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The role of women's decision-making agency in family planning behaviors among young married couples and married adolescent girls in India.

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy

in

Public Health (Global Health)

by

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The Dissertation of Anvita Dixit is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
ARSH	Adolescent Reproductive and Sexual Health
β Coef.	Beta Coefficient
CHARM2	Counseling Husbands and wives to Achieve Reproductive Health and Marital equity
CI	Confidence Interval
IPV	Intimate Partner Violence
IUD	Intrauterine device
LAM	Lactational Amenorrhea Method
OBC	Other Backward Caste
OR	Odds Ratio
SC	Scheduled Caste
SD	Standard Deviation
ST	Scheduled Tribe
UDAYA	Understanding lives of adolescents and young adults
UP	Uttar Pradesh
VIF	Variance Inflation Factor

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Chapter 2, titled “Male-female concordance in reported involvement of women in contraceptive decision-making and its association with modern contraceptive use among

couples in rural Maharashtra, India", in full, has been submitted for publication to the journal, Contraception: X. The co-authors include Nicole E Johns, Mohan Ghule, Madhusudana Battala, Shahina Begum, Jennifer Yore, Niranjan Saggurti, Jay Silverman, Elizabeth Reed, Tarik Benmarhnia, Sarah Averbach, and Anita Raj. The dissertation author, Anvita Dixit, is the primary investigator and author of this paper.

Chapter 3, titled "Association of traditional marital practices with contraceptive decision-making, contraceptive communication, and contraceptive use among couples in rural Maharashtra, India", in part, is currently being prepared for submission for publication. The co-authors include Nicole E Johns, Mohan Ghule, Madhusudana Battala, Shahina Begum, Niranjan Saggurti, Jay Silverman, Elizabeth Reed, Tarik Benmarhnia, Susan Kiene, Sarah Averbach, and Anita Raj. The dissertation author, Anvita Dixit, is the primary investigator and author of this material.

Chapter 4, "Association between early-in-marriage fertility pressure from in-laws and family planning behaviors, among married adolescent girls in Bihar and Uttar Pradesh, India.", in full, has been submitted for publication to the journal BMC Reproductive Health. The co-authors include Nandita Bhan, Tarik Benmarhnia, Elizabeth Reed, Susan M. Kiene, Jay Silverman, and Anita Raj. The dissertation author, Anvita Dixit, is the primary investigator and author of this paper.

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ABSTRACT OF THE DISSERTATION

The role of women's decision-making agency in family planning behaviors among young married couples and married adolescent girls in India.

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Background: Husbands and in-laws often control decision-making around fertility due to gendered social norms and practices in India. This can lead to a lack of women's reproductive control resulting in challenges around contraception use and unintended pregnancy.

Objective: To examine women's decision-making – a key aspect of agency – in family planning and contraceptive use, with young married couples in rural Maharashtra, India and married adolescent girls in Bihar and Uttar Pradesh, India.

Methods: Cross-sectional studies were carried out using dyadic young couples data in Maharashtra, India (N=961 Chapter 2; N=1,200 Chapter 3), and married adolescent girls (N=4,893, Chapter 4) in Bihar and Uttar Pradesh, India. Multivariable regressions examined associations between 1) spousal reports of the wife's involvement in contraceptive decision-making and modern contraceptive use (Chapter 2); 2) marginalizing marital practices (female non-involvement in marital choice, child marriage, dowry, and *purdah*) with three family planning behavioral outcomes: contraceptive decision-making, communication, and use in marriage (Chapter 3); 3) and in-laws' fertility pressure and marital family planning communication, contraceptive use, parity, and time until first birth (Chapter 4).

Results: Chapter 2 shows that couples where women report they are not involved and men report women are involved, have lower odds of contraceptive use, relative to those with couple agreement on female involvement (adj. RR=0.61, 95% CI 0.45, 0.83). In Chapter 3, women reporting marital choice have higher odds of marital contraceptive communication (AOR 2.08, 95% CI 1.26, 3.44) and modern contraceptive use (AOR 1.73, 95% CI 1.11, 2.71). Chapter 4 shows that in-laws' fertility pressure was associated with lower parity (adj. β -0.10, 95% CI -0.17, -0.37) and couple communication about family size (AOR 1.77, 95% CI 1.39, 2.26).

Conclusions: Findings indicate that women's decision-making involvement can be important for women's contraceptive use as well as for their marital communication regarding family planning and fertility discussions. Couple and adolescent focused family planning interventions would benefit from greater focus on women's agency in marriage including for marital choice and contraceptive use, as well as engagement of male partners in family planning; in pronatal contexts emphasizing on social norm change broadly and targeting

parents/in-laws of newly married individuals in a way that does not reinforce their power but focuses on women's agency.

CHAPTER 1: Introduction

OVERVIEW

Family planning and fertility behaviors, especially among vulnerable adolescent girls and young couples, has been an important topic in public health. Conventionally, the research has focused on understanding women's perspectives only, and has often neglected understanding of husbands and couple dynamics, as well as missing out on the fertility pressures of in-laws and social norms reinforced through practices that marginalize women. These are especially important in the Indian context, where extended families and social norms have a substantial influence on women's family planning behaviors, often negatively affecting their reproductive agency. In this dissertation, I aim to examine (1) the association between women's perceived decision-making agency and modern contraceptive use; (2) the associations between traditional marital practices and contraceptive behaviors; (3) and the association between early-in-marriage fertility pressure from in-laws and family planning behaviors, with a focus on young couples and adolescent girls in India.

This dissertation is divided into five chapters: this Introduction (Chapter 1); a study of contraceptive decision-making agency (Chapter 2); a study of marital agency measured by traditional marital practices (Chapter 3); a study of early-in-marriage in-law fertility pressure (Chapter 4); and a Discussion (Chapter 5). Chapters 2, 3, and 4 report the original research studies based this dissertations' primary study aims. Chapter 2, "Male-female concordance in reported involvement of women in contraceptive decision-making and its association with modern contraceptive use among couples in rural Maharashtra, India.", provides evidence to support couple-focused family planning counselling that enhances women's active involvement and male responsibility in family planning decision-making. Chapter 3, entitled, "Association of traditional marital practices with contraceptive decision-making, couple communication, and method use among couples in rural Maharashtra, India.", shows that, among the examined

traditional marital practices, women's choice of spouse affects their communication with their husbands on contraception use and its actual use. Chapters 2 and 3 are based on cross-sectional analysis using couples' baseline dyadic data from the CHARM2 [Counseling Husbands and wives to Achieve Reproductive Health and Marital equity] randomized controlled trial (RCT) (PI: Raj, R01-HD084453-01A1). This study is aimed at evaluating a gender-synchronized, gender-transformative family planning intervention to increase uptake of contraceptives, prevent unintended pregnancy, and decrease interpersonal violence, among young women (18 to 29 years old) and their husbands in rural Maharashtra, India (N=1,201).

