decisions					
No	1.000			0.133	
Yes	2.303	0.846	6.267	0.102	1.358
SOCIAL: Who decides if you use a contraceptive method?					
Mainly partner's decision	1.000			0.094	
Mainly your decision	4.176	2.131	8.184	0.000	<b>1.785</b>
Both decide together	2.168	1.192	3.944	0.011	<b>1.392</b>

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
MEDIA: Exposure to FP messages on TV					
No	1.000			0.135	
Yes	1.687	0.388	7.339	0.486	1.215
MEDIA: Exposure to FP messages on radio					
No	1.000			0.135	
Yes	1.054	0.556	1.998	0.872	1.021
Media: Exposure to FP messages elsewhere					
No	1.000			0.138	
Yes	0.072	0.006	0.941	0.045	<b>0.277</b>
Intervention area:					
Vertical	1.000			0.148	
Integrated	0.690	0.355	1.338	0.272	0.865
Intercept	0.001	0.000	0.003	0.000	
/lnsig2u	0.304	-0.235	0.842		
sigma_u	1.164	0.889	1.524		
rho	0.292	0.194	0.414		
LR test of rho=0					
chibar2(01)=	73.70				
Prob>=chibar2=	0.000				
Number of Obs	2485				
Number of Groups	108				
Random effects	Gaussian				
Integration Method	mvaghermite				
Wald chi2(40)	295.190				
Prob>chi2	0.000				

Table 7. Mixed-Effects Logistic Regression: Ever spoken with husband about the number of children to have

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
Maternal Education						
None	1.000			0.083		
Primary	0.807	0.398	1.633	0.550	0.072	0.867
Secondary or higher	0.781	0.434	1.404	0.408	0.070	0.848
Islamic	1.007	0.439	2.309	0.988	0.083	1.004
Maternal Age						
15-24 years	1.000			0.078		
25-34 years	0.952	0.612	1.481	0.827	0.075	0.967
35-49 years	1.274	0.669	2.425	0.461	0.091	1.173
Husband's education						
None	1.000			0.069		
Primary	0.935	0.420	2.078	0.868	0.066	0.953
Secondary	1.352	0.787	2.322	0.275	0.085	1.230
Tertiary	1.577	0.850	2.925	0.148	0.094	1.362
Islamic	1.126	0.480	2.640	0.785	0.075	1.086
Wealth						
Poorest	1.000			0.050		
Second	1.127	0.542	2.346	0.749	0.055	1.095
Third	1.385	0.674	2.845	0.376	0.064	1.277
Fourth	2.002	0.954	4.201	0.066	0.083	1.662
Least Poor	2.812	1.331	5.938	0.007	0.104	<b>2.091</b>
Number of wives						
Sole wife	1.000			0.083		
2 wives	0.699	0.446	1.096	0.119	0.065	0.784
3+ wives	0.760	0.324	1.785	0.529	0.069	0.831
Parity						
<2	1.000			0.082		

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
2	0.728	0.418	1.268	0.262	0.066	0.806
3	0.946	0.528	1.695	0.852	0.079	0.964
4	1.241	0.661	2.329	0.502	0.094	1.151
5+	0.898	0.485	1.662	0.731	0.076	0.930
Currently Breastfeeding						
No	1.000				0.087	
Yes	0.824	0.522	1.301	0.407	0.076	0.880
KNOWLEDGE: Knowledge Index						
Low	1.000				0.053	
High	2.040	1.223	3.403	0.006	0.088	<b>1.662</b>
BELIEF: Couples who use FP have a better quality of life						
No	1.000				0.064	
Yes	1.391	0.734	2.637	0.311	0.081	1.255
VALUE: Approve of FP for Spacing						
No/DK	1.000				0.038	
Yes	3.619	2.105	6.225	0.000	0.100	<b>2.617</b>
VALUE: Important for couples to discuss FP						
No	1.000				0.080	
Yes	0.970	0.527	1.786	0.922	0.078	0.980
CONTRACEPTIVE MYTHS						
Low	1.000				0.069	
High	1.506	1.018	2.230	0.041	0.091	<b>1.313</b>
NORM: Religious leaders should speak about FP						
Disagree/DK	1.000				0.085	
Agree	0.834	0.523	1.329	0.445	0.076	0.887
NORM: Most couples in the community use FP						

