COUPLES' AGREEMENT ON GENDER NORMS AND MODERN CONTRACEPTIVE USE IN URBAN NIGERIA

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ABSTRACT

Kashika Mohan Sahay: Couples' Agreement on Gender Norms and Modern Contraceptive Use in Urban Nigeria
(Under the direction of Sandra L. Martin and Ilene S. Speizer)

Around the world, socially defined responsibilities, decision making ability, and control over resources vary for men and women; with men usually having more power than women in social situations. In Nigeria, gender inequity is high and use of family planning (FP) methods is low. However, few studies have examined couples' agreement on gender norms and how (and if) this relates to modern contraceptive use in urban areas.

This dissertation uses a two-paper format to analyze data collected from men and women in four Nigerian cities (Abuja, Ibadan, Ilorin and Kaduna) as part of the Measurement, Learning & Evaluation Project. I retrospectively matched data on 2,184 married couples to investigate couples' agreement on gender norms (attitudes towards wife beating, household decision making, and restrictions on wife's activities) and modern contraceptive use between 2010-2014.

In the first paper, I present evidence of high inequity among couples on specific gender norms: namely, restrictions on contraceptive use, beating if unfaithful, and husband deciding large household purchases. Adjusted multivariate analysis found couples where both partners favored restricting wife's activities had 0.31 times lower odds (95% CI: 0.21, 0.45) of using modern contraception as compared to couples who both disapproved of restrictions on wife's activities. Couples that disagreed about restrictions on wife's activities had 0.57 times lower odds of using modern contraception as compared to couples that both disapproved of restrictions in multivariate analysis. The wife beating and household decision making measures had more mixed associations with modern contraceptive use. In the second paper, using reproductive calendar data, I find that 37.5% of women adopted modern contraception within the extended postpartum period (i.e.18 months after a birth event). Couples' agreement on gender norms

was not associated with modern contraceptive adoption in this period. However, other variables such as women's education status and work status were significantly associated with contraceptive adoption, supporting existing evidence on the importance of gender equity.

These analyses suggest that even if an individual endorses an equitable viewpoint, their partner's disagreement could prevent or discourage modern contraceptive use. Understanding of gender norms may promote healthy reproductive lives for married couples in urban Nigeria.

After writing and rewriting (what feels like) hundreds of drafts, this page stops me in my tracks. Every time I think of all the people who have contributed to this endeavor, my eyes well up.

First and foremost, this PhD is dedicated to my mother, Manika, for always believing in me. You are the one who has always been there for me and believed that I was worthy of complete this dissertation and anything else that I choose to put my mind to. You are the mother of a PhD now!!

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LIST OF ABBREVIATIONS

CPR	Contraceptive Prevalence Rate
DHS	Demographic Health Survey
EU	Enumeration Area
FP	Family Planning
FP 2020	Family Planning 2020 Initiative
GSDM	Gender Sensitive Decision Making Scale
ICPD	International Conference on Population and Development
LAM	Lactational Amenorrhea
MCH	Maternal and Child Health
MDG	Millennium Development Goals
MLE	Measurement, Learning and Evaluation
NURHI	Nigeria Urban Reproductive Health Initiative
NDHS	Nigeria Demographic and Healthy Survey
PSU	Primary Sampling Unit
RWA	Restrictions on Wife's Activities Scale
SDG	Sustainable Development Goals
URHI	Urban Reproductive Health Initiative
WHO	World Health Organization

CHAPTER 1: INTRODUCTION AND CONCEPTUAL MODEL

Introduction

In this dissertation, I investigated whether couples' agreement on gender norms (restrictions on wife's activity, attitudes towards wife beating and household decision making) are associated with women's modern contraceptive use in urban Nigeria. This dissertation is relevant to Sustainable Development Goals (SDG) 3 (health for all), 5 (gender empowerment), and 11 (focus on urban areas). The project uses a matched couples' dataset that allow me to examine husband-wife agreement on key gender related measures and women's modern contraceptive use at baseline and over time. In this section, I briefly review the relevance of this dissertation to the SDGs, provide definitions of key terms and present the conceptual frame surrounding this dissertation.

Table 1-1. Key indicators used in this dissertation.

Gender norms measures
- Restrictions on wife's activities
- Justification of wife beating
- Household decision making power

Couples agreement on gender norms
- Both members endorse equitable gender norms for all scale items
- Both members endorse some inequitable gender norms across scale items
- Husband endorses more inequitable norms than wife
- Wife endorses more inequitable norms than husband

Modern contraception (as classified in the NURHI baseline report[70])
- Sterilization (male/female)
- Implants, injectables, intrauterine contraceptive devices (IUCD)
- Daily pill/emergency pill
- Condoms (male/female)
- Breastfeeding /lactational amennorhea (LAM)
- Diaphragms, foam, jelly or spermicide

Non-use of modern contraception
- Traditional methods
- Non-use of contraception

Sustainable development goals (SDG) and relevance to this dissertation

The SDGs endorse gender equality as a key path to sustainable development and promote the adoption of improving access to and uptake of family planning in the developing world[1]. This study focuses on understudied urban areas and highlights agreement and disagreement within couples on gender

norms. The dissertation is unique in that it combines data on reproductive health, gender attitudes, and sociodemographic factors from men and women along with women's reproductive calendar data. Combining these data allows me to provide a rich picture of contraceptive use and gender norms over time in this urban Nigerian population. Urban areas are increasingly an area of focus as disparities exist between the urban rich and poor as well. Increasingly, individuals are living in urban areas. Findings from this analysis can contribute evidence for expanding family planning (FP) interventions that consider gender and couples' dynamics. This research has implications for the health and well-being of Nigerian women, their husbands, families and communities.

Gender norms

This dissertation examines gender norms surrounding household decision making, restrictions on women's activities and attitudes towards wife beating. Briefly, I outline the relationship between gender norms, gender equ(al)ity, and women's empowerment/autonomy as defined in SDG goal 5. SDG 5 states "Achieve gender equality and empower all women and girls." The United Nations defines gender inequality, as the time and context specific ways that rights, responsibilities and opportunities are unequally distributed on the basis of socially defined gender norms[2]. Importantly, gender norms (i.e. the roles, powers and ability to make decisions) are recognized as socially constructed hierarchies of power that have historically privileged men. Women's empowerment is often seen as the process by the hierarchy can be dismantled and power redistributed. Often a distinguishing factor between empowerment and equity is the implication that empowerment is a dynamic process that occurs over time whereas equ(al)ity is the goal to work towards. Although there is considerable debate in the field on the implications of different terms, these terms are often measured using similar scales[3]. For a detailed analysis of appropriateness, use and value of gender related metrics, I refer the reader to papers by Malhotra and Ghuman[3,4].

Data from this dissertation can be an interesting corollary to the SDG indicator "5.6.1. Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care". Although, we do not look at informed decision

making, this dissertation provides evidence of married women's abilities to make decisions overall and specific to her own health care, as well as her partner's views on these decisions. Furthermore, it tests whether it's acceptable for a wife to refuse sex, refuse having another child and her rights to be free of violence under certain circumstances. Analyses of data from population-based surveys in a number of African countries suggest that gender norms that support women's abilities to negotiate sexual activity and control over household economic decision-making are associated with higher contraceptive use[5]. For this dissertation, I am operationalizing these complex realities by measuring couples' agreement on equitable gender norms, which assesses the extent to which husbands' and wives' agree on specific gender norms. The details of the measures are discussed later in Chapter 2-4.

Family planning

SDG number 3 advocates for health and well-being for all. Included within health and well-being is a recognition that increasing uptake of family planning remains a critical global need[6]. As recently as 2012, an estimated 12% (220 million) women worldwide, who are married or living with a partner still had an unmet need for family planning, (i.e. women who want to space or limit their births but do not have access to a modern method of contraception)[8]. Between 1990 and 2010, the worldwide contraceptive prevalence rate (CPR) among women of reproductive age increased from 13% to 26%[6]. However, very minimal reductions in unmet need have been recorded since 1990[8]. Unmet need in sub-Saharan Africa is double that of the rest of the world at 25% of married women of reproductive age (approximately 49 million women). In response to the continued need for family planning, the Family Planning 2020 initiative (FP2020), works with government stakeholders in the world's poorest countries to focus efforts on family planning[9]. Thus, increasing access to voluntary and effective family planning methods is critical for sustainable development[9].

Understanding women's patterns of contraceptive adoption in the postpartum period has implications for service delivery and access to contraceptive services[10]. Research from postpartum women in 22 developing countries suggests that nearly 40% of postpartum women intend to use contraception but are not currently using a method[11]. Many women report attending a health facility for care for themselves

or an infant within 6 months of delivery[11]. This represents a significant opportunity for FP services and programs who may be able to identify women in the postpartum period as they seek health services[12]. However, inequitable gender norms, or the imbalance in the rights, resources and opportunities available to women, may be an underlying factor influencing contraceptive use patterns[13–18]. For example, a longitudinal study in India found that male centric attitudes (attitudes supportive of men having more power than women) were associated with lower odds of adopting modern contraception[18]. Other studies have shown that women's ability to make decisions in the household as well as have freedom to move freely in their communities influences their contraceptive adoption[17–19]. As another example, in Uganda, women who reported that their spouse opposed the use of contraception had a significant increase in unmet need[20]. Data from 2013 DHS provides important country-specific benchmarks for the postnatal period.

Linking family planning and gender norms

In recent years, more equitable gender norms (i.e. women having the ability to conduct activities without restriction, participation in household decision making, and negative attitudes towards wife beating) have been highlighted as potential stepping stones towards increased family planning use in sub-Saharan Africa among married women[21]. However, much of the available research involving men in FP focuses on men's fertility preference, perceptions of family planning, and attitudes towards contraception, rather than gender norms[22–24]. Men have high knowledge and awareness of contraceptive methods, but low use[25–27]. Furthermore, analysis of fertility preferences in several countries in sub-Saharan Africa showed that married men have a higher ideal number of children than their wives[28]. In addition, men and women do not always agree on the importance of family planning[29–34]. Couples studies by Becker and colleagues provide a framework for thinking about family planning related discussions, approval and attitudes from male and female perspectives[32,33,35]. In traditional African families, men often have dominant roles in household decision making[36,37]. In patrilineal societies, male authority may overpower a woman's ability to implement family planning behaviors[38]. Thus, studying gender inequities may provide important social context for low use of family planning methods[39]. In terms of contraceptive adoption, it's

unclear to what extent men's attitudes and perceptions play a role in women's contraceptive behavior[16,18,40,41]. Only a handful of studies link men's views with contraceptive adoption over time[18]. These studies were largely conducted outside of sub-Saharan Africa. Thus, this dissertation provides critical information based on couple-level data. The following section reviews available literature on gender norms and family planning with a focus on sub-Saharan Africa where possible.

Couples' agreement on gender equity and FP-related outcomes

A study conducted in rural India[42] found considerable disagreement among couples in reports of gender equity. In Jeejebhoy et al. (2002), couples' agreement on the restrictions on wife's abilities measure ranged from 50-67%. Thus, nearly half of couples disagreed about the level of involvement in household decisions, wife's abilities to move around freely and attitudes about the justifiability of domestic violence. In multivariable models, husband and wife's individual perceptions of restrictions on wife's abilities, as well as joint perceptions of restrictions, were independent predictors of contraceptive use. Household decision making ability, as perceived by the wife, was also a significant predictor of contraceptive use after controlling for other sociodemographic factors such as age, parity and education[42]. Thus, couples agreement on the restrictions on wife's ability and decision making power may be important exposures to consider in the sub-Saharan African context where patrilineal attitudes dominate[43].

Understanding the joint viewpoints of men and women can provide more context for family planning behaviors[44] and decision making processes[45]. If male dominant views predict contraceptive use, then it's essential to include the perspectives of men in family planning studies. Several matched couples studies assess the relative influence of the man's fertility attitudes in associated with current contraceptive use[41,46,47]. In Indonesia, couples that had discordant views about the potential burden of a pregnancy were less likely to use contraception than couples that agreed about the potential burden of a pregnancy[41]. In another study, in rural Bangladesh, women's contraceptive use was influenced by her husband's fertility desires but it was conditional on the woman's education status (i.e. women with higher education were more likely to use contraception even if their husband disapproved)[46]. Another study in Bangladesh[47] found that married women were more likely to use contraception if their husband wanted to stop

childbearing as compared to if the woman wanted to stop childbearing. In Ghana, one study found that couples are more likely to use contraception when both members of the couple wanted to stop childbearing. In the case of discord, (either husband or wife wanting to stop childbearing), the husband's preferences did not necessarily dominate. Thus, the relative desire to stop childbearing between husband's views and wife's views needs to be more fully assessed.

Sociodemographic differences within couples are associated with contraceptive use. According to one DHS study from Ghana and Kenya, couples in polygamous relationships are less likely to agree about fertility preferences and use contraception than their monogamous counterparts[48]. In several studies assessing educational status, when a wife had comparable or higher educational status than the husband, the couple was more likely to be using contraception[33,49,50]. A study in urban Kenya[38] found that discordant religions among couples predicts current contraceptive use. Age differences of an average of 8-10 years (husband older than wife) are consistently reported in the literature in sub-Saharan Africa[35,50,51]. However, age differences between couples are not significant predictors of contraceptive use[50]. Additionally, a woman's increasing age was a significant predictor of contraceptive use[50]. A high number of living children is also a consistent predictor of contraceptive use/desire to stop childbearing[27,32,50]. Taken together, this suggests that sociodemographic differences such as marriage type[48], fertility attitudes[52,53], and educational differences[27,33,49,50] within a couple may be associated with contraceptive use. Other important predictors include religion, age and number of living children.

The literature on gender equity in Nigeria in relation to contraceptive use is similarly mixed for men and women. A 1991 study in Nigeria found that men with gender inequitable views were more likely to want to continue to have more children[54]. For women, baseline results from an earlier study[55] show a positive association between equitable gender relations (in terms of high household decision making and low acceptability of domestic violence) and modern contraception[55].

Married individuals' gender norms and contraceptive use

Couple studies are not always available and thus, researchers often focus on married men and married women separately. Some evidence suggests married individuals who endorse gender equitable views have higher contraceptive use than individuals who do not endorse gender equitable views[16,42,56,57]. In rural Ethiopia, men who report that their wife has joint decision making power in the choice of contraceptive methods have a higher likelihood of using contraception themselves[58]. Similarly, in rural India, men who report that their wives are involved in household decision making are more likely to be using modern contraception[59]. In Burkina Faso, women who are involved in their health care decisions were more likely to use contraception than women who are not involved in their healthcare decision-making[57].

In non-matched studies with married women, gender equity is associated with increased use of several other MCH outcomes, (not just FP use)[5,60,61]. In Etrirea, women's ability to visit family and relatives and household decision making power were associated with receiving antenatal care. In Ethiopia, disagreement with wife beating had a strong, positive association with receiving antenatal care[60]. Delivery in a health facility was strongly associated with disagreement with wife beating in both Ethiopia and Etrirea. Using pooled data from five countries in Africa, Singh et al. 2015 found that women with high levels of household decision making power were more likely to take their children to the clinic. Furthermore, women who believed that wife beating was not acceptable were more likely to have a facility delivery or have a child that was fully immunized, after controlling for other factors[5]. In urban Nigeria, women with high decision making power and negative views about the acceptability of domestic violence were more likely to have a skilled attendant present at birth and have an institutional birth[55]. These data suggest

Figure 1-1. Map of Nigeria's six geopolitical regions.

that gender norm measures such as restrictions on activity, decision making and attitudes towards domestic violence are associated with several important MCH outcomes.