Chapter 4 highlights that in-laws' pressure on fertility is a common experience for adolescent girls and affects their communication with their husbands on the number of children to have and the number of children they actually have (i.e., parity). Research reported in these chapters contributes to the body of research on couple, family and societal-level factors that influence women's agency in family planning behaviors. The data for Chapter 4 comes from a cross-sectional survey of 5,206 married adolescent girls, aged 15-19 years, from the "Understanding lives of adolescents and young adults" (UDAYA) study carried out by the Population Council in Uttar Pradesh (N=1,798) and Bihar (N=3,408), India (PI: Raj, 2017-66705). Finally, the Discussion in Chapter 5 presents an overall summary of findings from the three research chapters, and highlights learnings for future research and programmatic directions.

BACKGROUND

Globally, it is estimated that over 40% of pregnancies are unintended (1), which increases the risk of maternal, infant and child morbidity and mortality (2, 3). Family planning is an important public health intervention which reduces unintended pregnancy, consequently improving maternal and child health (4, 5). However, there is a substantial unmet need for

contraceptive methods among women who want to delay or stop childbearing but are not using contraception, thereby contributing to high levels of unintended pregnancies (6, 7). The indicator of unmet need for family planning refers to fecund women who are not using contraception but who wish to delay the next birth or do not want any more children (8). It has been estimated that about 153 million women of reproductive age worldwide (of which 138 million are in developing countries) who are married or in a union have an unmet need for family planning, of which South Asia has the greatest number (51 million) (6).

Family planning in India

In India, 11% of all pregnancies result in unintended births, 33% result in induced abortions, and 5% result in miscarriages from unintended pregnancy (9). About 47.8% of women in India use modern contraceptives to prevent unwanted pregnancy or contraction of Sexually Transmitted Diseases (STDs) or Sexually Transmitted Infections (STIs). However, female sterilization dominates contraceptive use, since 36% of modern method use involves female sterilization (75% of all users). The use of modern non-permanent methods that can help women in delaying or spacing pregnancies is limited. Use of condoms (5.6%) or birth control pills (4.1%) as a spacing method by couples is low. The use of highly effective methods, such IUD (1.5%), and injectable contraceptives (0.2%) is even more limited (10). Modern spacing methods are particularly important, since they reduce the number of short interpregnancy intervals which lead to adverse health consequences for mothers and infants (11, 12). The term ‘modern contraceptives’ describes barrier methods, injectables, oral contraceptives, implants, IUDs, and sterilization. ‘Modern spacing contraceptives’, here, includes oral pills, injectables, male and female condoms, implants, intrauterine devices (IUDs), and the lactational amenorrhea method (LAM) (13).

Despite a commitment by the Indian Government and global partners to improve modern spacing contraceptive use, as stated in the targets of the Sustainable Development Goals and the Family Planning 2020 goals, it continues to be a major public health concern (14, 15). India has one of the largest and oldest family planning programs in the world, since the year 1952, and has prioritized promotion of family planning, yet progress has been inadequate, since India accounts for 20% of the worlds eligible couples with an unmet need (15). There has been growing evidence of improving supply in the national family planning program, but more recent evidence has highlighted demand and consideration of gender as a key factor (16-18). This calls for a need to understand traditional social norms and women's agency in the use of family planning. There is growing evidence on social norms in India showing that pronatalism, pregnancy early in marriage, son-preference, reduced value of girls, and fertility decisions determined by the husband and in-laws limit women's ability to practice beneficial fertility and beneficial family planning behaviors (19-21). However, understanding of women's agency has been limited due to lack of clarity in definition, which has mainly focused on women's voice in terms of their control of decision-making (22, 23).

Women's agency in Social Cognitive Theory and Empowerment Theory

Women's agency especially, their decision-making ability, is a key construct in the gender equity and empowerment process (24). Agency is formed by a belief in oneself at the individual level and environmental feedback at the interpersonal level, leading to an ability to take decisions towards one's well-being with the support of structural and societal resources (25). The term 'agency' has been used differently when described traditionally in the study of human agency in the field of psychology, and more recently in developmental and gender economics, where women's agency has been in focus. The field of psychology has studied it as a cognitive process based on individual perception, whereas in economics it has been a more

direct behavior that is also gendered and accounts for the socio-economic environment. Overall, there has been a lack of clarity in the conceptualization of the term.

The Social Cognitive Theory conceives human agency as determined by the interaction of self-generated mental processes of proactive belief in oneself and feedback mechanisms from environmental events (25, 26). These mechanisms through which personal agency arises are indicators of the construct and can be used to measure it, since the construct of agency itself is latent, and is difficult to measure directly. These mechanisms arise directly from an individual level that includes self-efficacy, self-esteem, and aspirations/goals, and from the level of social interaction with the environmental influence, which includes decision-making control, discussion including negotiation, perceived social attitudes, and participating in social groups.

The psychology perspective using SCT explains human agency in terms of cognitive mechanisms originating from the individual's interaction with their social environment. However, model testing of agency does not take into account the sociological antecedents to agency (e.g., race, class, geography), or how agency is expressed at different ages (27). There are structural factors that influence the formation and practice of agency and within which human agency occurs. These include access to finance, experience of violence and sexual harassment, and mobility in the environment. Explanations of agency from women's empowerment theory in economics extend this concept (of "power within" for belief in oneself, and "power to" practice that belief) to structural socio-economic factors and constraints, including access to financial resources, distribution of resources (food and education), perceived gender role attitudes in society, experience of violence and harassment, legal gender discrimination, etc. In this framework, the cognitive dimension of agency interacts with pre-existing socio-economic resources to acquire power (or empower) and achieve well-being as an outcome (28, 29). The agency theory framework for this dissertation is illustrated in Figure 1.1. This dissertation is built on the concept of human agency borrowed from the Social Cognitive Theory (SCT) (25, 26, 30), and Empowerment Theory (28, 29).