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
No	1.000			0.065	
Yes	1.433	0.880 2.335	0.148	0.084	1.281
SELF-EFFICACY: Women should be involved in household decision-making					
No	1.000			0.074	
Yes	1.111	0.714 1.729	0.640	0.080	1.074
SELF-EFFICACY: Confident to use FP if partner opposes					
No	1.000			0.060	
Yes	1.757	1.123 2.750	0.014	0.090	<b>1.485</b>
SOCIAL: Husband influences FP decisions					
No	1.000			0.072	
Yes	1.385	0.931 2.060	0.108	0.089	1.244
SOCIAL: Mother-in-law influences FP decisions					
No	1.000			0.078	
Yes	1.325	0.526 3.339	0.551	0.094	1.202
SOCIAL: Mother influences FP decisions					
No	1.000			0.075	
Yes	2.368	1.250 4.486	0.008	0.130	<b>1.726</b>
SOCIAL: Health provider influences FP decisions					
No	1.000			0.078	
Yes	1.147	0.559 2.355	0.708	0.085	1.095
SOCIAL: Who decides if you use a contraceptive method?					
Mainly partner's decision	1.000			0.058	
Mainly your decision	0.492	0.230 1.052	0.067	0.033	0.575
Both decide together	2.094	1.183 3.705	0.011	0.097	<b>1.687</b>
MEDIA: Exposure to FP messages on TV					
No	1.000			0.076	
Yes	2.043	0.959 4.350	0.064	0.121	1.586

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
MEDIA: Exposure to FP messages on radio					
No	1.000			0.076	
Yes	1.282	0.766	2.147	0.345	1.180
Media: Exposure to FP messages elsewhere					
No	1.000			0.076	
Yes	2.948	0.801	10.855	0.104	1.966
Intervention area:					
Vertical	1.000			0.075	
Integrated	1.135	0.628	2.054	0.675	1.088
Intercept	0.002	0.001	0.007	0.000	
/lnsig2u	-0.029	-0.632	0.574		
sigma_u	0.986	0.729	1.332		
rho	0.228	0.139	0.351		
LR test of rho=0					
chibar2(01)=	46.62				
Prob>=chibar2=	0.000				
Number of Obs	2912				
Number of Groups	108				
Random effects	Gaussian				
Integration Method	mvaghermite				
Wald chi2(40)	186.180				
Prob>chi2	0.000				

Table 8. Mixed-Effects Logistic Regression: Ever spoken with husband about family planning

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
Maternal Education					
None	1.000			0.218	
Primary	1.227	0.687	2.191	0.490	1.073
Secondary or higher	1.385	0.803	2.388	0.242	1.118
Islamic	0.795	0.379	1.668	0.543	0.920
Maternal Age					
15-24 years	1.000			0.227	
25-34 years	0.877	0.598	1.285	0.500	0.956
35-49 years	0.962	0.551	1.676	0.890	0.987
Husband's education					
None	1.000			0.222	
Primary	1.273	0.726	2.232	0.400	1.085
Secondary	1.207	0.769	1.893	0.413	1.066
Tertiary	0.998	0.568	1.753	0.994	0.999
Islamic	0.553	0.271	1.127	0.103	0.000
Wealth					
Poorest	1.000			0.199	
Second	0.996	0.593	1.672	0.986	0.998
Third	1.371	0.808	2.329	0.242	1.123
Fourth	1.084	0.610	1.928	0.782	1.031
Least Poor	2.042	1.122	3.716	0.019	<b>1.286</b>
Number of wives					
Sole wife	1.000			0.227	
2 wives	0.684	0.473	0.988	0.043	<b>0.874</b>
3+ wives	1.487	0.739	2.992	0.266	1.139
Parity					
<2	1.000			0.195	