Understudied urban areas in Nigeria

Nigeria is especially crucial for FP efforts due to high maternal mortality and low contraceptive prevalence[62–64]. Nigeria's maternal mortality ratio of 560 deaths per 100,000 births is among the ten highest in the world[65]. Furthermore, between 1990-2013, unmet need in Nigeria has remained stable at approximately 21, even as the contraceptive prevalence rate has increased from 7% to 14% of women married/in union[6]. Only about 10% of married men report use of a modern method of contraception, whereas the prevalence of traditional methods is approximately 5%[62]. In 2013, among married women, the contraceptive prevalence rate was 15% (10% modern and 5% traditional)[62]. Numerous surveys throughout the country indicate that knowledge and awareness of contraceptives is high, while actual use is low [7,62,66]. In the past decade, family planning initiatives have also been named as critical to combatting increased urbanization and climate change[67]. According to the World Bank, Nigeria has the ninth largest urban population (83 million people) in the world and the most urban dwellers in all of Africa[68,69]. Although almost 27% of women in urban areas use some form of contraception[62], considerable variation exists between different cities[70]. For example, modern contraceptive use in urban Nigeria based on MLE baseline data ranged from 21.6% in Northern cities (Ilorin, Kaduna and Zaria) to 36.7% in Abuja[55].

Nigeria-specific indicators relating to FP are available in the 2013 Nigeria Demographic Health Survey. The maternal mortality ratio in 2014 was 560 deaths per 100,000 live births, among the tenth highest in the world[71]. The total fertility rate in Nigeria is 5.5 births. Women may breastfeed their children for up to 2 years, but exclusive breastfeeding rates are extremely low in Nigeria. The median duration of exclusive breastfeeding is less than a month (0.5 months) based on demographic health survey data[62]. The median duration of abstaining from sex is 2.8 months and the median duration that women do not have their period is 10.6 months following a birth. Taken together, this suggests that women in Nigeria resume sexual relations shortly after a birth, but they do not exclusively breastfeed thus potentially increasing their risk of an unwanted, mistimed pregnancy. Literature from Nigeria on postpartum contraceptive use

and gender relations is sparse. In parts of Nigeria, men are in control of fertility and may refuse contraception under certain circumstances[37]. Men often indicate a low frequency of spousal communication and discussion of fertility goals[44]. Thus, an imbalance in gender relations could influence a woman's ability to access and implement family planning behaviors in a timely fashion, especially in the extended postpartum period.

Addressing family planning needs in Nigeria is challenging because the country has a great deal of ethnic, religious and economic diversity. The country is divided into six geopolitical regions that each has its unique blend of ethnic and religious groups. Predominant ethnic groups include the Hausa (27%), Yoruba (14%), and Igbo (15%)[62]. Predominant religions in Nigeria are Islam (51%), non-Catholic Christian (36%), Catholic (11%), and traditionalist (approximately 1%)[62]. Poverty is an immense issue in Nigeria with 82.2% of the population living on less than $2 a day, and with 46% of the population living below national poverty lines[68].

Available decision making measures from the 2013 Nigeria Demographic Health Survey (NDHS) for Nigeria suggest that women who are able to make more decisions in the household seem to use modern methods more frequently than women who are not able to make any household decisions[62]. Women with no household decision making power are also more likely to want a higher number of children (8.3 children) compared to women who have more decision-making participation (5.7 children). Notably, nearly half of the women in the NDHS sample have no household decision making participation[62]. This suggests that considerable variation exists among married women with respect to decision making power and fertility preferences in Nigeria. However, to my knowledge, no contemporary couples' studies in Nigeria exist assessing gender norms and family planning use.

Conceptual Model for this Dissertation

The preceding literature review demonstrates that equitable gender norms and family planning use are generally positively associated. Based on the studies reviewed, a majority focused on Asian/rural contexts and matched couples studies in Nigeria were rare. To address these gaps, this dissertation creates a couples' dataset that examines contraceptive use over time in urban Nigeria. Couple-level data are

important because it allows researchers to examine how relationship dynamics may influence contraceptive use. From a design perspective, couples studies have several advantages over non-matched studies because they allow researchers to simultaneously examine both husbands' and wives' perspectives on specific questions, and take into account key sociodemographic factors within a couple unit[32]. However, couples' studies are often limited because both the husband and wife are not always asked same questions. Thus, this dissertation retrospectively matches married couples in four cities in Nigeria to create a couples' dataset and examine couples' agreement on gender norms.

The data used in this dissertation is a subsample of data collected from men and women in four cities from the Measurement Learning and Evaluation (MLE) project in four cities in Nigeria (Abuja, Ibadan, Ilorin, and Kaduna). The MLE project works to identify the impact of various interventions to increase contraceptive prevalence among urban populations, especially the urban poor. The MLE project is the evaluation component of the Bill & Melinda Gates Foundation-funded Urban Reproductive Health Initiative (Urban RH Initiative) which aims to improve the health of the urban poor in India, Kenya, Nigeria and Senegal. The MLE Project in Nigeria collected baseline population-level data between October 2010 and March 2011 from women in six cities (Abuja, Benin City, Ibadan, Ilorin, Kaduna, and Zaria) and men in four cities (Abuja, Ibadan, Ilorin and Kaduna). Representative samples of women and men were then selected and interviewed using a two-stage sampling method. In the first stage, random samples of primary sampling units (PSUs) were selected to represent the cities' populations based on the 2006 Population and Housing Census enumeration areas. Only urban enumeration areas (EAs) (classified by the census) were eligible. The second stage involved a random sample of 41 households within each PSU. If a household was selected, all women ages 15-49 were eligible for an interview. Women who provided verbal consent were asked questions relating to demographics, reproduction, fertility preferences, and gender relations and maternal and child health by a trained female interviewer. In approximately half of the households in four cities, all men between the ages of 15-59 male head of households were identified and eligible to be interviewed. Consenting men were asked similar questions

by a trained male interviewer. Overall at baseline, 10,353 women and 5,547 men completed interviews within households in a four-city sample (Abuja, Ibadan, Ilorin and Kaduna).

Sample weights and software packages

All analyses were conducted in Stata 14 SE using procedures that address complex survey design. I adjusted for clustering and unequal probability of selection of households in my analyses using city-level weights for the four cities. Thus, the weighted sample represents married/cohabiting male heads of the household and their wives across the four cities of Abuja, Ibadan, Ilorin or Kaduna who completed the interview. Standard diagnostic procedures and fit statistics were used in all models to verify that statistical assumptions are met and to evaluate model fit.

Outcome

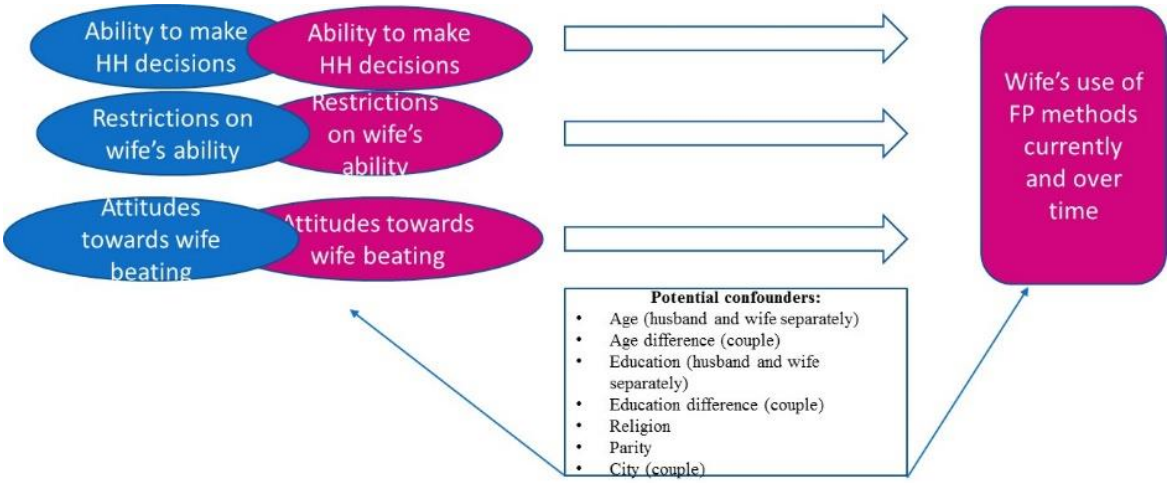
The details of specific outcomes are discussed within the manuscripts in Chapters 2 and 3. The first manuscript (included in Chapter 2) uses the outcome of modern contraceptive use, whereas the second manuscript (Chapter 3) is focused on modern contraceptive adoption based events recorded in the reproductive calendar. Demographic surveys have shifted to a month-by-month reproductive calendar that theoretically provides a more complete contraceptive history. In this method, women are asked to recount their contraceptive use on a month by month basis, providing details on method used, reason for discontinuation, pregnancy and pregnancy outcome.

Exposure

To operationalize gender norms, I incorporated research scales focused on gender norms including: 1) restrictions on wife's activities, 2) attitudes towards wife beating, and 3) household decision making[5,13,59]. These scales are commonly used in DHS-type survey to measure constructs relating to gender equity at the household and individual levels. The scales were developed in Asia to understand social contexts where women had inequitable access to resources, social capital and household decision making power[72]. To my knowledge, these scales have not been validated in the urban Nigerian context. Despite this limitation, several researchers have used these scales to describe social inequities in sub-Saharan African contexts with mixed results as described in the literature review[5,40]. In this dissertation, I

created a couples' agreement variable that combines the husband's views and the wife's view to better understand the dynamic relationship between them. This couples' agreement variable is similar to one published by Jejeebhoy et al.[42]. Other scholars are working towards a definition/measurement of reproductive empowerment that incorporates couples' communication, reproductive choice, and access to resources[40,73–75]. Thus, the validity of the couples' agreement metric is not established. However, there is precedent for using couple-level variables (termed concordance/discordance) to measure men's engagement in family planning/maternal and child health outcomes[42].

Figure 1-2. Conceptual model of couples' agreement and family planning use.



Conceptual model

The following section provides a visual representation of the proposed associations explored in this dissertation. Additionally, I evaluated whether couples agree or disagree on each of the measures and evaluate the significance of that association. With respect to decision making, I evaluated the views of husband and wife separately and categorize their attitudes as either husband-centric or non-husband centric (wife or joint decision-making)[39]. In the case of disagreement, I examined a woman's view relative to her spouse's view in relation to her contraceptive use[76]. Contraceptive use is reported by the woman and classified as modern or non-modern use based on the NURHI baseline report definitions of modern use[70].

Diagrammatically, I used a conceptual model adapted from Earp and Ennett 1991 guidelines[77]. Within the diagram, the couple level agreement on gender norm measures are represented by intersecting circles, the modern contraceptive methods are included in the box on the right, and the center box illustrates the confounders. I initially evaluated the views of husband and wife separately, to see if the husband had more relative power on gender norms measures. However, since it did not matter which spouse disagreed in the first paper, I collapsed disagreement into a single disagreement category for the second paper.

Organizational structure

Chapters 2-4 detail the analyses used in this remainder of this dissertation. Chapter 2 provides the text of the first manuscript on FP use at baseline and couples agreement with a sample of 2,184 couples. In Chapter 3, I report on the adoption of modern contraception among women followed over time who have a birth during the course of the reproductive calendar. Chapter 4 provides a summary of results and some public health implications along with strengths and limitations of this approach.

CHAPTER 2: MANUSCRIPT 1[1]: COUPLES' AGREEMENT ON GENDER NORMS AND CONTRACEPTIVE USE IN URBAN NIGERIA

Background

According to UN Women, gender "refers to the social attributes and opportunities associated with being male and female … as well as the relations between women and those between men…[g]ender determines what is expected, allowed and valued in a women or a man in a given context[2]." Around the world, gender norms such as the normative activities, responsibilities, decision making, and control over resources are inequitably distributed between men and women[2,16]. Women's gender roles are often limited due to cultural factors, and are influenced by age, work status and education[78]. Inequitable gender norms may manifest as social acceptability for a husband to beat his wife or his restrictions on her activities outside (and inside) the home[16]. Furthermore, within the household, decision making power can be inequitable when the husband is the primary decision maker as opposed to decisions being made by the wife or jointly by both partners. Understanding gender norms within a husband-wife partnership can potentially provide insight into the social context for low family planning (FP) use[39]. For example, among couples who agree that husbands should be able to restrict wives activities, FP use could be lower because women may be limited in their abilities to access FP clinics. Or if couples do not share decision making power within the household, a woman may have limited ability to make decisions about her FP and healthcare. As another example, it's possible that if couples endorse wife beating, women may be less likely to use FP.

The 1994 International Conference on Population and Development asserted that actively engaging men and women is critical to the uptake and use of FP[1]. Among couples in sub-Saharan Africa,

[1] This chapter is a manuscript under review at the *Journal of International Perspectives on Sexual and Reproductive Health*. Sahay, KM, Speizer, I, Barden-O'Fallon, J, Babalola, S, and Martin, SL. "Couples' Agreement on Gender Norms and Contraceptive Use in Urban Nigeria."

evidence suggests that married men have a higher ideal number of children than their wives[28]. In some instances, male authority may overpower a woman's ability to implement her FP desires, as men are often the primary household decision makers[38]. In Nigeria, husbands and wives have differing perceptions about future fertility, timing of their next child and contraceptive decision making[44,50]. Kritz and colleagues using data from a 1991 survey in Nigeria found couples' agreement on gender norms (termed women's authority) was positively associated with contraceptive use[79]. Although many studies focus on rural areas[16] or a specific community within Nigeria[9,12], contemporary couples' studies in urban Nigeria are limited[55].

Research has typically assessed the potential association between gender norms and FP in either studies of married women or studies of married men (rather than in studies that examine both partners in a couple). This research has found that married women are often not able to make FP and household related decisions[5,39]. Among married women in Burkina Faso[57] and Tanzania[81], women with equitable decision making power were more likely to use contraception as compared to women with inequitable decision making. Similarly, in urban Nigeria, women with more equitable gender norms were more likely to be using modern contraception[55]. Among men in rural India and Ethiopia, those who reported more equitable decision making were more likely to use modern contraceptives than men with inequitable decision making[58,59]. However for men in Honduras[39], urban India[59] and Tanzania[81], equitable decision making was not associated with contraceptive use. Unfortunately, both members of a couple are usually not interviewed and many studies use perceptions of partner attitudes and behaviors with the assumption that the surveyed partner is aware of his or her partner's thoughts and desires. This approach is limited as one study in India illustrates only a loose association between husband and wife's perceptions of restrictions on women's abilities[42].