Effects of women's agency on contraceptive use

To affect health behaviors, such as modern contraceptive use, behavioral theory can offer important insight into constructs to target for behavioral change. A review of effective interventions demonstrates that Social Cognitive Theory-based interventions have resulted in significant impact on contraceptive use (31, 32). SCT posits a causal structure in which perceptions of self-efficacy (i.e., agency and perceived capacity to engage in a behavior) operates with behavioral goals, outcome expectations, and perceived, as well as actual, environmental impediments and facilitators to affect health behavior (26). To that end, these effective interventions emphasize contraceptive knowledge, access and skills, in line with the SCT approach (31, 32). While SCT demonstrates utility, it does not adequately guide consideration of power dynamics inherent to male-female relationships, rooted in harmful traditional gender norms, that can form a barrier between women's choice to use family planning and its actual use (33, 34).

Corresponding to this point, a review of effective family planning interventions also highlights the value of gender-transformative approaches (i.e., those that alter harmful gender norms, such as partner violence or male partner reproductive control) in affecting women's use of reproductive services (35). Empowerment theory provides important insight into this approach. Empowerment theory posits that women's agency, or ability to convert their decision-making into action, is central to their achievement of their goals, and this agency is affected by their access to resources and opportunity for achievement (36) (28, 29).

Using SCT and Empowerment Theory, this dissertation examines modifiable factors that can impede or facilitate women's use of contraceptives, with an emphasis on the role of agency on this outcome, as a central feature of both theories in their explanation of behavioral change or goal achievement (See Figure 1.1 on Theoretical Framework). Use of modern family planning methods will be viewed at each of the levels of agency, including agency specific to family

planning , marital agency, and in-laws' influence on agency, as illustrated in this theoretical framework. First, family-planning-specific agency will look at couples' decision making, which has been studied but not adequately. Although it has been established that certain mechanisms of agency are associated with family planning and reproductive health, the data comes from women's reports and there is a lack of understanding of the mechanism of decision-making that accounts for their interaction with their husbands, which feeds back into women's agency to use family planning (23, 37). This dissertation pushes the current knowledge to include reports from both wives and husbands (Aim 1).

Second, to understand marital agency, I use proxy variables that demonstrate traditional norms and marginalizing marital practices (e.g., lack of marital choice and dowry, measuring the concepts of social provisioning and economic exchange in marriage). These marital practices indicate agency at marriage that may set women up to use modern family planning methods later on in the marriage (Aim 2). Empowerment theory based on a gender power structure suggests that traditional gender norms, intersecting with social and environmental factors, can be harmful to the health of women and girls. Proxies to measure gender norms can be used to assess how they can be restrictive to women's agency and health outcomes (38, 39).

Finally, I assess the influence of in-laws early in marriage on women's agency for young adolescent married women. This influence affects their family planning behaviors as they proceed to carry out their fertility behaviors in their reproductive years. Since agency is different at different stages of life (40), there is a need to understand the formation of agency at this age and its mechanism of family engagement through in-law involvement among younger populations, which may lead to disadvantages for reproductive outcomes over their life course. In the Indian context where extended families with a patriarchal bond play a central role in daily life, decisions are often made by family elders for the wider good of the family. It is not just the husband, but extended family members such as the mother in-law who forge women's agency around fertility and family planning (Aim 3).

Effect of women's agency on gender inequitable outcomes

Gender inequities existing globally lead to violence against women and girls, affecting health and economic indicators (41, 42). Women's empowerment, including agency and gender-equitable interventions, has been identified as key to improving reproductive health outcomes globally (43, 44), and specifically in India (45). The World Bank defines empowerment as "the process of enhancing an individual's or group's capacity to make purposive choices, and to transform those choices into desired actions and outcomes" (46). The UN's Sustainable Development Goal 5 aims to "achieve gender equality and empower all women and girls" (14). However, there is a lack of consensus on the theoretical definition of women's empowerment and rigorous measures that can help us track the progress in this direction (47). The emphasis on making choices and decisions in the process of women's empowerment, and lack of indicators to assess notable progress in this direction warrants further study.

A comprehensive understanding of agency has been impeded, which has delayed the development of constructs for empirical testing of this issue (48, 49). The lack of conceptualization of the construct has led to disjointed assessments of agency. Currently, interventions are focused just on addressing IPV, and indicators to measure gender equity do not look beyond gender disaggregated data (50, 51). Inadequate analysis is available to understand women's agency and gender empowerment. Understanding the manner in which agency mechanisms may lead to improved intervention outcomes remains a challenge (52). There is literature on understanding its fragmented mechanisms, including decision-making (53), collective agency (54), and access to financial resources (55). Systematic review shows that women's agency, measured separately as household decision-making and mobility, is associated with the use of family planning methods among vulnerable populations, but is sensitive to which components are being used as a proxy for agency (37, 46, 56). Large datasets testing women's agency (including domains of social norms, mobility, and control over

resources) have found important impacts of education, poverty and violence on agency (57). However, an up-to-date, state-representative assessment, or study with samples focused specifically on adolescent girls, is lacking to understand components of agency that are at the core of women's empowerment. This dissertation contributes to the evidence conceptualizing women's agency mechanisms that can improve gender equity outcomes and reach global goals. The findings from studying gender inequities and FP outcomes would be applicable for settings with limited resources in countries with similar contexts.

Study Setting

India is a unique study setting to conduct impactful research on gender inequities and family planning outcomes. The 2017 global gender gap report by World Economic Forum rated India at 108 of 144 countries, down from 87 of 144 nations in 2016 (58). India is home to the highest number of women in the world who are married as children (27%), while 29% of women report domestic violence, and low female labor force participation at 25% (59). Living in such inequities exacerbates women's lack of agency and FP decision leading to short inter-pregnancy intervals, unintended pregnancy, and low use of contraceptives (60, 61). Not only does India provide an opportunity to study distinctive associations between women's agency and family planning behaviors, but the contribution of findings to programs in India has the potential for a global impact, given the large number of people at risk of unintended fertility outcomes. An intervention in the populous nation of India will have a sizable impact on global indicators, since it accounts for 20% of the world's eligible couples with an unmet need for FP (15). This dissertation uses data from the states of Maharashtra, Bihar and Uttar Pradesh, which constitute a large proportion of the 1.3 billion people in the country, with 114 million, 99 million, 200 million people, respectively, living in these states. Indicators such as high fertility rates, female illiteracy, child marriage, and falling contraceptive use in these populous states debilitate national progress. The most vulnerable are adolescent girls who live in rural areas, who have

lower educational attainment and get married young, which leads to a myriad poor outcomes (59). The datasets used in this dissertation help gain a finer research focus to study the most vulnerable populations.