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
2	0.970	0.598	1.573	0.901	0.192	0.989
3	1.851	1.117	3.069	0.017	0.241	<b>1.239</b>
4	3.079	1.758	5.394	0.000	0.283	<b>1.453</b>
5+	1.421	0.832	2.427	0.198	0.221	1.133
Currently Breastfeeding						
No	1.000				0.222	
Yes	0.993	0.649	1.520	0.974	0.222	0.998
KNOWLEDGE: Knowledge Index						
Low	1.000				0.178	
High	2.212	1.517	3.228	0.000	0.240	<b>1.348</b>
BELIEF: Couples who use FP have a better quality of life						
No	1.000				0.177	
Yes	2.023	1.198	3.414	0.008	0.230	<b>1.302</b>
VALUE: Approve of FP for Spacing						
No/DK	1.000				0.110	
Yes	8.493	5.512	13.087	0.000	0.288	<b>2.630</b>
VALUE: Important for couples to discuss FP						
No	1.000				0.154	
Yes	2.872	1.666	4.952	0.000	0.231	<b>1.502</b>
CONTRACEPTIVE MYTHS						
Low	1.000				0.223	
High	0.978	0.692	1.383	0.901	0.221	0.992
NORM: Religious leaders should speak about FP						
Disagree/DK	1.000				0.231	
Agree	0.845	0.566	1.262	0.409	0.218	0.944
NORM: Most couples in the community use FP						

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
No	1.000			0.194	
Yes	1.720	1.167 2.535	0.006	0.236	<b>1.217</b>
SELF-EFFICACY: Women should be involved in household decision-making					
No	1.000			0.222	
Yes	0.992	0.678 1.451	0.968	0.222	0.997
SELF-EFFICACY: Confident to use FP if partner opposes					
No	1.000			0.178	
Yes	2.646	1.857 3.772	0.000	0.257	<b>1.443</b>
SOCIAL: Husband influences FP decisions					
No	1.000			0.204	
Yes	1.977	1.394 2.805	0.000	0.257	<b>1.263</b>
SOCIAL: Mother-in-law influences FP decisions					
No	1.000			0.224	
Yes	0.490	0.206 1.165	0.106	0.172	0.769
SOCIAL: Mother influences FP decisions					
No	1.000			0.218	
Yes	2.643	1.315 5.312	0.006	0.297	<b>1.363</b>
SOCIAL: Health provider influences FP decisions					
No	1.000			0.219	
Yes	1.947	0.999 3.794	0.050	0.272	<b>1.244</b>
SOCIAL: Who decides if you use a contraceptive method?					
Mainly partner's decision	1.000			0.166	
Mainly your decision	0.390	0.220 0.692	0.001	0.104	<b>0.629</b>
Both decide together	3.889	2.507 6.030	0.000	0.280	1.691
MEDIA: Exposure to FP messages on TV					
No	1.000			0.221	
Yes	1.441	0.554 3.744	0.454	0.250	1.130

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR
MEDIA: Exposure to FP messages on radio					
No	1.000			0.217	
Yes	1.526	0.957	2.435	0.076	1.153
Media: Exposure to FP messages elsewhere					
No	1.000			0.220	
Yes	2.566	0.574	11.478	0.218	1.350
Intervention area:					
Vertical	1.000			0.243	
Integrated	0.657	0.359	1.202	0.173	0.865
Intercept	0.001	0.000	0.003	0.000	
/lnsig2u	0.367	-0.088	0.821		
sigma_u	1.201	0.957	1.508		
rho	0.305	0.218	0.409		
LR test of rho=0					
chibar2(01)=	112.01				
Prob>=chibar2=	0.000				
Number of Obs	2912				
Number of Groups	108				
Random effects	Gaussian				
Integration Method	mvaghermite				
Wald chi2(40)	436.07				
Prob>chi2	0.000				

Table 9. Mixed-Effects Logistic Regression: Approve of contraception for birth spacing