A few couples' studies provide a framework for examining health service priorities simultaneously among husbands and wives[42,45,51]. In urban Kenya, couples that communicated about FP and desired number of children were more likely to use contraception than couples that did not communicate[51]. One couples' study in Nepal found that couples who endorsed more equitable gender

norms were more likely to use antenatal care and complete immunizations as compared to couples with less equitable gender norms[42]. When the husband and wife agreed on equitable gender norms, the women used more antenatal care as compared to when couples disagreed, even after controlling for demographic factors[45]. Our study provides contemporary couples' data on contraceptive use in urban Nigeria and highlights the importance of accounting for each spouse's viewpoint on gender norms.

Research Questions

This study addresses two research questions from a sub-sample of urban Nigerian couples:

1) To what extent do couples agree (or disagree) about equitable gender norms?
2) Is agreement (or disagreement) on equitable gender norms associated with modern contraceptive use among couples?

The primary hypothesis for this study is that Nigerian urban couples where both partners endorse equitable gender norms are more likely to use modern contraception as compared to couples where at least one member of the couple endorses inequitable norms. We believe that couples will disagree on several items of the gender norms scales. Among couples that disagree, we expect that if the husband has less equitable views than the wife, then the wife will be less likely to use contraception. To assess these questions, we conduct a secondary data analysis of data collected as part of Measurement, Learning & Evaluation (MLE) Project to evaluate the Nigerian Urban Reproductive Health Initiative.

Setting

Nigeria is especially crucial for FP efforts due to high gender inequity and poor FP outcomes[62,71]. As of 2014, the Social Index for Gender Inequity, ranked Nigeria as having "very high" levels of gender inequity. In terms of FP, the Nigeria Demographic and Health Survey reported that 15.1% of currently married/in union women ages 15-49 were currently using any method of contraception; but only 9.8% were using a modern method in 2013[62]. The maternal mortality ratio is in 2014 was 560 deaths per 100,000 live births, among the tenth highest in the world[71]. In urban areas, 26.8% of currently married women were using any method contraception (16.8% modern) based on 2013 DHS data[62]. Notably, nearly

half of the Nigerian population resides in urban areas[62] and recent research has found high disparities in contraceptive use between the urban rich and urban poor[71].

In this study, we focus on four geographically, culturally and ethnically diverse cities in Nigeria: Abuja, Ibadan, Ilorin, and Kaduna, all with vastly different modern contraceptive prevalence rates per the 2010/2011 Nigeria Urban Reproductive Health Initiative (NURHI) baseline survey[70]. Abuja is in the middle of the country and ethnically/religiously diverse with a modern contraceptive prevalence of 29.2% in 2010/2011. Ibadan is a southwestern city with agricultural roots and the third largest urban area in Nigeria. The modern contraceptive rate was 33% in 2010/2011, and people are primarily ethnically Yoruba and religiously Christian. Abuja is the smallest of the four cities, established as the capital city of Nigeria in 1991. Ilorin is a northern, predominately Muslim and Yoruba city. Relative to the other cities, Ilorin has the second lowest modern contraceptive prevalence rates (21.3%). Kaduna is a predominantly Hausa city that includes both Muslims and Christians; the primary industries in Kaduna include manufacturing and service. The modern contraceptive prevalence rates in Kaduna was the lowest among the four cities as of 2010/2011 (16.3%)[70].

Data

This study uses baseline data from the Nigeria MLE project. The MLE project is the evaluation component of the Bill & Melinda Gates Foundation-funded Urban Reproductive Health Initiative (Urban RH Initiative) which aims to improve the health of the urban poor in India, Kenya, Nigeria and Senegal. The MLE project identifies the impact of various interventions to increase contraceptive prevalence among urban populations, especially the urban poor. In Nigeria, the MLE project collected baseline population-level data between October 2010 and March 2011 from women in six cities (Abuja, Benin City, Ibadan, Ilorin, Kaduna, and Zaria) and men in four cities (Abuja, Ibadan, Ilorin and Kaduna). Representative samples of women and men were selected and interviewed using a two-stage sampling method. In the first stage, random samples of primary sampling units (PSUs) were selected to represent the cities' populations using probabilities proportional to the cities' size. Urban enumeration areas were identified through the 2006 Population and Housing Census. The second stage involved a random sample

of 41 households within each selected PSU. If a household was selected, all women ages 15-49 were eligible for an interview. In addition, in approximately half of the households in four cities, all men between the ages of 15-59 were identified and eligible to be interviewed. Women who provided verbal consent were asked questions relating to demographics, reproduction, fertility preferences, gender relations, and maternal and child health by a trained female interviewer. Consenting men were asked similar questions by a trained male interviewer. This study uses a matched sub-sample of married couples from the four cities[70].

Study Sample

The couples sub-sample was obtained by matching male heads of households with their spouses in a secondary data analysis exercise (details Table 2-1). Overall at baseline, 5,232 women and 5,547 men completed interviews within households selected for a male interview. We excluded: 2,251 women because they were not designated as the spouse of a heads of the household, 214 because they were not legally married or cohabitating, and 7 who were not full time residents of the home[2]. A similar exclusion criteria was used among the 5,547 men surveyed. Overall, 2,760 women and 2,510 men were considered eligible to be matched. During the matching process, we could not identify partners for 576 women and 399 men, so these individuals were excluded from the final analysis. Thus, the final matched sample includes 2,184 couples (2,184 women and 2,111 men since some men had multiple wives with whom they were matched).

The MLE project obtained ethical clearance from the University of North Carolina at Chapel Hill Institutional Review Board (UNC IRB) and the National Health Research Ethics Committee of Nigeria to conduct the surveys. This secondary data analysis was also approved by the UNC IRB.

[2] Note, we would have liked to analyze female head of households. However, among the female head of households, we were unable to match any female head of households to any of the men in the sample. This is probably because while 364 female head of households were married, only 5 men in the dataset identified themselves as spouse of head of household.

Variables

This study's primary outcome is the current use of a modern contraceptive as reported by the woman. Modern methods include: pills, injectable, intrauterine contraceptive devices (IUCDs), implants, condoms, sterilization, Lactational Amenorrhea Method (LAM), and emergency contraception. Non-use of modern methods was the reference category and included: traditional methods (Standard Days Method[3], calendar method and withdrawal) and no method. We use the women's reported contraceptive use in this analysis because men may have more than one partner and may vary contraceptive use between different partners[51].

The primary independent variables of interest are couples' agreement on three gender norms scales: attitudes towards wife beating, household decision making and restrictions on wife's activities[5]. We chose these gender norm scales for conceptual links to the acceptability of women's involvement in activities, responsibilities, decision making, and control over resources, as well as predominance in the literature[5,40]. The scales used here were adapted from DHS questions on gender equity[5]. The creation of the couples' agreement variable is discussed for each scale below.

Acceptability of wife beating scale

The acceptability of wife beating scale included seven yes/no questions about the acceptability of wife beating. Respondents were asked whether it was acceptable to beat a wife under a set of hypothetical circumstances (going out without permission, neglecting household responsibilities, cooking improperly, refusing another child, refusing sex, and being unfaithful). An individual's views were characterized as inequitable when an individual answered "yes" to an item on this scale, (an equitable norm is a "no" answer). For an individual, the sum of the number of "yes" responses was calculated ranging from 0-7 (i.e. number of inequitable norms). For multivariate analysis, couples' agreement was grouped into one of four categories based on a comparison of husbands and wives' scores: 1) both the husband and his wife

[3] SDM was categorized as a traditional method by the NURHI baseline report. In the full reproductive calendar, <1% of women reported using the SDM method at any point.

have a score of 0 (both have equitable views), 2) husband's score is higher than the wife's score (the husband's views are less equitable than his wife's views), 3) wife's score is higher than husband's score (the husband's views are more equitable than his wife's views) 4) the husband's and wife's scores are equal, but greater than zero (both the husband and wife have the same number of non-zero inequitable views).

Restrictions on wife's activities

The restrictions on wife's activities scale (sometimes referred to as freedom from prohibitions scale[55]) is a series of six yes/no questions about the acceptability of a husband restricting his wife's behavior (e.g. work outside the home, have visits from others, cell phone use, ability to visit friends/family, and use of contraception). As with the wife beating scale, an inequitable norm for this scale is defined when an individual answered "yes" to an item on this scale (an equitable norm is a "no" answer). The individual "yes" responses were added together for an overall number of restrictions (0-6) score endorsed by an individual. Couples' agreement was characterized in the same manner as the acceptability of wife beating scale.

Household decision making

The household decision making questions ask whether the primary decision maker for a given decision (e.g. small household purchases, large household purchases, visiting friends or family, and deciding when and where to seek wife's medical care) is the husband, wife or both equally. In the household decision making scale, an inequitable or male-centric norm is one when the husband is the primary decision maker (an equitable norm is when the wife is the primary decision maker or the couples make joint decisions). Individual answers for each decision were added together for an overall score reflecting the number of male-centric decisions (0-4). As with the other scales, couples' agreement was classified into four categories.

Covariates

We include men's and women's characteristics as covariates based on a priori review of the literature[5,51]. The number of husband's inequitable views was added as a control variable to provide a baseline metric to the couples' agreement variable discussed above. In addition covariates include, characteristics reported by the women including work status, parity,[4] marriage type, religion*, age, and education. Woman's work status was assessed using the question: "As you know, some women take up jobs for which they are paid in cash or kind. Others sell things, have a small business or work on the family farm or in the family business. In the last seven days, have you done any of these things or any other work?" Parity was calculated by summing the number of living children residing with the woman, number of living children residing away from the woman, and number of children that died[5]. Due to a high prevalence of polygyny in Nigeria[62], we also controlled for marriage type using an indicator variable. Polygyny was assessed from the woman's perspective based on "yes" responses to the question, "Besides yourself, does your husband/partner have any other wives?"[6] Religion was dichotomized to Muslim and Christian. Categorical variables for women's age in five year age intervals and education levels (none, primary, secondary, higher than secondary, Quranic) were included as well.

We include, among the covariates, several categorical variables comparing husband's and wife's relative differences in sociodemographic characteristics. To assess the relative age difference between husband and wife, we created a categorical variable with three levels: wife's and husband's ages within 5 years of each other, husband more than 5 but less than 10 years older than wife, and husband 10 or more years older than wife. A similar categorical variable was created comparing husband and wife's education levels: husband and wife comparably educated (both none/ Quranic, primary, secondary, higher than secondary), husband more educated than wife, and wife more educated than husband.

[4] Highly correlated with husband's responses

[5] Highly correlated with number of living children r=0.91

[6] 92% of men and women agreed on their accounts of multiple partners.

The household level factors included as covariates were: household wealth quintiles and city. Wealth quintiles were assessed using principal component analysis of household assets and housing characteristics as described by Filmer and Pritchett for the Demographic Health Survey[82]. Households were asked about the availability of the asset in binary terms--'yes, have the asset' or 'no, don't have' and did not account for the differing quality of assets across houses. The asset variables included in the wealth index included: watch, stove, electric fan, TV, VCR, DVD, radio, sewing machine, sofa, car/jeep, bicycle, motorcycle, air conditioning, mobile phone, landline phone, computer, internet, refrigerator, camera, digital camera, tenure rooms, separate kitchen, fuel, water source, and toilet. Since the wealth index was at the household level, this did not differ for husbands and wives.

Analysis Plan

To evaluate our research questions, we quantify couples' agreement on gender norms using the percent agreement on equitable and inequitable views for each gender norm. We use logistic regression analysis to analyze the association between couple agreement on gender norms and modern contraceptive use as reported by the woman, adjusting for the couples' individual-level characteristics (*i.e.*, age differences, education concordance, religion, parity, work status, husband's number of inequitable norms) and household factors (household wealth and city of residence)[7]. We also compare eligible individuals in the matched couples' sample with unmatched married individuals using F-tests. We compare matched and unmatched individuals' sociodemographic factors to assess if our couples' subsample is representative of the larger sample of married individuals. All statistical analyses are conducted in Stata 14 SE. Population level women's weights are used to account for clustering and complex survey design. A significance level of 0.05 was determined a priori.

[7] We initially performed multinomial regression, but no statistical differences were found between traditional and non-use. We focus on modern contraceptive use for its programmatic relevance.

Results

Sample characteristics

The sub-sample of married/cohabiting women included in this study were statistically different from unmatched married/cohabiting women (see Table 2-2). Matched women in the sub-sample are more likely to be younger, more educated, wealthier, have fewer children and be Christian as compared to un-matched women not included the sub-sample. Couples in the sub-sample were slightly wealthier than unmatched individuals. Current contraceptive use was statistically similar in the two groups (29% in the matched group, 26% in the unmatched group. However, more women (weighted n=240), were currently pregnant in the matched sample (11.2%) as compared to the unmatched sample (7.3%). Couples where the wife was pregnant were subsequently excluded from multivariable analysis. After excluding pregnant women from the non-user category, modern contraceptive use was 34% in the matched sample compared to 29% in the unmatched sample.

Sociodemographic characteristics of women and their partners in the analytical sample

We find that husbands are consistently more educated, have more children (possibly due to multiple wives/partners) and are more likely to be working outside the home than their wives (see Table 2-3). Among the matched couples, the average age of husbands was 40 years (SD: 0.2 years), whereas the wives were significantly younger at 32 years (SD: 0.2 years). Approximately one third of husbands were 10 or more years older than their wives. In aggregate, women were less educated than men. Within couples, 33% of husbands were more educated than their wives, but 13% of husbands were less educated than their wives. Couples overwhelmingly had the same religion (57% both Muslim, 36% both Protestant, 1% both Catholic). Approximately 70% of husband and wife pairs reported the same number of living children, but, not surprisingly, 22% of men reported a higher number of children than their wives.

Contraceptive use and unmet need levels

In our sample, more than half of the women are not using any type of contraception, yet unmet need levels are low. Unmet need describes women who want to limit or delay pregnancy but are not using contraception. Over all four cities, unmet need was approximately 14.7% of women, with more women

indicating an unmet need for spacing rather than limiting (9.5% for spacing and 5.2% for limiting). Even among contraceptive users, spacing predominated (24%) as only 17.8% of women were using contraception to limit. Approximately 34% of women had no unmet need i.e. they were not using contraception and did not want to space or limit births and 9% of women indicated infecundity.

To what extent do couples agree or disagree on gender norms? Acceptability of wife beating scale

Wife beating was also mainly viewed as unacceptable by couples in this sample—ranging from 66% to 94% (see Table 2-4). For six out of the seven items, less than 5% of couples both felt wife beating was acceptable. Of the circumstances listed, wife beating in the case of suspected infidelity was the most highly endorsed (7.5% of couples). Interestingly, husbands and wives overwhelmingly agreed that a wife should not be beaten if the wife refuses to have another child (94%). The results suggest that urban couples in Nigeria largely view wife beating as unacceptable, except for possibly in the case of suspected infidelity.

In summary, over two-thirds of couples (67%) felt that wife beating was unacceptable under all circumstances listed. Disagreement on the wife beating scale was more limited than the other scales---in 15% of couples, the wife felt that wife beating was acceptable under certain circumstances, while their husbands endorsed no situations; and for 11.8% of couples, the husband felt that wife beating was acceptable under certain circumstances, while their wives endorsed no situations. Only 6.2% of couples both felt that wife beating was acceptable under certain circumstances. Other scales, such as the restrictions on wife's activities and household decision making scales were more mixed.