Aims 1 and 2 use data from a Junnar sub-district (pop. 369,000) in rural Pune district in Maharashtra, where female illiteracy is 27% and the child sex ratio is 871 girls per 1000 boys (indicative of son preference and missing girls) (62). The sample includes non-sterilized women, since only 25% of non-sterilized women of childbearing age use modern contraception here (63). This ongoing RCT provided an opportunity to use an existing research infrastructure and study sample for this dissertation. Aim 3 uses state-representative data from Bihar and UP, which have among the highest national fertility rates in the country (3.4 in Bihar, 2.7 in UP vs. 2.2 national average), compounded by low literacy (47.8% in Bihar, 35.7% in UP vs. 27.6% of women nationally are illiterate); child marriage (41.9% in Bihar, 22.9% in UP, and 27.9% nationally at 18-29 years); and falling current use of modern contraception from 41.3% to 32.1% in Bihar, 42.4% to 39.8% in UP, and 55.8% to 51.2% nationally in the last decade (59, 64). Open data availability for this state-representative sample with information focused on adolescent girls and their family planning dynamics was beneficial for this dissertation.

AIMS AND HYPOTHESES

The overall goal of the proposed dissertation is to assess mechanisms of agency at three levels; family-planning-specific agency, marital agency, and family engagement agency. The study will also evaluate the association between these forms of agency and the use of modern family planning methods among socially vulnerable married groups in India: rural young couples and married adolescent girls.

The dissertation will assess perceived family-planning-specific agency measured by contraceptive decision-making control in marital relationships (Aim 1); social norms affecting interpersonal agency at marriage (termed here ‘marital agency’), measured by traditional

marginalizing practices regarding marital choice (whom and when), age at marriage, dowry, and purdah practice (Aim 2); and family engagement in family planning decision-making among adolescent girls (Aim 3); and whether these elements of agency are associated with family planning behaviors, such as modern contraceptive use in marriage. Outlined below are the aims and corresponding hypotheses for each of these three studies:

Aim 1: To assess the association between perceived women's contraceptive agency and women's use of modern contraceptive methods among a sample of married women aged 18-29 years old and their husbands in rural Maharashtra, India. Perceived women's family planning agency will be measured by concordance between the couple's perception of the wife's involvement in family planning decision-making.

Hypothesis 1: Couples that report concordance in their perception of the wife's involvement in contraceptive decision-making (i.e., when both partners agree that the woman is involved in decision-making) will have significantly higher odds of currently using modern family planning methods.

Aim 2: To assess marital agency, measured by marginalizing social practices (including choice of who & when to marry, purdah, child marriage and dowry) and whether they are associated with women's contraceptive decision-making control, contraceptive communication, and having ever used contraception among couples in rural Maharashtra, India.

Hypothesis 2: Couples where women report higher marital agency (defined as not experiencing marginalizing social practices), compared to lower marital agency, will have significantly higher odds of women's control of contraceptive decision-making, contraceptive communication, and having ever used contraception.

Aim 3: To test the association of family engagement in decision-making, measured by in-laws' pressure to have children early in marriage, with having ever used contraception, parity, time until first birth, and couple communication about family size among married adolescent girls in Bihar, and Uttar Pradesh, India.

Hypothesis 3: It is expected that girls who report pressure from in-laws will have lower odds of having ever used contraception, higher parity, lower time till birth, and lower odds of discussion of family size.

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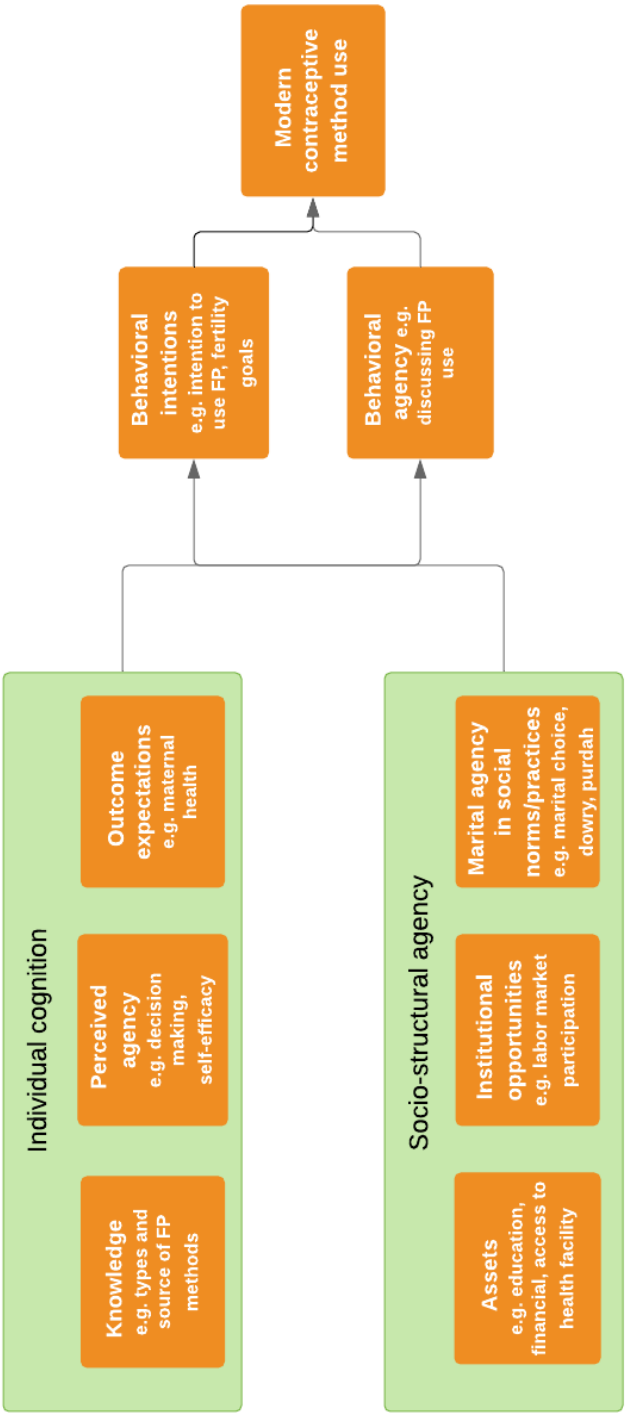

Figure 1.1: Application of the Social Cognitive Theory (SCT), and Empowerment Theory to women's agency in family planning.