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
Maternal Education						
None	1.000			0.483		
Primary	1.948	1.058	3.587	0.032	0.556	1.152
Secondary or higher	1.049	0.594	1.854	0.869	0.488	1.011
Islamic	0.960	0.517	1.780	0.897	0.478	0.991
Maternal Age						
15-24 years	1.000			0.498		
25-34 years	0.888	0.652	1.209	0.451	0.485	0.974
35-49 years	0.639	0.399	1.025	0.063	0.450	0.903
Husband's education						
None	1.000			0.472		
Primary	0.982	0.585	1.649	0.946	0.470	0.996
Secondary	1.775	1.132	2.785	0.012	0.536	<b>1.135</b>
Tertiary	1.370	0.799	2.348	0.253	0.507	1.074
Islamic	1.212	0.677	2.169	0.517	0.494	1.045
Wealth						
Poorest	1.000			0.500		
Second	0.970	0.664	1.415	0.873	0.497	0.993
Third	0.900	0.591	1.369	0.621	0.489	0.977
Fourth	0.782	0.487	1.257	0.310	0.474	0.947
Least Poor	0.706	0.408	1.220	0.212	0.463	0.925
Number of wives						
Sole wife	1.000			0.486		
2 wives	0.949	0.701	1.284	0.734	0.481	0.988
3+ wives	1.247	0.609	2.551	0.546	0.510	1.050
Parity						
<2	1.000			0.463		

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
2	1.185	0.802	1.751	0.394	0.482	1.040
3	1.161	0.766	1.761	0.481	0.480	1.035
4	1.007	0.624	1.623	0.978	0.464	1.002
5+	1.602	1.033	2.485	0.035	0.515	<b>1.111</b>
Currently Breastfeeding						
No	1.000				0.479	
Yes	1.077	0.766	1.512	0.670	0.487	1.017
IPC: Ever talked with Husband about FP						
No	1.000				0.440	
Yes	8.237	5.313	12.768	0.000	0.693	<b>1.575</b>
KNOWLEDGE: Knowledge Index						
Low	1.000				0.456	
High	1.701	1.247	2.321	0.001	0.516	<b>1.132</b>
CONTRACEPTIVE MYTHS						
Low	1.000				0.539	
High	0.374	0.278	0.503	0.000	0.430	<b>0.798</b>
BELIEF: Couples who use FP have a better quality of life						
No	1.000				0.354	
Yes	5.490	3.903	7.722	0.000	0.568	<b>1.606</b>
VALUE: Important for couples to discuss FP						
No	1.000				0.400	
Yes	2.779	1.980	3.900	0.000	0.518	<b>1.294</b>
NORM: Religious leaders should speak about FP						
Disagree/DK	1.000				0.445	
Agree	1.985	1.439	2.737	0.000	0.523	<b>1.177</b>
NORM: Most couples in the community use FP						
No	1.000				0.484	

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
Yes	1.029	0.745	1.422	0.862	0.488	1.006
SELF-EFFICACY: Women should be involved in household decision-making						
No	1.000				0.489	
Yes	0.961	0.701	1.316	0.803	0.484	0.991
SELF-EFFICACY: Confident to use FP if partner opposes						
No	1.000				0.443	
Yes	2.782	2.011	3.850	0.000	0.565	<b>1.274</b>
SOCIAL: Husband influences FP decisions						
No	1.000				0.490	
Yes	0.896	0.642	1.249	0.517	0.478	0.976
SOCIAL: Mother-in-law influences FP decisions						
No	1.000				0.484	
Yes	1.491	0.814	2.729	0.196	0.528	1.090
SOCIAL: Mother influences FP decisions						
No	1.000				0.483	
Yes	1.916	0.956	3.840	0.067	0.555	1.148
SOCIAL: Health provider influences FP decisions						
No	1.000				0.486	
Yes	0.932	0.417	2.082	0.863	0.478	0.984
SOCIAL: Who decides if you use a contraceptive method?						
Mainly partner's decision	1.000				0.435	
Mainly your decision	2.097	1.364	3.224	0.001	0.516	<b>1.187</b>
Both decide together	1.723	1.212	2.448	0.002	0.495	<b>1.137</b>
MEDIA: Exposure to FP messages on TV						
No	1.000				0.486	
Yes	1.116	0.383	3.251	0.841	0.498	1.025
MEDIA: Exposure to FP messages on radio						