To what extent do couples agree or disagree on gender norms? Restrictions on wife's activities

We calculated couples' agreement on each of the restrictions on wife's activity scale items and overall across the entire scale (Table 2-4). Equitable agreement on the restrictions of wife's activities scale ranges from 66-83%, depending on scale item. Couples were most likely to agree that a woman could use a mobile phone or visit her family without restriction. For five out of the six restrictions, very few couples (less than 5%) jointly endorsed restrictions on the wife. However, restrictions on contraceptive use was the most controversial restriction, with 28% of couples disagreeing about the

acceptability of contraceptive use. The results suggest that couples in Nigeria largely view husbands restrictions on wife's activities as unacceptable, apart from contraceptive use.

Overall, nearly half of couples (47%) agreed that no restrictions on the wife's activities were acceptable. However, 39% of couples disagreed about the acceptability of restrictions (see Table 2-4). When couples disagreed, 26% of husbands expressed more restrictions than their wives; whereas for 13% of couples, wives were more restrictive than their husbands.

To what extent do couples agree or disagree on gender norms? Household decision making

For the household decision-making scale, the husband had a greater say in all three decisions among nearly one-third of couples (32.5%), but couples often disagreed on decision making roles. Husbands reported more male-centric decision making than their wives 38% of the time, while the wife reported more male-centric decision making 23.5% of the time. Only 6.2% of couples felt that all three decisions should be wife-centric or shared equally. This suggests the dominant decision making power of husbands in the context of the household.

Of the three scales, household decision making had the most disagreement between members of couples. Total disagreement ranged from 30-41% depending on the scale items. Couples overwhelmingly agreed that the husband had the most decision-making power for large purchases (62.6% husband-centric), but small household daily purchases, deciding when to seek wife's healthcare, and visits to family and friends were more likely to be joint/wife only decisions.

Is couples' agreement on gender norms associated with modern contraceptive use?

Separate logistic regression models were fitted for each of the three gender norm scales and modern contraceptive use. The adjusted odds ratios and 95% confidence intervals are presented in Table 2-5, after controlling for age, education, parity, religion, work status, city of residence, wealth status, age difference between spouses, concordance on education and whether the husband endorsed any gender inequitable views for that scale.

Agreement on the restrictions on wife's activities measure was significantly associated with modern contraceptive use. As expected, the adjusted odds ratio (aOR) for modern contraception use was

0.26 times lower for couples where both partners endorsed some restrictions as compared to couples that both endorsed no restrictions (95%CI: 0.16, 0.44). However, contrary to our hypothesis, it did not matter whether the husband or the wife had more inequitable gender norms. If either member of the couple endorsed restrictions, the woman was less likely to use modern contraception—husband more inequitable aOR: 0.57 (0.36, 0.90); wife more inequitable aOR 0.61 (0.42, 0.87). (See Table 2-5).

Agreement on the household decision making measure did not have significant associations with modern contraceptive use. Since most couples endorsed at least some male-centric decisions, the reference group for this scale was the same non-zero number of male-centric decisions. Couples that agreed that all decisions should be joint/wife did not have different modern contraceptive use than couples that endorse some male-centric decisions aOR 1.08 (0.55, 2.13). Similarly, if the spouses disagreed on the number of male centric decisions, the odds of contraceptive use were statistically no different than if the couple agreed on some restrictions. The adjusted odds ratio for wife more inequitable than husband is 1.03 (95% CI: 0.70,1.52); the adjusted odds ratio for husband more inequitable than wife is 0.97 (95% CI: 0.68, 1.36)).

Contrary to our expectations for the wife beating measure, when both partners within the couple endorsed some wife beating, they had 2.44 times higher odds of using contraception as compared to couples that both felt wife beating was not justified under any circumstances (95% CI: 1.08, 5.48) after adjusting for covariates. In the case of disagreement between spouses, there were no significant differences as compared to couples who agreed that wife beating was inappropriate.

In terms of covariates, in all models, the odds of modern contraceptive use increased with parity, age and education level as reported by the woman. Women in Abuja, Ibadan, and Ilorin had higher odds of using modern contraception relative to women in Kaduna in all models. The husband's number of inequitable views, women's work status, and relative age/education were not significant in any of the adjusted models. For the restrictions of wife's activity scale, women in polygynous relationships were less likely to use modern contraception than their monogamous counterparts, but marriage type was not

significant in the other models. For the household decision making scale and wife beating scale, Christian religion was significantly associated with higher odds of using modern contraception.

Discussion

In this study, we performed a detailed couples-level analysis of the insufficiently studied urban populations of Nigeria. Consistent with the high fertility preferences documented in Nigeria, women are more likely to be using contraception for spacing rather than limiting of births[7]. Our couples' analysis systematically examined the role of couples' agreement on gender norms and FP use. The analysis also adjusted for demographic characteristics as well as household factors. We found that couples' agreement on gender norms varies widely based on the circumstance and scale item. Among the 2,184 urban Nigerian couples interviewed, couples' in which one or both members endorse restricting wife's activities are less likely to use modern contraception, after adjusting for sociodemographic factors.

We also found that couples in which both partners endorsed wife beating in some circumstances had higher odds of contraceptive use than couples who did not endorse wife beating under any circumstances. Although this result is somewhat surprising, research among women in Mali found that women who had more egalitarian views about wife beating had higher ideal family size as compared to women who endorsed wife beating[75]. This points to complexity in interpreting gender norms in relation to contraceptive use. Furthermore, this scale asks couples about hypothetical circumstances where violence could be perceived to be acceptable rather than actual intention or perpetration of these acts.

In contrast with other studies[42,81], men in this study generally held more inequitable views than their wives on the restrictions on wife's activities and household decision making scales. Also in contrast with other studies[55,57,72], equitable norms in household decision making was not significantly associated with higher contraceptive use. This could be because only four decisions were assessed in our study (visiting friends and family, small household purchases and large household purchases, women's ability to seek her healthcare), whereas other studies[42,81] used a larger number of decisions. Despite these differences, this study contributes to a growing body of literature with a focus on gender norms and FP use. In contrast to a previous study using the same dataset[55], couples' agreement on household decision

making and acceptability of wife beating were not associated with modern contraceptive use. Our differing analytical sample could explain our non-significant result. The earlier study[55] focused solely on married women in six cities, rather than the couples in four cities that we have available (men were only sampled in four of the six cities). In our study, matched women were more likely to be younger, more educated, have fewer children, less likely to be in polygynous relationships, wealthier and Christian as compared to the overall population of eligible married women in the large sample, suggesting some potential for systematic advantages. This could explain the low prevalence of inequitable gender norms and high agreement between couples. It is possible that if all married individuals across the four cities could be matched, we would have more variability in couples' agreement. Furthermore, our analytic approach focused on couples' agreement on gender norms, rather than the actual number of inequitable gender norms within a women's life. Thus, it's possible that a woman's perception of equitable gender norms may be more critical than actual agreement on gender norms with her husband.

This study has programmatic implications for contextualizing gender norms. Freedom from restrictions on activities in other countries has emerged as an important proxy for social capital (e.g. visibility in society), ability to access healthcare facilities (e.g. care for an ailing child), and greater control in the familial unit (e.g. ability to visit friends and family)[3,83,84]. Our findings suggest that a couple's attitudes about wife's activity restrictions are also related to health behavior, specifically contraceptive use. Interventional research suggests that changing gender norms can result in increased contraceptive use[85]. Further research is needed to determine the role of gender norms on spousal communication and discussion of FP attitudes.

This study has several limitations, notably in the measurement of gender norms[3,5,34]. These gender norm scales focus on acceptability rather than action. Thus, the administration of the survey instrument itself may suffer from social desirability bias. For example, participants may believe that the socially acceptable response is to say that it's unacceptable to beat one's wife. Thus, it's important to clarify meaning and to understand the deeper context for responses. Many researchers have noted that these measures were designed in the Southeast Asian setting and thus may not be as useful in African settings

despite their prevalence in DHS-type surveys[5,55]. Despite measurement challenges, gender-related measures have the potential to provide proxy insight into differences in social context for men and women[5].

The study is further limited by its use of cross-sectional data; we cannot establish temporality or causality of gender norms and contraceptive use. Contraceptive use in this study was considerably higher than the Nigerian population because of the focus of women (and men) in union residing together. Notably, our subsample of couples is not nationally representative of urban married couples in Nigeria so generalizability may be limited. Since we matched couples retrospectively, we had to be conservative in our matching criteria, thus potentially excluding polygynous couples. Even so, our study includes a relatively large sample of 2,184 couples across the four cities and complex survey design allows us to weight the respondents to reflect the population-base from the four cities.

Our study supports avenues for further research on gender and family planning. Further qualitative studies are needed to define relevant gender norms in the Nigerian setting. Other researchers use terms such as gender equality, autonomy, agency, status and/or empowerment to describe similar attributes[3,42,45,55,78]. In this study, gender norms were operationalized based on decision-making ability, restrictions on wife's activities, and acceptability of wife beating. However, a framework for reproductive empowerment specific to contraceptive use and gender attitudes could be established. Future research could also attempt to establish a temporal relationship between the presence of restrictions on wife's activities and contraceptive use over time. Further research could assess couples' agreement on myths and perceptions specific to FP use and methods.

Couple studies like this one, provide insight into how the joint viewpoints of couples could be associated with FP behaviors. This study includes perspectives from both partners to provide a more nuanced understanding of gender norms within a relationship. The results of this study provide evidence that endorsement of restrictions on wife's activities, by either member of a couple, is independently associated with lower FP use.

Even if a wife endorses an equitable viewpoint, her husband's disagreement could prevent or discourage her from accessing FP services. This information will be important for developing gender sensitive interventions that promote healthy reproductive lives for married couples in Nigeria.

Chapter 2 Tables

Table 2-1. Subsample characteristics of women and men surveyed in select cities in Nigeria, 2010/2011, MLE.

Categories	Women n	Men n
Participants who completed the interview in 4 cities in households selected for male interviews	5,232	5,547
Excluded not spouse/head of household	2,251	2,047
Excluded not married/cohabiting (based on self-report)	214	978
Excluded not full-time resident of the home	7	12
Number of eligible individuals	2,760	2,510
Excluded households where spouse did not complete the interview	576	399
Final matched sample:	2,184	2,111

Table 2-2. Comparison of sociodemographic characteristics of matched and unmatched married men and women at baseline, 2010/2011, couples sub-sample, Nigeria MLE.

		Women		Men	
		Matched women (weighted n=2,130) %	Unmatched married women (weighted n=582) %	Matched men (weighted n=2,194) %	Unmatched married men (weighted n=403) %
Age[8]					
	15-19	1.8	0.3	0.0	0.0
	20-24	10.9	5.3	0.9	0.9
	25-29	25.1	18.0	7.2	5.2
	30-34	25.6	19.5	19.0	17.2
	35-39	18.9	19.3	20.1	14.3
	40-44	11.1	19.2	19.9	14.2
	45-49	6.8	18.4	16.2	15.1
	50-54[9]	NA	NA	12.1	18.1
	55-59	NA	NA	4.6	15.0
Education*					
	None	9.4	18.7	3.9	7.8
	Quranic	1.7	0.8	4.8	3.7
	Primary	19.2	21.5	13.7	15.9
	Junior secondary	7.1	5.9	6.1	5.6
	Senior secondary	37.4	25.7	35.7	27.3
	Higher	24.2	26.7	34.3	37.7
Religion*					
	Catholic	4.1	3.5	2.7	6.2
	Protestant	41.0	35.7	40.8	38.5
	Muslim	54.3	60.4	56.0	54.6
City*					
	Abuja	21.7	23.9	18.3	12.3
	Ibadan	31.3	22.2	30.2	14.2
	Ilorin	22.0	30.4	20.0	18.8
	Kaduna	25.1	23.5	31.6	54.7
Polygyny[10] (n=2,100)					
	Yes	14.4	27.4	13.8	12.3
Parity*					
	0	6.5	5.7	6.1	5.6
	1-3	54.6	43.3	48.7	40.3
	4 or more	39.0	51.0	45.3	54.2

[8] Indicates statistically significant differences between matched and unmatched individuals F-test ($p<0.05$).

[9] Men were eligible to be in the sample from age 15-59, women were eligible from age 15-49

[10] Evaluated by asking Wife-- besides yourself, does your husband/partner have other wives? Husband—Do you have more than one wife/partner?

Worked outside the home[11][12]					
	Yes	61.4	58.6	96.0	89.7
Current contraceptive usage[13][14]					
	Modern	34.3	28.2	NA	NA
Unmet Need*[15]					
	Yes	15.5	20.4	NA	NA
				NA	NA
Currently pregnant*					
	Yes	11.2	7.3	NA	NA

[11] For women the time frame was the last 7 days, for men the time frame was the last 12 months

[12] Excluding currently pregnant women from the non-user category.

[13] Unmet need was only evaluated for women

[14] Age differences rounded to the nearest whole number based on self-reported husband and wife's ages

[15] Four husbands were more than 4 years younger than their wives, they are included in this category

Table 2-3. Couple concordance on education, age, and religion at baseline, couples sub-sample, 2010/2011, Nigeria MLE.

Sociodemographic factor	(Weighted n) %
Education	(n=2,079)
Both no education	1.1
Both Quranic education	1.0
Both primary education	5.5
Both secondary education	26.2
Both higher than secondary education	20.3
Husband more educated than wife	33.3
Wife more educated than husband	12.6
Age[16]	(n=2,130)
Husband same age, younger or within 5 years of wife	38.0
Husband 6-10 years older than wife	37.4
Husband older more than 10 years older than wife	24.7
Religion	(n=2,109)
Both husband and wife Muslim	53.1
Both husband and wife Christian[17]	43.0
Wife Christian, husband Muslim	2.5
Wife Muslim, husband Christian	1.5

[16] Due to small number of Catholics, Christian category includes all denominations

[17] equitable=”no” response to restrictions on wife’s activities/wife beating or “wife” or “both equally” decision making

Table 2-4. Percentage of husbands and wives who agree and disagree on gender norms by scale item at baseline, couples' sub-sample, Nigeria MLE, 2010/2011.

	Agreement			Disagreement		
	Both equitable	Both inequitable[18]	Total agreement	Husband inequitable	Wife inequitable	Total disagreement
	%	%	%	%	%	%
Justified wife beating[19]						
If he suspects her of being unfaithful	66.6	7.5	74.1	10	15.9	25.9
If she neglects the house or the children	79.3	4	83.3	8.5	8.3	16.7
If she goes out without telling him	83.8	1.2	85.0	7.2	7.7	15.0
If she argues with him	85.6	0.8	86.4	4.6	8.9	14.5
If she cooks the food improperly	89.2	0.4	89.6	3.4	7	10.4
If she refuses to have sex with him	89.2	0.5	89.7	3.4	6.9	10.3
If she refuses to have another child	94	0.3	94.3	2.4	3.3	5.7
Overall justified wife beating (n=1,577)[20]	67.0	6.2	73.2	11.8	15.0	26.8
Restrictions on wife activities[21]						
Using contraceptives	65.8	6.5	72.3	10.8	16.9	27.7
Working outside the home	71	3.2	74.2	8.7	17	25.7
Visiting your friends	76.1	2.2	78.3	5.8	15.9	21.7
Having visits from people	79.3	1.1	80.4	5.8	13.8	19.6
Visiting your family	83	0.2	83.2	4.2	12.6	16.8
Using a mobile phone	83.2	0.3	83.5	3.8	12.7	16.5

[18] inequitable="yes" response to restrictions on wife's activities/wife beating or "husband" decision making;

[19] Responses to: **S**ometimes a man is annoyed or angered by things that his wife does. In your opinion, is a man justified in hitting or beating his wife in the following situations?