CHAPTER 2: Male-female concordance in reported involvement of women in contraceptive decision-making and its association with modern contraceptive use among couples in rural Maharashtra, India.

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ABSTRACT

Objective: Women's involvement in contraceptive decision-making increases contraceptive use and reduces unmet need, but study of this has been limited to women's self-reports. Less research is available examining women's involvement in contraceptive decision-making as reported by both men and women. We carried out a cross-sectional study using data from rural India (N=961 young married couples). Using multivariable regression, we examined the association between concordance or discordance in spousal reports of the wife's involvement in contraceptive decision-making and modern contraceptive use, adjusting for demographics, intimate partner violence, and discussion of contraceptive use.

Results: More than one third (38.3%) of women reported current modern contraceptive use. Reports of women's involvement in contraceptive decision-making showed 70.3% of couples agreed that women were involved, jointly or alone (categorized as Concordant 1); 4.2% agreed women were not involved (categorized at Concordant 2); 13.2% had women report involvement but men report women were uninvolved (categorized as Discordant 1); and 12.2% had women report lack of involvement but men report that women were involved (categorized as Discordant 2). Discordant 2 couples had lower odds of modern contraceptive use relative to Concordant 1 couples (adjusted RR=0.61, 95% CI 0.45, 0.83). No other significant differences between Concordant 1 couples and other categories were observed.

Conclusion: One in four couples indicated discordance on women's involvement in contraceptive decision making, with the Discordant 2 category having lower odds of contraceptive use. Couples' concordance in women's involvement in contraceptive decision-making offers a target for family planning research and interventions to better meet their needs.

Implications: Couple's concordance on women's involvement in contraceptive decision-making is associated with contraceptive use. There is potential in couple-focused family planning counseling that enhances women's contraceptive decision-making agency to improve women's contraceptive use.

KEYWORDS: Contraceptive decision-making, couple concordance, contraceptive use, dyadic data, India

INTRODUCTION

India is home to 20% of the world's married couples with an unmet need for contraceptives, with an estimated 50% of all pregnancies being unintended (1, 2). Contraceptive use can prevent unintended pregnancy and reduce maternal and child morbidity and mortality (3-5). Some evidence suggests that women's control over reproductive decision-making is associated with increased likelihood of contraceptive use in India, though there have been mixed results across studies and other nations (6-10). This may be a result of women's control being assessed using women's self-report only, but couples' contraceptive decision-making can be better understood by assessing reports from both women and their husbands. Growing evidence suggests that when couples generally agree on women's involvement in decision-making, the wife's healthcare utilization is increased compared to when they disagree (11). Studies of couples' dyadic data suggest that the balance of power between male and female partners may better predict a couple's decision-making practice than women's individual decision-making agency alone (9, 12-16). However, little research exists examining contraceptive decision-making agency as measured by dyadic couples' reports.

Men are often the decision-makers for fertility-related issues in India, including contraceptive use (17-20). Interventions aimed at engaging men in couples' reproductive health care have been shown to improve contraceptive uptake (19, 21). The wife's communication with her husband and the husband's support of contraceptive use are both associated with improved joint family planning decision-making in these studies (19, 21-23). However, interventions designed to engage men in contraceptive decision-making have primarily focused on increasing male involvement in family planning, but have not directly addressed women's perceived decision-making agency. Examination of women's perceived decision-making agency, through

their voice or involvement in the contraceptive decision-making process with their husbands, is warranted.

In this paper, we assess the association between women's perceived decision-making agency, as measured by the couple's concordance of reporting women's involvement in contraceptive decision-making, and modern contraceptive use among women in rural India. We also consider the role of intent to use contraception, given the theoretical importance of behavioral intention to perform the outcome (24), and the fact that married women of reproductive age who want to avoid pregnancy and would intend to use contraception still report non-use of contraceptive methods (25, 26). We also explore the relationship between women's decision-making agency and women-led contraceptive use, by assessing the association between women's involvement in contraceptive decision-making and the type of contraceptive method used.

METHODS

Sample

We conducted a cross-sectional analysis using baseline dyadic data collected between September 2018 and June 2019 from the CHARM2 [Counseling Husbands and wives to Achieve Reproductive Health and Marital equity] intervention study of young women (18 to 29 years old) and their husbands in Maharashtra, India (N=1,201). CHARM2 is a two-arm cluster randomized controlled trial (RCT) to evaluate a gender-synchronized, gender-transformative family planning intervention. CHARM2 aims to increase uptake of contraceptives, prevent unintended pregnancy, and decrease interpersonal violence. Couples who were not currently married or cohabiting, or who were using a permanent contraceptive method, were not eligible to participate in the study. The detailed protocol for this cluster-RCT is published elsewhere (27). The analytic dataset for the current study also excluded couples with currently pregnant wives (n=199) and those missing information on decision-making (n=36). Additionally, one

couple missing demographic information was excluded, and couples using uncommon methods (injectable contraceptive (n=3) and emergency contraceptive pill (n=1)) were excluded, for a final sample of 961 couples. The University of California San Diego, ICMR-National Institute for Research in Reproductive Health in India, and the Population Council obtained approval from their respective IRBs for the protocol.

Measures

The primary outcome of interest was women's report of any current use of a modern contraceptive method (dichotomized as yes/no) based on the past three months. Modern contraceptive methods included were oral contraceptive pills, Intrauterine Devices (IUDs), and male condoms (28). For assessing the association between couples' concordance on women's contraceptive decision-making agency and women-led contraceptive use, methods included were non-modern (withdrawal and rhythm), male condoms, pills and IUDs, where use of pills and IUDs can be considered as women-led.