	Odds Ratio	[95% Conf. Interval]	P>z	Adjusted Probability	RRR	
No	1.000			0.486		
Yes	1.037	0.639	1.685	0.882	0.490	1.008
Media: Exposure to FP messages elsewhere						
No	1.000			0.487		
Yes	0.411	0.117	1.451	0.167	0.392	0.806
Intervention area:						
Vertical	1.000			0.485		
Integrated	1.013	0.500	2.050	0.972	0.486	1.003
Intercept	0.033	0.013	0.081	0.000		
/Insig2u	0.912	0.563	1.261			
sigma_u	1.578	1.325	1.878			
rho	0.431	0.348	0.517			
LR test of rho=0						
chibar2(01)=	455.57					
Prob>=chibar2=	0.000					
Number of Obs	2912.000					
Number of Groups	108.000					
Random effects	Gaussian					
Integration Method	mvaghermite					
Wald chi2(40)	546.23					
Prob>chi2	0.000					

## Figures

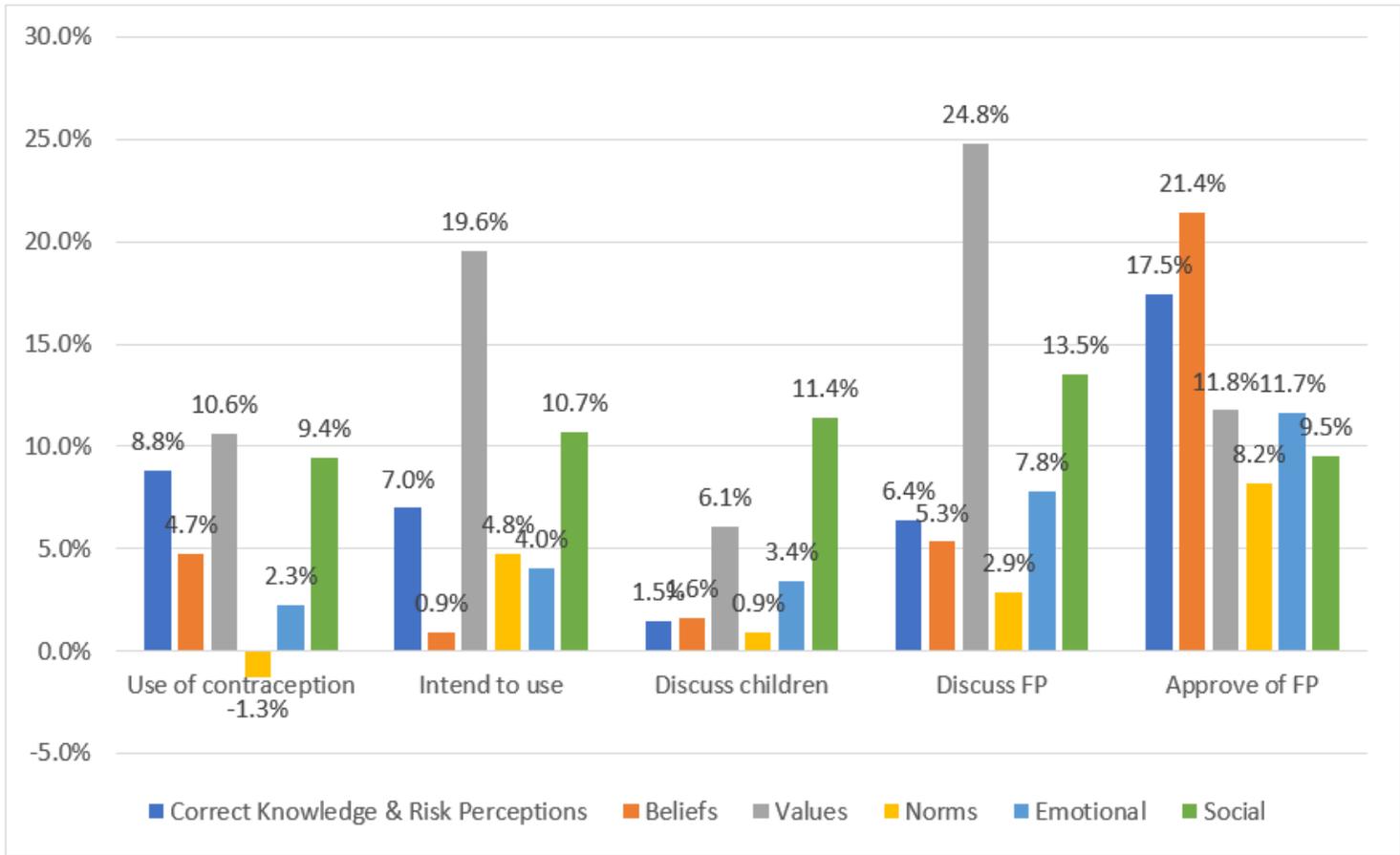
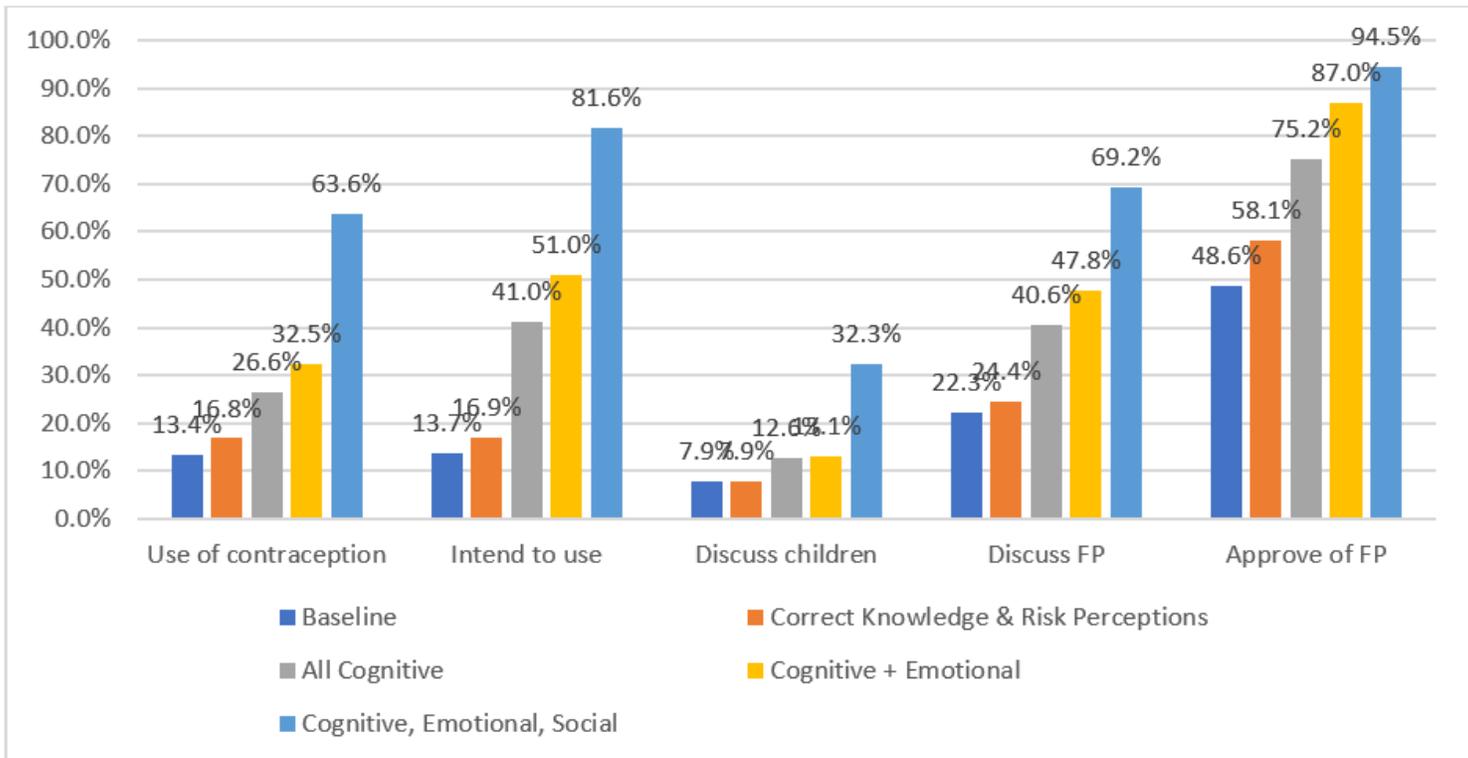


Figure 1

Marginal Effects from Ideational Factors



## Figure 2

Improved Family Planning Outcomes from Improved Ideational Factors