[20] In aggregate across all 7 scale items—both equitable: husband and wife both have zero circumstances where wife beating is acceptable: both inequitable: husband and wife have some situations where beating is acceptable; husband inequitable: husband has non-zero circumstances, wife has zero circumstances; wife inequitable: wife non-zero circumstances, husband zero circumstances.

[21] Responses to: Sometimes in a marriage or a relationship, a man prohibits his wife from doing certain things. Does your husband prohibit you from/ Do you prohibit your wife from…?

Overall restriction on wife's abilities (n=1,872)[22]	46.7	13.8	60.5	26.2	13.3	39.5
Greater say in decision-making[23]						
Deciding when to visit family and friends	45.1	13.9	59.0	26.0	15.0	41.0
Making small daily household purchases	59.9	8.6	68.5	21.6	9.9	31.5
Making large household purchases	6.9	62.6	69.5	17.2	13.3	30.5
Deciding when and where to seek your (wife's) medical care	46.9	13.3	60.2	22.6	17.2	39.8
Overall greater say in decision making (n=1,683)[24]	5.6	27.0	67.4	39.9	27.5	32.6

[22] In aggregate across all scale items—both equitable: husband and wife both have zero restrictions, both inequitable: husband and wife both have same non-zero number of restrictions; husband inequitable: husband more restrictions than wife; wife inequitable: wife more restrictions than husband

[23] Responses to: in a couple, who do you think should have the greater say in each of the following decisions: the husband, the wife, or both equally?

[24] In aggregate across all 4 scale items: both equitable: husband and wife both zero male-centric decisions, both inequitable: husband and wife both have same non-zero number of male-centric decisions; husband inequitable: husband more male-centric than wife; wife inequitable: wife more male-centric decisions than husband

Table 2-5. Adjusted[25] odds ratios (aOR) (and associated 95% confidence intervals) for couples' agreement on gender norms/husband's total inequitable views and modern[26] contraception as reported by the woman based on logistic regression analysis, couples subsample, urban Nigeria, 2010/2011.

	Modern contraception aOR (95% CI)
Model 1: Acceptability of wife beating[27]	(weighted n=1,444)
Both endorse zero wife beating	REF
Husband some endorsement of wife beating, wife no endorsement of wife beating	0.90 (0.48, 1.70)
Wife some endorsement of wife beating, husband no endorsement of wife beating	1.02 (0.71, 1.48)
Both endorse some wife beating	2.44 (1.08, 5.48)*
Husband's total number of circumstances where wife beating acceptable (0-7)	0.95 (0.75, 1.45)
Model 2: Restrictions on wife's activities	weighted n=1,664
Both endorse zero restrictions	REF
Husband more restrictions than wife	0.57 (0.36, 0.90)*
Wife more restrictions than husband	0.60 (0.42, 0.87)*
Both endorse same non-zero number of restrictions	0.26 (0.16, 0.44)*
Husband's total number of inequitable restrictions (0-6)	1.06 (0.93, 1.02)
Model 3: Household decision making[28]	(weighted n=1,411)
Both endorse zero male-centric decisions	1.08 (0.55, 2.13)
Husband more male-centric decisions than wife	0.97 (0.68, 1.36)
Wife more male-centric decisions than husband	1.03 (0.70, 1.52)
Both endorse same non-zero number of male-centric decisions	REF
Husband's total number of inequitable decisions (0-4)	0.98 (0.80, 1.19)

[25] Adjusted for woman's: work status, age, education, wealth, city, parity, religion and marriage type; man's: number of inequitable views; couple: age and education concordance. [Husband's religion, marriage type, parity and work status were removed due to collinearity issues.]

[26] Modern methods include: pills, injectables, IUCDs, implants, condoms, sterilization, Lactational Amenorrhea Method (LAM), and emergency contraception

[27] Due to lack of variability (only 1.1% of couples endorsed same non-zero number of wife beating attitudes), we used a classification that compared husbands some v. no endorsement of wife beating.

* Significance at $p<0.05$.

[28] Note, due to small sample size in couples that endorse non-husband centric decision making, we had to change the reference category for this scale.

CHAPTER 3: MANUSCRIPT 2[29]: DO COUPLE-LEVEL ATTITUDES TOWARDS GENDER NORMS PLAY A ROLE IN CONTRACEPTIVE ADOPTION IN THE EXTENDED POSTPARTUM PERIOD?

Background

Understanding women's patterns of contraceptive adoption in the extended postpartum period has implications for service delivery and access to contraceptive services[1]. Short birth intervals, or the time between births, can result in high maternal and infant morbidity and mortality[2,3]. Research from 22 developing countries suggests that nearly 40% of women intend to use contraception in the extended postpartum period but are not currently using a method, suggesting high levels of need[4]. Notably, there are many barriers to the adoption of family planning (FP) methods for women in the extended postpartum period including fear of side effects while breastfeeding, ambivalence towards a future pregnancy, and spousal communication[5–8]. Extended postpartum contraception is further complicated by myths around inability to get pregnant as long as menstruation has not started. Available literature suggests that women resume sexual intercourse sometime between 6 weeks to 3 months after birth, but modern contraceptive use usually begins after the return of menstruation (which varies based on hormonal factors and breastfeeding practices)[7,9]. However, based on a 2003 DHS survey in Kenya and Zambia, only one-fourth of women who had already begun menstruating after a birth were using modern contraception[10]. In high fertility regions such as Nigeria, FP is primarily used for spacing births rather than limiting births, thus use of sterilization and longer acting methods is low[11]. The WHO recommends an optimum birth spacing of 24 months between pregnancies, however studies commonly evaluate 12-18 months after pregnancy as

[29] Portions of this chapter will be submitted as a manuscript to the *Journal of International Perspectives on Sexual and Reproductive Health* in the coming weeks. Sahay, KM, Barden-O'Fallon, J, Speizer, I, Babalola, S, Ibrahim, J and Martin, SL. "Do Couple-Level Attitudes Towards Gender Norms Play a Role in Contraceptive Adoption in the Extended Postpartum Period?"

the extended postpartum period for practical considerations (i.e. a large proportion of women have subsequent pregnancies)[4,12].

Inequitable gender norms, or the imbalance in the rights, resources and opportunities available to women, may be an underlying factor associated with contraceptive use patterns[13–18]. A longitudinal study in India found that in communities where men have more relative power than women, women were less likely to adopt modern contraception[18]. Other studies have shown that women's ability to make decisions in the household as well as participate in activities without restriction in their communities influences their contraceptive adoption[17–19]. Spousal opposition can also be a deterrent to contraceptive adoption[17,20,21]. Research from Uganda found that women who reported that their spouse opposed the use of contraception had significantly greater unmet need than women who reported their spouse did not oppose the use of contraception[22]. Thus perceptions of inequities in gender relations could be associated with a woman's ability to access and implement FP behaviors in a timely fashion, even when services are potentially available[23]. However, it's unclear if couples' agreement on gender norms are associated with modern contraceptive adoption during the extended postpartum period[24].

Couples' agreement on gender norms is rarely available from both husbands and wives. However, several matched couple studies evaluate associations between couples' fertility views and current contraceptive use[6,25–27]. These studies have primarily focused on couple-level factors associated with the adoption of contraception. In Ghana, Bawah et al. found that spousal communication was an important predictor of contraceptive use[28]. Another study in Ghana found that couples were more likely to use contraception when both members of the couple wanted to stop childbearing[27]. A study assessing couples' ambivalence towards pregnancy in Indonesia, found that couples that disagree that a potential pregnancy would be a "problem" were less likely to use contraception than couples that agreed that a potential

pregnancy would not be a "problem[30]"[29]. However, these studies do not always include attitudes about other relationship factors such as gender norms.

The specific objective of the research is to determine the effect of couples agreement on gender norms is association with contraceptive adoption. The primary hypothesis for this study is that individuals who disagree with their partners about equitable gender norms will be less likely to adopt contraceptive methods as compared wives who agree with their partners about equitable gender norms. For the purposes of this study, equitable gender norms are norms where 1) the wife is involved equally in decision making, 2) the wife's ability to participate in daily life activities are not restricted by her husband, and 3) beating one's wife is not considered justifiable under any circumstances. To evaluate this question, contraceptive adoption is assessed using information on the women's reproductive calendar data. Couples' agreement on gender norms are calculated based on husband and wife's attitudes on DHS-type survey questions on gender norms.

Methods

Setting

Nigeria is especially crucial for FP efforts due to high gender inequity and poor FP outcomes[30,31]. As of 2014, the Social Index for Gender Inequity, ranked Nigeria as having "very high" levels of gender inequity[32]. Notably, nearly half of the Nigerian population resides in urban areas[30] and recent research has found high disparities in contraceptive use between the urban rich and urban poor[31]. Data from the Nigerian 2013 Demographic Health Survey (NDHS) provides important country-specific benchmarks for FP and maternal health. The maternal mortality ratio in 2014 was 560 deaths per 100,000 live births, among the tenth highest in the world[31]. The total fertility rate in Nigeria is 5.5 births. Women may breastfeed their children for up to 2 years, but exclusive breastfeeding rates are extremely low in Nigeria. The median duration of exclusive breastfeeding is less than a month (0.5 months) based on 2013 NDHS[30].

[30] Problem was not defined in the study and was intentionally broad to encompass physical, mental, economic problems as interpreted by the individual

The median duration of abstaining from sex is 2.8 months and the median duration that women do not have their period is 10.6 months following a birth. Taken together, women in Nigeria resume sexual relations shortly after a birth but do not exclusively breastfeed, thus potentially increasing their risk of an unwanted/mistimed pregnancy. Literature from Nigeria on extended postpartum contraceptive use and gender relations is sparse. In parts of Nigeria, men are in control of fertility and may refuse contraception under certain circumstances[24]. Men often indicate a low frequency of spousal communication and discussion of fertility goals[33].

In this study, we focus on four geographically, culturally and ethnically diverse cities in Nigeria: Abuja, Ibadan, Ilorin, and Kaduna, all with vastly different modern contraceptive prevalence rates per the 2010/2011 Nigeria Urban Reproductive Health Initiative (NURHI) baseline survey[32]. Abuja is the smallest of the four cities, established as the capital city of Nigeria in 1991. Ibadan is a southwestern city with agricultural roots and is the third largest urban area in Nigeria. Ibadan's residents are primarily ethnically Yoruba and religiously Christian. Ilorin is a northern, predominately Muslim and Yoruba city. Kaduna is a predominantly Hausa city that includes both Muslims and Christians. In terms of FP, in 2013, less than 10% of married women of reproductive age (15-49) in Nigeria were using a modern contraceptives[30]. In urban areas, modern method use was considerably higher (16.8% modern)[30]. Modern contraceptive rates among married women in our four cities of interest are as follows: Ibadan: 33%; Abuja: 29.2%; Ilorin:21.3%; Kaduna:16.3%[32]. City-based estimates of extended postpartum contraceptive adoption are not available.

The dataset

This study involves a subsample of data collected from men and women in four cities from the Measurement, Learning & Evaluation (MLE) project in Nigeria using population based data. The purpose of the MLE project was to collect data to evaluate interventions aiming to increase contraceptive prevalence among key urban populations in four countries. The MLE Project in Nigeria collected baseline population-level data between October 2010 and April 2011 from women in six cities (Abuja, Benin City, Ibadan, Ilorin, Kaduna, and Zaria) and men in four cities (Abuja, Ibadan, Ilorin and Kaduna).

Representative samples of women and men were selected and interviewed using a two-stage sampling method. In the first stage, randomly sampled urban enumeration areas (EAs) (classified by the 2006 Population and Housing Census) were eligible as primary sampling units (PSUs). Within each selected PSU, second stage sampling involved a random sample of 41 households. Within a selected household, all women ages 15-49 were eligible for an interview. Women who provided verbal consent were asked questions relating to demographics, reproduction, fertility preferences, gender relations, and maternal and child health by a trained female interviewer. In addition, in approximately half of the households in four cities, all men between the ages of 15-59 were identified and eligible to be interviewed through a parallel process. Consenting men were asked similar questions by a trained male interviewer. At baseline, 2,184 couples were identified within households in a four-city sample (Abuja, Ibadan, Ilorin and Kaduna).

At the follow-up interview, in 2014, all eligible women who were usual residents in the household at baseline were tracked and if found, asked for verbal consent for a follow-up interview. At the follow-up interview, women were also asked to complete a reproductive calendar that recorded their reproductive events from January 2009 to the follow up interview date in 2014 (see Figure 3-1). Women were asked about any contraceptive methods they used, the length of time they used the method, the reason for discontinuation of method (if applicable), births, miscarriages, stillbirths and abortions on a month-by-month basis. In the present study, we identified women in the couples' sample who were followed until June-October 2014 and created a matched couples' dataset with follow-up data as well as reproductive calendar data. Of the 2,184 eligible matched women in the couples' study, follow-up information was available for 1,515 women. In total, we found nearly 70% of the baseline matched couples. Nearly one third of women (n=474), did not have any births during the reproductive calendar and were excluded from the sample. Thus, our final analytic sample includes 1,014 couples. Weights were not included in this analysis as the sample selected (women with at least one birth during the reproductive calendar), is not representative of married women in the four cities in Nigeria (see Figure 3-2).

MLE obtained ethical clearance from the University of North Carolina at Chapel Hill Institutional Review Board (UNC IRB) and the National Health Research Ethics Committee of Nigeria to conduct the surveys. The UNC IRB also approved this secondary data analysis.

Variables

The primary outcome of interest is modern contraceptive adoption following a birth outcome, as reported by women in the retrospective reproductive calendar. Women enter the analysis sample in the month following their first birth event in the reproductive calendar (regardless of outcome) and are followed until a contraceptive adoption or 18 months, whichever comes first. Contraceptive adoption is coded as 1 when a woman adopts any modern method of contraception (including sterilization (male/female), implants, injectables, intrauterine contraceptive devices (IUCD), daily pill/emergency pill, condoms (male/female), lactational amennorhea (LAM), diaphragms, foam, jelly or spermicide) following the first birth or pregnancy termination (miscarriage, stillbirth or abortion) and 0 otherwise. This is a calculated variable where all women entered the cohort at the birth event and are followed across all events up until 18 months past pregnancy. An intermediate analysis at 12 months was also conducted due to a high number of subsequent pregnancies by 18 months.

The primary independent variables of interest are based on couples' agreement as derived from three DHS-based gender norms measures: attitudes towards wife beating, household decision making and restrictions on wife's activities[23]. These measures have previously been used to describe the acceptability of women's involvement in activities, responsibilities, decision making, and control over resources, in the literature[23,34]. The creation of the couples' agreement variable is discussed for each measure below. We assume that the couples' agreement variable was constant over time.