The primary exposure of interest was couples' perceived women's contraceptive decision-making agency, and included both wife's and husband's report of the wife's involvement in contraceptive decision-making. Both members were asked, "Would you say that using or not using contraception is: mainly your decision, your husband's/wife's, joint by both husband and wife, your mother, mother-in-law, elderly head of household, your sibling, your husband's/wife's sibling or someone else?" The responses were collapsed into four categories of decision-making; woman alone, husband alone, wife and husband jointly, or others. The final variable of couples' concordance/discordance on women's involvement in contraceptive decision-making was constructed combining husband and wife reports into four categories of contraceptive decision-making:

- Concordant 1 (women and men in agreement): Both agree women were involved (women only or joint decision-making)

- Concordant 2: Both agree that women were uninvolved (men only or others decided).
- Discordant 1: Women report women were involved and men report women were uninvolved
- Discordant 2: Women report women were uninvolved and men report women were involved

Additional variables included a priori as confounders, based on previous literature and the authors' expertise were: wife's age, wife's education (none or primary, secondary or higher), husband's age, husband's education (none or primary, secondary or higher), caste (General, Scheduled Caste/Scheduled Tribe/Other Backward Castes), religion (Hindu, non-Hindu), parity (0, 1, 2-4), any living sons (Yes, No), fertility desires (Have a/another child, No more/none, Undecided/ Don't know), Below Poverty Line card holder (Yes, No), and wife's age at marriage. In addition, we included women's reports of ever experiencing intimate partner violence (physical and/or sexual), wife's knowledge of contraceptive methods (number of methods), husband's knowledge of contraceptive methods, and couple's concordance of contraceptive discussion in the past 3 months (both yes, both no, Wife yes/Husband no, Wife no/Husband yes). For assessing intention to use, women and men were asked: "Will you use a contraceptive method or continue to use one in the next 3 months to avoid or delay pregnancy?" with a yes/no response.

Analysis

Descriptive frequencies and proportions were calculated. Multivariable Poisson regression was used to model the relationship between women's involvement in contraceptive decision-making (reference group: Concordant 1) with modern contraception use for all women, in both an unadjusted and adjusted model for all potential confounders listed above. A Poisson regression with robust variance estimation for confidence intervals was carried out to limit

possible inflation in the effect size relative to logistic regression, since the outcome is not rare (modern contraceptive use is greater than 10% in this sample) (29, 30). All comparison contrasts (comparing Discordant 2 with Concordant 2, Discordant 2 to Concordant 1, and Concordant 1 to Concordant 2) in both unadjusted and adjusted models are reported in Appendix Table 2.2.

An exploratory analysis to examine intention to use contraception was carried out with the multivariable model, adjusting for women's intention to use modern contraceptives (Appendix Table 2.3 M2), and then men's intention to use modern contraceptives (Appendix Table 2.3 M3). Further, an equivalent multinomial logistic regression was carried out with the categorical type of contraceptive use as the outcome.

As a sensitivity analysis (Appendix Table A2.1), a propensity-score-adjusted Poisson regression was carried out to limit possible selection bias from the observational design of the study. All analyses were conducted using STATA version 14.0 (31).

RESULTS

A reported 38.3% of wives were using modern contraception: 25.7% were using male condoms, 3.2% pills and 9.1% IUDs. In 70.3% of couples, both husband and wife reported that the wife was involved in contraceptive decision-making (Concordant 1) and in 4.2% of couples both husband and wife reported that the wife was uninvolved (Concordant 2). Discordance in the wife's involvement in decision-making was reported by 25.4% of couples, with 13.2% of husbands reporting their wife was uninvolved, while the wife reported she was involved (Discordant 1), and 12.2% of husbands reporting that the wife was involved while the wife reported she was uninvolved (Discordant 2) (Table 2.1).

Adjusted multivariable analysis showed that couples in the Discordant 2 category for contraceptive decision-making (women reported women were uninvolved and men reported women were involved), had lower odds of reported modern contraceptive use relative to

Concordant 1 (women and men agree that women were involved) couples (adjusted RR=0.61, 95% CI 0.45, 0.83), after adjusting for confounders (Table 2.2). None of the remaining categories of couple concordance on women's involvement in contraceptive decision-making were significantly associated with the outcome. Exploratorily, we also adjusted for women's intention to use modern contraceptives, and found that the association of Discordant 2 category for contraceptive-decision making with modern contraceptive use relative to Concordant 1 couples was lost. However, once we adjusted for men's intention to use modern contraceptives, couples in the Discordant 2 category for contraceptive decision-making (women report women were uninvolved and men report women were involved) had lower odds of modern contraceptive use relative to Concordant 1 couples (Appendix Table A2.3 M3: adjusted RR=0.61, 95% CI 0.45, 0.83), findings comparable to our main findings on Discordant 2 couples. The sensitivity analysis showed that the Poisson adjusted regression with propensity scores did not substantially differ from the adjusted Poisson regression findings, computing a similar magnitude estimate as seen in our main findings (adjusted RR=0.51, 95% CI=0.36, 0.73) (Appendix Table A2.2).

In the multinomial logistic regression with type of contraceptive used as the outcome, Discordant 2 couples had lower odds of reporting condom use and IUD use relative to Concordant 1 couples (Condoms: AOR=0.49, 95% CI 0.26, 0.92, and IUD: AOR=0.37, 95% CI 0.16, 0.89), after adjusting for confounders (Table 2.3). There were no observed relationships between decision-making concordance and non-modern (withdrawal and rhythm) methods or pill use.

DISCUSSION

One in three couples reported that women either were not involved or had discordant views on women's involvement in contraceptive decision-making (i.e., they reported Concordant 2, Discordant 1 or Discordant 3). This highlights that many women are not involved in

contraceptive decision-making, and many couples are not on the same page about women's involvement in this decision-making. Discordant 2 couples, where women report women were uninvolved and men report women were involved, had lower odds of contraceptive use compared to Concordant 1 couples, where men and women both agree that women were involved in contraceptive decision-making. One in nine women in our sample reported no contraceptive decision-making control, while their husbands disagreed, reporting that their wife was involved. This suggests that some spouses may believe the other to be in control of contraceptive decisions when, in fact, neither is engaged. This also suggests that some women do not know or do not act on their reproductive agency when their husbands indicate they have it. This could reflect several realities, including poor communication, disempowerment of the women, or abdication of responsibility by the husbands for contraceptive decision-making.