Restrictions on wife's activities

The restrictions on wife's activities measure (sometimes referred to as freedom from prohibitions scale[35]) is a series of six yes/no questions about the acceptability of a husband restricting his wife's behavior (e.g. work outside the home, have visits from others, cell phone use, ability to visit friends/family, and use contraception). Each item on this scale was defined as an inequitable when an

individual answered "yes" to an item on this scale (an equitable norm is a "no" answer). The individual "yes" responses were added together for an overall number of restrictions (0-6) endorsed by an individual. For multivariate analysis, couples' agreement was characterized based on a comparison of husbands and wives' scores into three categories: 1) both the husband and his wife have a score of 0 (both have equitable views), 2) husband and wife disagree on the number of equitable views (regardless of which member had more equitable views), 3) the husband's and wife's scores are equal, but greater than zero (both the husband and wife have the same level of somewhat inequitable views). Disagreement was grouped into a single category, since we did not find differences between men and women's disagreement, (i.e. it was more important to note that the couple disagreed, not whether the man or woman held more inequitable views).

Acceptability of wife beating scale

The acceptability of wife beating measure included seven yes/no questions about the acceptability of wife beating. Respondents were asked whether it was acceptable to beat a wife under a set of hypothetical circumstances (going out without permission, neglecting household responsibilities, cooking improperly, arguing with husband, refusing another child, refusing sex, and being unfaithful). An individual's views were characterized as inequitable when an individual answered "yes" to an item on this scale, (an equitable norm is a "no" answer). For an individual, the sum of the number of yes responses was calculated ranging from 0-7 (i.e. number of inequitable norms). For multivariate analysis, couples' agreement was grouped into three categories based on a comparison of husbands and wives' scores: 1) both the husband and his wife have a score of 0 (both have equitable views), 2) husband and wife disagree on the number of equitable views, 3) the husband's and wife's scores are equal, but greater than zero (both the husband and wife have the same level of somewhat inequitable views).

Household decision making

The household decision making questions ask whether the primary decision maker for a given decision (e.g. small household purchases, large household purchases, visiting friends or family, and deciding when and where to seek wife's medical care) is the husband, wife or both equally[31]. In the household decision making measure, an inequitable or male-centric norm is one when the husband is the primary decision maker (an equitable norm is when the wife is the primary decision maker or the couple makes joint decisions). Individual answers for each decision were added together for an overall sum of male-centric decisions (0-4). As with the other measures, couples' agreement was classified into three categories: (1) both have score of zero, (2) one partner has a score of zero/the other partner has a score greater than zero, (3) both have score greater than zero.

Covariates were determined a priori based on literature review and included several sociodemographic, individual and regional characteristics[23,36]. We added the number of husband's inequitable views as a control variable to provide a baseline metric to the couples' agreement variable discussed above. In addition, other covariates reported by the women include work status, parity[32], marriage type, religion[*], age, and education. Woman's work status was assessed using the yes/no question: "As you know, some women take up jobs for which they are paid in cash or kind. Others sell things, have a small business or work on the family farm or in the family business. In the last seven days, have you done any of these things or any other work?" We created an indicator variable for "yes" responses to the work status question. We calculated parity by summing the number of living children residing with the woman, number of living children residing away from the woman, and number of children that died. Due to a relatively high prevalence of polygyny in Nigeria[30], we also controlled for marriage type using an indicator variable. Polygyny was assessed from the woman's perspective by

[31] Evaluated by asking Wife-- besides yourself, does your husband/partner have other wives?
* Indicates that differences between women retained and lost to follow up were statistically significant.

[32] Evaluated by asking Wife-- besides yourself, does your husband/partner have other wives?
* Indicates that differences between women retained and lost to follow up were statistically significant.

calculating an indicator variable for "yes" responses to the question, "Besides yourself, does your husband/partner have any other wives?" We dichotomized religion as Muslim and Christian due to a lack of variability in responses. In addition, women's age in years and education levels were included as covariates. To compare couples' characteristics, we also looked at differences between the couples' in terms of age and education.

The household level factors include: household wealth quintiles and city. Wealth quintiles were created using principal component analysis of household assets and housing characteristics as described by Filmer and Pritchett for the Demographic Health Survey[37]. Since the wealth index was at the household level, this did not differ for husbands and wives. Changes in marital status for the woman was also evaluated as a covariate, as this is often a proximate predictor of contraceptive use[1]. Less than 1% of events indicated marital dissolution/separation/change in marital status, so we did not include this variable in the final analysis.

Analysis

All descriptive and multivariate analyses are weighted to account for the survey design unless otherwise noted. We present descriptive weighted analyses of the responses for women in the couples' sample as well as those lost to follow-up. We use F-tests to compare differences between sociodemographic characteristics (for example: age, religion, contraceptive use, work status) between women retained and women lost to follow up.

We conducted six Cox proportional hazards models: one for each gender norm measure at each time point (12 and 18 months postpartum). Cox proportional hazards analyses were used to assess associations across multiple variables. The models evaluate both individual, couple and household level influences on the decision to practice modern contraception. In this analysis, we used four city weights from follow-up to account for survey design and loss to follow-up. We used the Breslow-Day method for handling ties. Hazard ratios can be used interpret results associated with the likelihood of contraceptive adoption for one group relative to a reference category. For example, a HR>1 for each gender norms measure suggests increased likelihood of contraceptive adoption for couples that both had inequitable

views/disagree on gender norms compared to couples that agree on equitable views (our reference category). On the other hand, a HR<1 suggests a decreased likelihood of contraceptive adoption for couples that agree on inequitable norms/disagree on gender norms as compared to couples that agree about equitable norms. We hypothesize that our analysis will result in a HR<1 for each of our gender norms with respect to adoption of modern contraception. The proportional hazards assumption was tested graphically. We set an a priori significance level of 0.05. All statistical analyses were conducted in Stata 14 SE.

Due to a large amount of missing data in the couples' agreement variable, we explored the option of using multiple imputation with chained equations. Traditional regression analysis methods drop an entire case if any of the covariates are missing, resulting in a significant reduction in sample size. However, multiple imputation functions (fully conditionally specified models) replace missing values with suitable estimates across multiple simulated datasets. This allows us to retain individuals and use multiple imputation techniques acceptable for large social science datasets. Missing values were imputed by using 100 burn-in rounds to impute 150 datasets using Markov chained Monte Carlo algorithms and trace plots used for diagnosis appropriateness of imputation. The multiple imputed datasets were analyzed using mi commands in Stata to produce estimates. Imputation results are available from the first author.

Results

Characteristics of analytic sample

In this analysis, we focused specifically on women who had at least one birth during the reproductive calendar (see Table 3-1). Women in the sample were monogamous, 60% Muslim, had at least one pregnancy, and had high levels of education/wealth status.

Couples' agreement on gender norms

About two thirds of couples agreed that wife beating was not justified under any circumstances (66%). Approximately one fourth of couples (27%), had differing opinions about the acceptability of wife beating while 6% of couples agreed that wife beating could be justified under some circumstances. The restrictions on wife's activities measure showed 41% of couples citing a different non-zero number of

restrictions than their spouse. The household decision making measure had 68% of couples citing a different number of male-centric responses than their spouse (see Table 3-2). Missing values in the exposure variable ranged from 9-14% depending on the measure for each case.

Survival analysis-adoption of modern contraception in the extended postpartum period

Adoption of contraception in the extended postpartum period was common. Across 896 women who entered the survival analysis after a birth outcome, 339 adopted modern contraception within 18 months of the birth outcome. The results of the multivariate survival analysis of adoption of modern contraception in the extended postpartum are shown in Table 3-3 to Table 3-5 for each gender norm scale.

In the multivariate analysis at 18 months, none of the gender norms measures were significantly associated with postpartum contraceptive adoption. Thus, the hazard for couples who agreed on having limited restrictions was not significantly different from the hazard for couples that disagreed on restrictions. After adjusting for covariates, women in couples in which both had inequitable views on restrictions on wife's activities were less likely to adopt modern contraception, relative to couples where both had equitable views (aHR 0.75, 95%CI: .49, 1.15). For the acceptability of wife beating measure, the adjusted hazard ratio was also directionally as expected, 0.91 (0.66, 1.26) for disagreement and 0.68 (0.42, 1.11) for joint inequitable views. Hazard ratios for household decision-making were also not statistically significant. For the household decision making the aHR was 1.05, 95% CI 0.83, 1.33 for disagreement and aHR 1.19 (0.67, 2.12) for joint inequitable views in comparison with equitable views (Tables 3-3 through 3-5). Results at 12 months were similar, and also were not statistically significant.

In our hazard modeling, several other individual-level variables were statistically significant determinants of subsequent contraceptive adoption in the extended postpartum. In terms of covariates, women's education level, work status, and a high number of children at baseline were significant predictors of contraceptive adoption across all three models. Results reported here are for the restrictions on wife's ability measures, but parameter estimates were similar for the other two measures (results available from first author). Compared to women with no education, women with primary education were aHR 1.87 (95% CI: 1.13, 3.08) times more likely to adopt contraception in the extended postpartum

period. Women working outside the home in the last seven days were more likely to adopt modern contraception as compared to women who did not work outside the home (aHR 1.30 (1.02, 1.65)). Finally, women with four or more children by 2011 were 2.42 (1.40, 4.20) times more likely to adopt contraception than women with fewer children.

The parameters controlling for baseline level of men's gender equitable views were not significantly associated with adoption in any models. Relative age differences between husband and wife were significant only in the restriction of wife's abilities model. Comparative differences in education was not a significant predictor in any models. City, wealth and religion were not significantly associated with adoption of modern contraception in any models.

To check the sensitivity of our results to alternative definitions of adoption, we modeled contraceptive adoption at 12 months, but we did not find any significance in the three couples agreement on gender norms measures. We further examined women who adopted modern contraception after LAM as compared to women who did not use LAM/discontinued LAM for no method. In addition, we conducted multiple imputation on missing items within the couples' agreement variable to reduce the degradation of sample due to missing data. We further tried to separate women who adopted and discontinued from women who adopted and continued modern methods through a review of all reproductive events within a 12 month time frame. None of these approaches changed our results (results available from first author).

Births, reproductive events and LAM

The 1,014 women included in the final sample had an additional 1.7 births (1.63, 1.74) over the remaining length of the reproductive calendar. At 12 months postpartum, 45 individuals had already had a subsequent birth but that number climbed to 128 individuals by 18 months. The total number of births per woman during the five year reproductive calendar ranged from 1 to 4. Nearly 86% of pregnancies ended with a live birth, but approximately 10% ended in miscarriage, stillbirth, abortion (4% had unreported outcomes). The most popular adopted methods were LAM, male condoms, and injectable. Approximately 13.5% of women in the sample indicated LAM as a method of contraception and the median duration of

use was 6 months. At 12 months, approximately 13% of individuals had sustained modern use (uninterrupted modern methods) whereas that number dropped to 8.5% by 18 months (Table 3-6).

Analytical sample in comparison to larger population of women in Nigeria

Sociodemographic characteristics of the analytic sample and women who were lost to follow-up vary considerably in terms of sociodemographic factors (Table 3-7). Nearly one third of women were lost to follow-up between the baseline and follow-up surveys. Based on F-tests, women who were lost to follow up were more likely to be living in Abuja or Ibadan, younger, monogamous, unemployed, and poorer as compared to women who remained in the sample. Women were similar in terms of religion, modern contraceptive use, and education level. This suggests that women in our sub-sample were structurally advantaged as compared to women in the larger MLE cohort of women in urban Nigeria.

Discussion

In this study, we follow a sample of women from a recorded birth event over a period of 18 months to identify which women adopted modern contraception. Based on our results, 13.5% of women used LAM and the median duration of LAM use is 6 months. Women in our sample also adopted modern methods that require consistent use such as condoms and pills. Based on our multivariate analysis, none of the couples' agreement variables on gender norms were significantly associated with contraceptive use in the extended postpartum period. Our study is unique in that we created an agreement variable between couples rather than a perception of the spouses' attitude[20]. Even though our couples' agreement variable was not associated with contraceptive adoption in the extended postpartum period, other covariates such as women's education status and work status were associated with adoption in the 18 months following pregnancy. This supports the idea that women's ability to gain access to resources through education and work opportunities has established implications for health and well-being. Thus, the highly educated women in our sample may already have advantages with respect to negotiating contraceptive use.

There are several potential reasons for our null result—first, it's possible that the high levels of missing data in our exposure variable biased our results towards the null, secondly, it's possible that agreement on gender norms is not immediately evident in the extended postpartum period and its effects

are subtler over time, and thirdly, it's possible that the construction of the gender norms variable needs additional work. Evidence suggests that especially when individuals have socially undesirable views, they may not respond to questions, thus resulting in more missing values for uncomfortable questions[38]. However, imputation results did not change the significance of these findings.

These findings have several notable limitations with regards to generalizability, social desirability and recall bias. With respect to generalizability, contraceptive use in this study is potentially different from the Nigerian population overall because of the focus of women (and men) in union residing together, as well as the design of our analytic sample. Since we matched couples retrospectively, we had to be conservative in our matching criteria, thus potentially excluding polygynous couples. Additionally, longitudinal follow-up data tended to include wealthier, highly educated and older women that could bias our findings as these individuals may have more viewpoints that are egalitarian. Furthermore, our women's unions tended to be stable, with less than 1% of events indicating a change in marital status. We used follow-up four city weights in analysis wherever possible to account for non-response bias. Secondly, it's possible that our survey instrument itself may suffer from social desirability bias in the measurement of gender norms. The gender norm measures focus on acceptability rather than action (i.e. individuals are asked whether it is justifiable for a husband to beat his wife rather than asking if the husband has ever beaten his wife). By framing the questions in this way, participants may believe that the socially acceptable response is to say that it is unacceptable to beat one's wife. Notably, the data collected for this study was part of a larger intervention aimed at increasing contraceptive use on married women. Thus, it is difficult to disentangle the interventional efforts from the changes in women's reproductive behavior attributable to inequitable gender norms. Despite these limitations, our study provides interesting opportunities for future programming and research.

Recognizing that social inequities exist between men and women involves a gender aware approach to programming. Increasingly, FP programs are using gender aware approaches to assist couples in dispelling myths/misconceptions around the practice. Gender aware strategies vary in their approaches: exploitative strategies (reinforcing or taking advantage of structural advantage), accommodating

strategies (recognizing the existing norms without trying to change them), or transformative strategies (critical examination of norms, reinforcement of equity in norms, and an aim to change). Thus, instead of simply making men aware of FP methods, programs can tailor their messaging to engage underlying gender concerns. This has importance especially in the extended postpartum period when women's activities may be restricted after childbirth[39].

Our study supports avenues for further research on establishing a couple-based framework for reproductive empowerment in the Nigerian setting. In this study, we operationalized gender norms based on couples agreement on decision-making ability, restrictions on wife's activities, and acceptability of wife beating. Despite their widespread use in DHS-type surveys, these gender norms measures were designed in Southeast Asia, and thus may not be relevant to the Nigerian context[23,35]. Qualitative studies and establishment of validated scales relating specifically to reproductive empowerment could be useful for better understanding the complex relationships between gender norms and contraceptive use[34,40].

Despite these limitations, this research is innovative because most adoption research focuses on women's perspectives exclusively, since matched data on husband's attitudes/perspectives are rarely available[41,42]. Our study triangulated data from women and men at baseline, and reproductive calendar information from women to provide an enhanced picture of women's reproductive histories. In addition, we included information gathered from their partners and provided contextual description of gender norms in these four cities.

This analysis has public health implications that provide further context for gender norms in understudied urban Nigeria. Understanding partners' preferences, attitudes and perspectives on gender norms could provide useful strategies for programs to reach women with need for contraception, especially during the extended postpartum period[39]. Further research is needed to determine the role of gender norms on the discussion of FP, attitudes towards various methods, and changes in contraceptive behavior over time. It's possible that increasing women's opportunities for education and employment could lead to more agreement on egalitarian gender norms and, in turn, increased modern contraceptive use extended postpartum period[33].

Chapter 3 Tables

Table 3-1. Demographic information for women retained at follow-up, women in analytic sample compared to women with no births, end term weighted percentages n=1,465, Nigeria MLE 2010-2014.

	Women with at least one-birth during calendar n=1,014 (weighted n=991)	Women with zero births during calendar period (weighted n=474)	p-value
Age at baseline*			
15-19	22 (2.2)	2 (<1)	<0.01
20-24	144 (14.6)	3 (<1)	
25-29	334 (34.8)	38 (8.0)	
30-34	301 (30.3)	86 (18.1)	
35-39	136 (13.7)	122 (25.8)	
40-44	37 (3.8)	130 (27.4)	
45-49	6 (<1)	93 (19.7)	
Level of education			
None	91 (9.2)	47 (10.1)	0.06
Quranic	194 (19.6)	78 (16.7)	
Primary	474 (47.9)	198 (42.5)	
Some secondary	213 (21.6)	135 (28.9)	
Higher than secondary	17 (1.7)	8 (1.7)	
Religion			
Christian	392 (39.8)	216 (45.8)	<0.01*
Muslim	591 (60.2)	257 (54.2)	
City of residence			
Abuja	169(17.1)	85 (18.0)	0.27
Ibadan	295 (29.8)	166 (35.0)	
Ilorin	209 (21.1)	92 (19.4)	
Kaduna	318 (32.1)	131 (27.6)	
Polygyny[33]			
Yes	143 (14.6)	82 (17.4)	0.24
Parity as of 2011*			
0	61 (6.1)	23 (4.8)	<0.01*
1-3	610 (61.6)	171 (36.1)	
4 or more	320 (32.3)	280 (59.1)	
Worked outside the home			
Yes			
Wealth quintile			
1	35 (7.3)	138 (14.0)	<0.01*
2	81 (17.2)	213 (21.4)	
3	106 (22.2)	251 (25.3)	
4	127 (26.7)	237 (24.0)	
5	125 (26.4)	152 (15.4)	

[33] Evaluated by asking wife-- besides yourself, does your husband/partner have other wives?

* Indicates that differences between women retained and lost to follow up were statistically significant.

Table 3-2. Couples' agreement on gender norms scales, women with at least one birth, 2010-2014, (n=1,014), weighted percentages Nigeria MLE.

	Both agree equitable	Both agree inequitable[34]	Husband and wife disagree
	n (%)	n (%)	n (%)
Justified wife beating (n=800)[35]	528 (66.0)	51 (6.4)	221 (27.6)
Restriction on wife's abilities (n=904)[36]	410 (45.3)	123 (13.6)	371 (41.0)
Greater say in decision making (n=782)[37]	237 (30.2)	43 (5.4)	536 (68.0)

[34] inequitable="yes" response to restrictions on wife's activities/wife beating or "husband" decision making;

[35] In aggregate across all 7 scale items—both equitable: husband and wife both have zero circumstances where wife beating is acceptable: both inequitable: husband and wife have some situations where beating is acceptable; Disagree:one member of the couple endorses zero circumstances, the other member endorses some circumstances

[36] In aggregate across all scale items—both equitable: husband and wife both have zero restrictions, both inequitable: husband and wife both have same non-zero number of restrictions; disagree-husband and wife have different numbers of restrictions

[37] In aggregate across all 4 scale items: both equitable: husband and wife both zero male-centric decisions, both inequitable: husband and wife both have same non-zero number of male-centric decisions; husband inequitable: husband more male-centric than wife; disagree-husband and wife have different numbers of male-centric decisions

Table 3-3. Results of Cox proportional hazards model for adoption of modern contraception after first birth outcome based on couples' agreement on restrictions on wife's abilities measure, Breslow-Day method for handling ties, 896 women, 393 adoption events within 18 months of pregnancy, women with at least one birth in the reproductive calendar, Nigeria MLE, 2010-2014.

Independent Variable	aHR (95% CI) 12 months (353 adoptions)	p-value	aHR (95% CI) 18 months (393 adoptions)	p-value
Restrictions on wife's activities				
Both equitable	REF		REF	
Husband and wife disagree	1.04 (0.81, 1.35)	0.755	0.93 (0.70, 1.24)	0.62
Both inequitable	0.86 (0.58, 1.29)	0.473	0.75 (0.49, 1.17)	0.21
		0		
Husband's number of wife beating acceptable	1.00 (0.93, 1.08)	0.952	1.02 (0.95, 1.09)	0.60
Wealth quintiles				
1	REF		REF	
2	1.21 (0.88, 1.66)	0.244	1.25 (0.89. 1.77)	0.20
3	1.18 (0.85, 1.65)	0.321	1.19 (0.83, 1.72)	0.34
4	1.35 (0.95, 1.93)	0.095	1.29 (0.86, 1.93)	0.21
5	1.45 (0.98, 2.14)	0.065	1.54 (0.98, 2.41)	0.06
Woman's education level				
None/Quranic	REF		REF	
Primary	1.44 (0.90, 2.30)	0.124	1.87 (1.13, 3.08)	0.01
secondary	1.72 (1.06, 2.77)	0.029	1.92 (1.12, 3.30)	0.02
Secondary or higher	2.08 (1.16, 3.72)	0.014	1.95 (1.02, 3.70)	0.04
Woman's number of children at baseline				
0 children	REF		REF	
1-3 children	1.58 (0.93, 2.69)	0.091	1.40 (0.83, 2.36)	0.20
4 or more	2.67 (1.50, 4.76)	0.001	2.42 (1.40, 4.20)	<0.01
Woman's baseline age	0.98 (0.96, 1.01)	0.13	0.99 (0.96, 1.01)	0.29
Polygyny as reported by man	1.17 (0.85, 1.62)	0.328	1.26 (0.92, 1.73)	0.15
Woman's religion (Christian)	0.99 (0.78, 1.26)	0.944	1.01 (0.78, 1.31)	0.94
Woman working outside the home	1.25 (0.98, 1.59)	0.072	1.30 (1.02, 1.65)	0.04
Comparative age differences (in years)	0.98 (0.96, 1.00)	0.11	0.98 (0.96, 1.01)	0.20
Comparative education				
Same level	REF		REF	
Husband higher than wife	0.92 (0.66, 1.29)	0.622	0.88 (0.61, 1.25)	0.47
Wife higher than husband	1.07 (0.81, 1.42)	0.632	0.97 (0.73, 1.31)	0.86
City				
Abuja	REF			
Ibadan	0.96 (0.70, 1.33)	0.816	0.87 (0.63, 1.18)	0.36
Ilorin	0.80 (0.57, 1.13)	0.214	0.78 (0.55, 1.09)	0.14
Kaduna	0.74 (0.52, 1.06)	0.102	0.74 (0.53, 1.02)	0.07

Table 3-4. Results of Cox proportional hazards model for adoption of modern contraception after first birth outcome based on couples' agreement on acceptability of wife beating measure, Breslow-Day method for handling ties, 797 women, 334 adoption events within 18 months, couples data Nigeria MLE, 2010-2014.

	12 months (309 adoptions)		18 months (334 adoptions)	
Independent variable	**aHR (95% CI)**	**p-value**	**aHR (95% CI)**	**p-value**
Agreement on wife beating				
Both equitable	REF		REF	
Husband and wife disagree	0.90 (0.68, 1.19)	0.478	0.93 (0.71, 1.21)	0.61
Both inequitable	0.72 (0.41, 1.27)	0.254	0.74 (0.42, 1.29)	0.29
Husband's number of wife beating acceptable	1.04 (0.94, 1.15)	0.471	1.02 (0.91. 1.13)	0.76
Wealth quintiles				
1	REF		REF	
2	1.22 (0.86, 1.71)	0.262	1.26 (0.91. 1.76)	0.28
3	1.16 (0.81, 1.66)	0.416	1.21 (0.86, 1.70)	0.09
4	1.39 (0.94, 2.05)	0.096	1.39(0.95,2.03)	0.13
5	1.33 (0.87, 2.04)	0.187	1.37 (0.91, 2.07)	<0.01
Woman's education level				
None/Quranic			REF	0.01
Primary	1.89 (1.09, 3.28)	0.024	2.00 (1.17, 3.42)	<0.01
secondary	2.21 (1.26, 3.88)	0.006	2.25 (1.31, 3.88)	0.01
Secondary or higher	2.44 (1.25, 4.77)	0.009	2.39 (1.25, 4.56)	<0.01
Woman's number of children at baseline				
0 children	REF		REF	
1-3 children	1.62 (0.94, 2.78)	0.082	1.41 (0.87, 2.30)	0.16
4 or more	2.61 (1.45, 4.73)	0.001	2.39 (1.40, 4.07)	<0.01
Woman's baseline age	0.98 (0.96, 1.00)	0.079	0.98 (0.96, 1.00)	0.05
Polygyny as reported by man	1.25 (0.84, 1.39)	0.186	1.24 (0.90, 1.72)	0.18
Woman's religion (Christian)	1.08 (0.84, 1.39)	0.535	1.15 (0.90. 1.47)	0.26
Woman working outside the home	1.30 (0.99, 1.69)	0.057	1.35 (1.04, 1.75)	0.02
Comparative age differences (in years)	0.98 (0.96, 1.01)	0.156	0.98 (0.96, 1.01)	0.16
Comparative education				
Same level	REF		REF	
Husband higher than wife	0.93 (0.66, 1.32)	0.685	0.92 (0.65, 1.29)	0.61
Wife higher than husband	1.12 (0.84, 1.51)	0.433	1.10 (0.84, 1.46)	0.49
City				
Abuja			REF	
Ibadan	0.97 (0.70, 1.36)	0.866	0.96 (0.70, 1.33)	0.81
Ilorin	0.78 (0.53, 1.13)	0.181	0.78 (0.55, 1.13)	0.19
Kaduna	0.80 (0.55, 1.15)	0.225	0.82 (0.58, 1.16)	0.26

Table 3-5. Results of Cox proportional hazards model for adoption of modern contraception after first birth outcome based on 826 women, 342 adoption events couples' agreement on decision making measures within 18 months, couples data, Nigeria MLE, 2010-2014.

Independent variables	12 months (312 adoptions)		18 months (342 adoptions)	
	HR (95% CI)	p-value	HR (95% CI)	p-value
Agreement on decision making measures				
Both equitable	1.07 (0.84, 1.36)	0.57	1.06 (0.84, 1.33)	0.626
Husband and wife disagree	1.19 (0.65, 1.90)	0.71	1.20 (0.73, 1.99)	0.469
Both inequitable	REF		REF	
Husband's number of wife beating acceptable	0.92 (0.81, 1.05)	0.23	0.94 (0.83, 1.06)	0.28
Wealth quintiles				
1	REF		REF	
2	1.23 (0.89, 1.72)	0.21	1.28 (0.94, 1.76)	0.119
3	1.19 (0.84, 1.69)	0.32	1.20(0.87, 1.67)	0.269
4	1.34 (0.92, 1.93)	0.13	1.36 (0.95, 1.93)	0.093
5	1.49 (0.98, 2.26)	0.06	1.49 (1.00, 2.24)	0.052
Woman's education level				
None/Quranic	REF		REF	
Primary	1.47 (0.89, 2.42)	0.13	1.56 (0.97, 2.51)	0.066
secondary	1.66 (0.99, 2.77)	0.05	1.76 (1.08 2.86)	0.023
Secondary or higher	2.17 (1.18, 4.00)	0.01	2.16 (1.21, 3.88)	0.01
Woman's number of children at baseline				
0 children	REF		REF	
1-3 children	1.51 (0.86, 2.66)	0.15	1.33 (0.80, 2.22)	0.266
4 or more	2.71 (1.46, 5.04)	<0.01	2.51 (1.43, 4.38)	0.001
Woman's baseline age	0.98 (0.96, 1.00)	0.12	0.98 (0.96, 1.00)	0.085
Polygyny as reported by man	1.03 (0.72, 1.46)	0.89	1.00 (0.72, 1.41)	0.979
Woman's religion (Christian)	0.99 (0.75, 1.29)	0.92	1.00 (0.77, 1.30)	0.993
Woman working outside the home	1.21 (0.93, 1.57)	0.16	1.21 (0.94, 1.55)	0.141
Comparative age differences (in years)	0.99 (0.96, 1.01)	0.21	0.98 (0.96, 1.00)	0.113
Comparative education				
Same level	REF		REF	
Husband higher than wife	0.92 (0.64, 1.31)	0.64	0.92 (0.65, 1.30)	0.65
Wife higher than husband	1.05 (0.78, 1.40)	0.75	1.07 (0.81, 1.41)	0.632
City				
Abuja	REF		REF	REF
Ibadan	1.01 (0.70, 1.45)	0.98	0.98 (0.69, 1.40)	0.927
Ilorin	0.89 (0.60, 1.30)	0.54	0.90 (0.63, 1.30)	0.587
Kaduna	0.78 (0.52, 1.15)	0.21	0.77 (0.53, 1.12)	0.173

Table 3-6. Birth and contraceptive events among women with at least one birth in the reproductive calendar and included in couples' subsample of women in four cities n=1,014, Nigeria MLE 2010-2014.

	Counts
Births per woman	
Total number	n[38] (%)
1	436 (30)
2	438 (30)
3	114 (8)
4	3 (<1)
LAM	
Number of women that breastfed at 18 months (any duration)	134
Average length of time	9.3 months
Median length of time	6 months

[38] 991 weighted number of individuals with at least one birth

Table 3-7. Comparison of women retained in the sample as compared to women lost to follow-up, couples subsample, Nigeria MLE, 2010-2014, weighted n=2,130.