Although previous studies assessing women's responses to contraceptive decision-making suggest that increasing women's reported agency alone may increase contraceptive use (10), wife-only decision-making did not show increased contraceptives use in our sample. On the other hand, men-only decision-making was associated with lower odds of contraceptive use. Comparably, a study of couples' household decision-making and contraceptive use in Bangladesh suggests that a balance in power, rather than wife-only decision-making, may have the most impactful outcomes (9). Furthermore, the association was not explained by socio-demographic correlates, and only a small part of this association is explained by spousal communication about contraceptives. Couple concordance in reporting recent contraceptive discussion was significantly associated with increased modern contraceptive use. In India, greater women's empowerment has previously been reported among couples who are concordant in their reporting of contraceptive communication and use (12). Thus, couple communication may further explain discordance in decision-making and should be considered in future research.

Among Discordant 2 couples (women report women uninvolved and men report women involved), when adjusted for women's intent to use (Appendix Table A2.3 M2), an association was not noted with women's use of contraceptives. However, when adjusted for men's intent to use, women had lower odds of using contraceptives (Appendix Table A2.3 M3). Thus, contraceptive use intention plays an important role when men and women disagree on women's involvement in contraceptive decision-making. However, intention is a complex construct, assumed to be a conscious decision, but can be ambivalent and may change over time (32, 33). When we assessed the association with the type of contraceptive used as the outcome, couples had lower odds of reporting using condoms and IUDs when women reported that they were not involved in decision-making, but men reported that women were involved (Discordant 2). Although we expected low use of women-controlled methods, women's involvement is also critical for male-controlled method of condoms and not specific to women-controlled methods. This highlights the need for women to be able to practice their contraceptive decision-making agency in partnership with men, regardless of whether the contraceptive is women-controlled or not.

The current study extends our understanding of women's contraceptive-specific agency by assessing both partners' report of decision-making, and adds to our understanding that increasing women's decision-making agency should be accompanied by engaging male partners when possible to optimally improve contraceptive utilization. However, our findings should be considered in the context of several limitations. First, this is a cross-sectional analysis, which precludes assumptions of causality. Responses were also subject to social desirability bias, and some men may have erroneously reported that their wives were involved in contraceptive decision-making. Furthermore, the sample for this study is from participants enrolled in a RCT, and generalizability of the findings may be limited (27). In particular, since the CHARM2 intervention aims at improving contraceptive use, only non-sterilized couples were included in the study and this sample, thus underestimating true contraceptive prevalence.

Given the Indian context, where female sterilization dominates (75% of all) contraceptive use, our findings are relevant to decisions involving the use of short- and long-term reversible contraceptives (IUD, pills, and condoms) only. These are the only modern methods currently available in the public health system in India and the most common methods reported in the study sample. While it was exploratory, a low cell count limited our understanding of the Concordant 2 group among those who do not intend to use contraceptives, and Concordant 2 and Discordant 2 groups among pill users in the multinomial analysis. Improved measurement of women's decision-making involvement is needed to advance our understanding of this complex construct (34). Finally, although we used the same measures for husbands and wives, they may perceive and respond to them differently. Multi-national evidence suggests that men and women do not have the same cognitive or semantic understanding of response categories to survey questions on gender relations (35).

To conclude, supporting a more equitable balance of power between couples and encouraging couples' informed and respectful joint decision-making regarding contraceptive use is important, but may not be enough to create impact. Interventions need to focus on a) women's agency to be involved and be an active participant in contraceptive decision-making, combined with b) male responsibility in family planning and their engagement in family planning programs.

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Chapter 2, titled "Male-female concordance in reported involvement of women in contraceptive decision-making and its association with modern contraceptive use among couples in rural Maharashtra, India", in full, has been submitted for publication to the journal, Contraception: X. The co-authors include Nicole E Johns, Mohan Ghule, Madhusudana Battala,

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Table 2.1: Sociodemographic characteristics of married couples enrolled in CHARM2 in rural Maharashtra, India (N=961).

Variable	Overall, n (%)	Current modern FP use	
		Yes, n (%)	No, n (%)
Modern contraceptive use (3 mo)			
Yes	368(38.29%)	-	-
No	593 (61.71%)	-	-
Couple concordance on contraceptive decision-making			
Concordant 1 (women and men agree): Women-Involved (women only or joint)	676 (70.34%)	285 (77.45%)	391 (65.94%)
Concordant 2: Women Uninvolved (men only or other)	40 (4.16%)	11 (2.99%)	29 (4.89%)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	127 (13.22%)	46 (12.50%)	81 (13.66%)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	1198(12.22%)	26 (7.07%)	92 (15.51%)
Age in years (Mean, SD)	24.11 (2.92)	24.58 (2.85)	23.83 (2.94)
Age at marriage in years (Mean, SD)	19.42 (2.36)	19.49 (2.33)	19.38 (2.39)
Husband's age in years (Mean, SD)	29.65 (3.70)	30.12 (3.72)	29.35 (3.66)
Education			
No education + Primary	138 (14.36%)	45 (12.23%)	93 (15.68%)
Secondary or higher	823 (85.64%)	323 (87.77%)	500 (84.32%)
Husband's education			
No education or Primary	134 (13.94%)	44 (11.96%)	90 (15.18%)
Secondary or higher	827 (86.06%)	324 (88.04%)	503 (84.82%)
Religion			
Hindu	893 (92.92%)	336 (91.30%)	557 (93.93%)
Other*	68 (7.08%)	32 (8.70%)	36 (6.07%)
Caste			
General	652 (67.85%)	261 (71.92%)	391 (65.94%)
SC/ST/OBC**	309 (32.15%)	107 (29.08%)	202 (34.06%)
Below Poverty Line (BPL) card holder			
Yes	240 (24.97%)	86 (23.37%)	154 (25.97%)
No	721 (75.03%)	282 (76.63%)	439 (74.03%)
Parity			
0	104 (10.82%)	13 (3.53%)	91 (15.35%)
1	534 (55.57%)	214 (58.15%)	320 (53.96%)
2-5	323 (33.61%)	141 (38.32%)	182 (30.69%)
Any living sons			
Yes	492 (51.20%)	208 (56.52%)	284 (47.89%)
No	469 (48.80%)	160 (43.48%)	309 (52.11%)

Table 2.2: Sociodemographic characteristics of married couples enrolled in CHARM2 in rural Maharashtra, India (N=961).