	Women with follow-up data available Weighted n=1,481 (%)	Women lost to follow-up Weighted n=649 (%)	F test
Age at baseline*			<0.01
15-19	21 (1.4)	17.3 (2.7)	
20-24	132 (9.0)	99 (15.3)	
25-29	353 (23.9)	180 (27.8)	
30-34	394 (26.6)	151 (23.2)	
35-39	274 (18.5)	128 (19.7)	
40-44	190 (12.9)	45 (7.0)	
45-49	117 (7.9)	28 (4.3)	
Level of education			0.63
None	138 (9.4)	63 (9.9)	
Quranic	22 (1.5)	15 (2.3)	
Primary	278 (19.0)	131 (20.5)	
Some secondary	661 (45.1)	285 (44.5)	
Higher than secondary	368 (25.1)	146 (24.4)	
Religion			0.55
Christian	675 (45.9)	360 (55.8)	
Muslim	797 (54.1)	285 (44.2)	
City of Residence*			0.03
Abuja	296 (20.0)	166 (25.5)	
Ibadan	446 (30.1)	220 (31.2)	
Ilorin	353 (23.4)	114 (22.0)	
Kaduna	385 (26.0)	149 (23.1)	
Polygyny[39]*			
Yes	228 (15.6)	74 (11.7)	0.03
Parity at baseline*			
0	80 (5.4)	57 (8.8)	<0.01
1-3	772 (52.1)	391 (60.2)	
4 or more	629 (42.5)	201 (31.0)	
Worked outside the home*			<0.01
Yes	938 (63.7)	361 (56.2)	
Modern contraceptive use in 2010-11 at the time of baseline interview			
Yes	449 (30.3)	196 (30.3)	0.97
Wealth quintile*			
1	169 (11.4)	98 (15.1)	<0.01
2	291 (19.7)	161 (24.8)	
3	361 (24.4)	146 (22.5)	
4	369 (24.9)	135 (20.8)	
5	290 (19.6)	109 (16.8)	

[39] Evaluated by asking Wife-- besides yourself, does your husband/partner have other wives?

* Indicates that differences between women retained and lost to follow up were statistically significant.

Figure 3-1. Sample reproductive calendar information collected, Nigeria MLE, 2010-2014.

				COL1	COL2	COL3			
	12	DEC	37				37	DEC	
	11	NOV	38				38	NOV	
	10	OCT	39				39	OCT	
	9	SEP	40				40	SEP	
2	8	AUG	41				41	AUG	2
0	7	JUL	42				42	JUL	0
1	6	JUN	43				43	JUN	1
1	5	MAY	44				44	MAY	1
	4	APR	45				45	APR	
	3	MAR	46				46	MAR	
	2	FEB	47				47	FEB	
	1	JAN	48				48	JAN	
	12	DEC	49				49	DEC	
	11	NOV	50				50	NOV	
	10	OCT	51				51	OCT	
	9	SEP	52				52	SEP	
2	8	AUG	53				53	AUG	2

INSTRUCTIONS:
ONLY ONE CODE SHOULD APPEAR IN ANY BOX
ALL MONTHS SHOULD BE FILLED IN COL 1 AND COL 3
INFORMATION TO BE CODED FOR EACH COLUMN

COL 1 BIRTHS, PREGNANCIES, CONTRACEPTIVE USE
- B BIRTHS
- P PREGNANCIES
- A ABORTION
- M MISCARRIAGE
- S STILL BIRTH
- 0 NO METHOD
- 1 FEMALE STERILIZATION
- 2 MALE STERILIZATION
- 3 IMPLANT
- 4 IUCD
- 5 INJECTABLES
- 6 DAILY PILL
- 7 EMERGENCY PILL
- 8 MALE CONDOM
- 9 FEMALE CONDOM
- H STANDARD DAYS METHOD
- L LAM
- X OTHER MODERN METHOD (SPECIFY_____)
- R RHYTHM METHOD
- W WITHDRAWAL
- Y OTHER TRADITIONAL METHODS

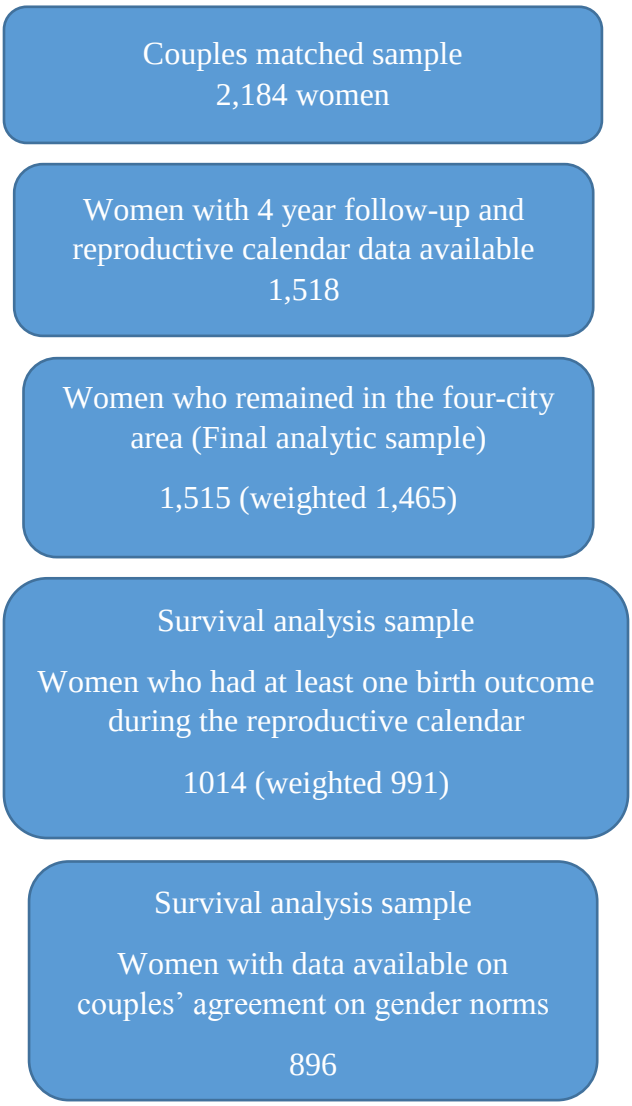
COL 2 DISCONTINUATION OF CONTRACEPTIVE USE
- 0 INFREQUENT SEX/HUSBAND AWAY
- 1 METHOD FAILED/BECAME PREGNANT WHILE USING
- 2 WANTED TO BECOME PREGNANT
- 3 HUSBAND/PARTNER DISAPPROVED
- 4 WANTED MORE EFFECTIVE METHOD
- 5 FEAR OF SIDE EFFECTS/HEALTH CONCERNS
- 6 LACK OF ACCESS/TOO FAR
- 7 COSTS TOO MUCH
- 8 INCONVENIENT TO USE
- 9 FATALISTIC/UP TO GOD
- F DIFFICULT TO GET PREGNANT/MENOPAUSAL
- A MARITAL DISSOLUTION/SEPARATION
- D LACK OF SEXUAL SATISFACTION
- L CREATED MENSTRUAL PROBLEM
- M GAINED WEIGHT
- G DID NOT LIKE METHOD
- N LACK OF PRIVACY FOR USE
- X OTHER _____ (SPECIFY)
- Z DON'T KNOW

COL 3 MARRIAGE
- X MARRIED, REMARRIED OR LIVING WITH A MAN
- O NOT MARRIED/WIDOWED/ SEPARATED/DIVORCED

0	7	JUL	54				54	JUL	0
1	6	JUN	55				55	JUN	1
0	5	MAY	56				56	MAY	0
	4	APR	57				57	APR	
	3	MAR	58				58	MAR	
	2	FEB	59				59	FEB	
	1	JAN	60				60	JAN	
	12	DEC	61				61	DEC	
	11	NOV	62				62	NOV	
	10	OCT	63				63	OCT	
	9	SEP	64				64	SEP	
2	8	AUG	65				65	AUG	2
0	7	JUL	66				66	JUL	0
0	6	JUN	67				67	JUN	0
9	5	MAY	68				68	MAY	9
	4	APR	69				69	APR	
	3	MAR	70				70	MAR	
	2	FEB	71				71	FEB	
	1	JAN	72				72	JAN	

Note women were asked about reproductive events on a month-by-month basis, but the data was processed so that each event was a row**.**

Figure 3-2. Description of analytical sample of women's contraceptive use data over time, couples' subsample, Nigeria MLE, 2010-2014.



CHAPTER 4: PUBLIC HEALTH IMPLICATIONS, STRENGTHS AND LIMITATIONS

Research Summary

In this dissertation, I created a couples' dataset that included information on gender norms and modern contraceptive use of 2,184 married/cohabiting couples in four cities within Nigeria. Information was collected from a Bill and Melinda Gates Foundation funded MLE project using a two-stage population based survey design with data collected from 2010-2014. Couples were matched within my sample, if they were spouse of head of household (women) and head of household (men). In terms of gender norms, I find that couples often disagree about the acceptability of women using contraception and other gender norms relating to household activities, restrictions on wife's abilities and acceptability of wife beating. Disagreement on gender norms ranged from 6% to 41% depending on the item. The vast majority of couples (94%) felt that a husband should not restrict a wife's cell phone use. However, disagreement on the acceptability of wife beating for infidelity was closer to 40%. As another example, approximately 2/3 of couples agree that husbands should dominate large household purchases, but other household decisions are more mixed. Twenty-eight percent of couples disagreed about restrictions on wife's contraceptive use. In this dissertation, the individual gender norm items were combined into three couples' agreement variables for multivariate analysis. In multivariate analysis, women in couples with disagreement on restrictions of wives' activities, were less likely to use modern contraception as compared to women in couples that agreed restrictions on activity were unacceptable. This difference persisted even after controlling for known confounders such as age, education level, parity at baseline, women's work status, city of residence, religion and marriage type. The number of restrictive attitudes held by the man was not associated with contraceptive use. This was a surprising finding since I had expected that in a male dominant society (such as Nigeria), the number of restrictions held by the man

may be associated with a woman's ability to use family planning. The other two measures, decision making and acceptability of wife beating, had more mixed results.

The second paper combined women's reproductive calendar data with the couples agreement variables to measure adoption of modern contraception in the extended postpartum period (12-18 months following birth). At 12 months, 45 individuals had already had a subsequent birth but that number had climbed to 128 individuals by 18 months. Approximately 13.5% of women use LAM after a birth and the median duration of LAM use is 6 months. Compared to the general population in Nigeria, this was a longer duration and higher percentage of women using LAM as a primary method of contraception in the postpartum period. The role of couples' agreement on all three gender norms measures was non-significant in this period. Even though our couples' agreement variable was not associated with extended postpartum adoption, other covariates such as women's education status and work status were associated with adoption in the 12-18 months following pregnancy. This dissertation provides context for the role of gender norms in the urban Nigerian household. I created a couples' agreement variable for each gender norm rather than in aggregate[18]. Social context, specifically understanding the factors that contribute to the acceptability of family planning methods, should continue to be explored through gender norms and equity measures.

Public Health Implications

This dissertation has potentially important implications for intervention recognizing the importance of gender norms in FP services. Women having fewer restrictions on their activities has emerged as an important proxy for social capital (e.g. visibility in society), ability to access healthcare facilities (e.g. care for an ailing child), and greater control in the familial unit (e.g. ability to visit friends and family) in several other countries [3,83,84]. Our findings suggest that a couple's attitudes about wife's activity restrictions are also related to contraceptive use in urban Nigeria. Interventional research suggests that changing gender norms can result in increased contraceptive use[85]. This research suggests that improving women's marital equity through changing gender norms within a relationship has implications for her family planning use over time[88].

Strengths

This dissertation is a rigorous study of couples' agreement on gender norms and current modern contraceptive use with several notable strengths. First, this dissertation is very relevant to SDGs that promote gender equality, health for all, and a targeted focus on urban areas. This research focus provides targeted analysis that may be useful for future FP programming—for example, identifying couples that disagree about contraceptive use could provide a meaningful point of intervention for understanding attitudes towards contraception. Secondly, the rigorous study design with matched couples allows for agreement within couple unit. This provides actual information on the husband's viewpoints, rather than simply the wife's perceptions of his viewpoint. Furthermore, the availability of survey weights to provide weighted population based estimates by city 'increase generalizability. As another strength, my findings include multiple event information from the reproductive calendar which allows for assessing changes in FP over time and a more comprehensive picture of reproductive events.

Due to the availability of reproductive calendar information, I was able to assess contraceptive adoption in the extended postpartum period (up to18 months following birth). This allowed me to see if couples' agreement on gender norms was associated with modern contraceptive use over time in a specific target population of interest. The reproductive calendar allowed for a more complete picture of contraceptive use history to monitor adoption and discontinuation over time with a specific focus on the postpartum period. Thus, this dissertation creatively analyzes population-based data by creating a matched couples' dataset and examines the role of couples' agreement on current contraceptive use among couples at baseline and over time.

Limitations

The dissertation, as with all analyses, has some methodological limitations. Statistically analyzing complex realities relating to gender equity is fraught with many limitations. I focus on the household perspective and use items from socio-cultural, familial/interpersonal and educational domains. This is not to undermine broader perspectives; I fully acknowledge that household practices do not exist in a vacuum and are influenced by larger contextual factors. I recognize that reducing complex interactions between

husband and wife to binary outcomes is reductionist, and ignores many sociocultural, economic and familial norms and constraints[90,91]. I have controlled for city, wealth, age, parity, work status and education in the analysis to provide some room for contextual differences. To further complicate matters, these concepts are dynamic processes that can vary over time and are not static constants[3,92]. Therefore, while these analyses can perhaps shed some couple-level disagreement in attitudes, the findings should be interpreted with caution[93].

From an analytic sample perspective, this project has several limitations. To conservatively assure that matched couples are in fact married to one another, I only matched men who were head of household with women who were spouse of head of household (based on the household roster), those who self-reported being married and living in the same household during the interview. I am not able to look at households with female head of households and polygynous couples. Despite this limitation, I could match 71% of married men in the four-city sample. In the case of polygyny, I was not able to separate the male's responses specific to each wife. On a related note, I am assuming independence in couples even though approximately 138 men (6%) are repeated in this analysis. Thus, I am limited in understanding differences in the way a man may treat primary/secondary wives. Furthermore, I do not have data available for men at end term, limiting my ability to see potential changes in gender relations over time. In addition, data from the reproductive calendar has been criticized for missing data points and lack of reliability of retrospective recall. Data can be unreliable as women do not necessarily remember all methods used or they may incorrectly report the timing of births, pregnancy outcomes, or changes in contraceptive method. However, despite these shortcomings, the reproductive calendar is an accepted metric for gathering contraceptive use histories as it provides more details than a single time point[80,94]. Despite these limitations, the study provides meaningful insight into the FP needs of couples in urban Nigeria.

Summary Statement

The results of this dissertation provide evidence that attitudes about restrictions on wife's activities, held by either husband or wife, is independently associated with lower modern FP use. Even if a wife endorses an equitable viewpoint, her husband's disagreement could prevent or discourage her from accessing FP services and vice versa. Even though our couples' agreement variable was not associated with extended postpartum adoption, other covariates such as women's education status and work status were associated with adoption in the 18 months following pregnancy. This provides additional support to an established fact that women's ability to gain access to resources through education and work opportunities has important implications for health. Notably, the highly-educated women in our sample may already have advantages with respect to negotiating extended postpartum contraceptive usage.

The study is relevant to current sustainable development goals that promote women's access to family planning throughout urban areas as well as by engaging men to promote gender equity. This study includes perspectives from both partners to provide a more nuanced understanding of gender norms within a relationship. Couple level analyses provide insight into how the joint viewpoints of couples could be associated with FP behaviors at different points in time in an understudied population in urban Nigeria. This information could be important for developing gender sensitive interventions that promote healthy reproductive lives for married couples in Nigeria. Focusing on contraceptive adoption in the extended postpartum period can reduce the number of mistimed/unwanted pregnancies and healthier mothers, babies and families.

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