Fertility desires			
Have a/another child	573 (59.63%)	200 (54.35%)	373 (62.90%)
No more/none	314 (32.67%)	135 (36.68%)	179 (30.19%)
Undecided/Don't know	74 (7.70%)	33 (8.97%)	41 (6.91%)
Knowledge of contraceptive methods (Mean, Range)	4.19 (0-12)	4.50	4.00
Husband's knowledge of contraceptive methods (Mean, Range)	4.12 (0-11)	4.20	4.07
IPV (Physical or Sexual)* **			
Yes	109 (11.34%)	34 (9.24%)	75 (12.65%)
No	852 (88.66%)	334 (90.76%)	518 (87.35%)
Couple concordance on contraceptive discussion			
Both yes	247 (25.70%)	155 (42.12%)	92 (15.51%)
Both no	261 (27.16%)	42 (11.41%)	219 (36.93%)
Wife yes/Husband no	111 (11.55%)	56 (15.22%)	55 (9.27%)
Wife no/Husband yes	342 (35.59%)	115 (31.25%)	227 (38.28%)
Intention to use modern contraceptive in 3mo			
Yes	484 (50.36%)	349 (94.84%)	135 (22.77%)
No	477 (49.64%)	19 (5.16%)	458 (77.23%)
Total N	**961** (100%)	**368** (100%)	**593** (100%)

Note: Excluded 240 women from 1,201 who were either pregnant or missing on decision-making responses (200 were pregnant, 45 missing on decision-making, incl both), or missing on another independent variable. Mean (SD/range) are reported for continuous variables. Proportions are reported for categorical variables. *Other religion includes Muslim/Buddhist/Jain/Christian/Other
** SC: Scheduled Caste, ST: Scheduled Tribe, OBC: Other Backward Caste
*** IPV includes report of any physical or sexual intimate partner violence, not emotional violence.

Table 2.3: Unadjusted and adjusted Poisson regression between couple concordance of women's involvement in contraceptive decision making and current modern contraceptive use among married couples enrolled in CHARM2 in rural Maharashtra, India (N=961).

Variable	Unadjusted	Adjusted
Couple concordance of women's involvement in contraceptive decision making	RR (95% CI)	RR (95% CI)
Concordant 1 (women and men agree): Women-Involved (women only or joint)	ref	ref
Concordant 2: Women Uninvolved (men only or other)	0.64 (0.39-1.04)	0.79 (0.54-1.18)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	0.82 (0.64-1.05)	0.82 (0.66-1.02)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	0.52 **(0.38-0.72)**	0.61 **(0.45-0.83)**

Note: Adjusted for age, age at marriage, husband's age, education, husband's education, caste, religion, parity, any living sons, and Below Poverty Line status, knowledge of family planning methods, fertility desires, husband's knowledge of family planning methods, physical or sexual IPV, and concordance of FP discussion.

Table 2.4: Unadjusted and adjusted multinomial logistic regression between couple concordance of women's involvement in contraceptive decision making and type of contraceptive use among married couples enrolled in CHARM2 in rural Maharashtra, India (N=958).

Variable	Unadjusted	Adjusted
	OR (95% CI)	AOR (95% CI)
Non-modern (withdrawal, rhythm)		
Concordant 1 (women and men agree): Women-Involved (women only or joint)	ref	ref
Concordant 2: Women Uninvolved (men only or other)	1.32 (0.62-2.83)	1.35 (0.59-3.11)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	1.01 (0.62-1.65)	0.84 (0.49-1.42)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	0.75 (0.46-1.22)	0.86 (0.51-1.47)
Male condoms		
Concordant 1 (women and men agree): Women-Involved (women only or joint)	ref	ref
Concordant 2: Women Uninvolved (men only or other)	0.75 (0.32-1.74)	0.98 (0.38-2.52)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	0.96 (0.60-1.54)	0.86 (0.50-1.48)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	0.40 **(0.23-0.70)**	0.49 (0.26-0.92)
Pills		
Concordant 1 (women and men agree): Women-Involved (women only or joint)	ref	ref
Concordant 2: Women Uninvolved (men only or other)	**	**
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	0.52 (0.15-1.78)	0.34 (0.09-1.29)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	**	**
IUD		
Concordant 1 (women and men agree): Women-Involved (women only or joint)	ref	ref
Concordant 2: Women Uninvolved (men only or other)	0.43 (10-1.90)	0.53 (0.11-2.47)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	0.48 (0.21-1.10)	0.42 (0.18-1.00)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	0.38 **(1.17-0.87)**	0.37 **(0.16-0.89)**

Note: Adjusted for age, age at marriage, husband's age, education, husband's education, caste, religion, parity, any living sons, and Below Poverty Line status, knowledge of family planning methods, fertility desires, husband's knowledge of family planning methods, physical or sexual IPV, and concordance of FP discussion.
*Injectable contraceptive and emergency contraceptive pill users were also excluded from this analysis. **Empty cell could not be calculated.

APPENDIX

Table A2.1: Sensitivity analysis showing propensity score adjusted Poisson regression for the association between couple concordance of women's involvement in contraceptive decision-making and current modern contraceptive use among married couples enrolled in CHARM2 in rural Maharashtra, India (N=961).

Variable	
Couple concordance of women's involvement in contraceptive decision making	RR (95% CI)
Concordant 1 (women and men agree): Women-Involved (women only or joint)	ref
Concordant 2: Women Uninvolved (men only or other)	0.69 (0.42-1.14)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	0.86 (0.67-1.10)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	**0.51 (0.36-0.73)**

Table A2.2: Unadjusted and adjusted Poisson regression for all category comparisons of the association between couple concordance of women's involvement in contraceptive decision making and current modern contraceptive use among married couples enrolled in CHARM2 in rural Maharashtra, India (N=961).

Variable	Unadjusted	Adjusted
Couple concordance of women's involvement in contraceptive decision making	RR (95% CI)	RR (95% CI)
Ref Concordant 2		
Concordant 1 (women and men agree): Women-Involved (women only or joint)	1.56 (0.96-2.54)	1.26 (0.85-1.86)
Concordant 2: Women Uninvolved (men only or other)	ref	ref
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	1.29 (0.81-2.04)	1.03 (0.69-1.53)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	0.81 (0.58-1.15)	0.77 (0.56-1.05)
Ref Discordant 1		
Concordant 1 (women and men agree): Women-Involved (women only or joint)	1.21 (0.95-1.54)	1.22 (0.98-1.51)
Concordant 2: Women Uninvolved (men only or other)	0.77 (0.49-1.22)	0.97 (0.65-1.44)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	ref	ref
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	0.63 (0.48-0.84)	0.75 (0.56-0.99)
Ref Discordant 2		
Concordant 1 (women and men agree): Women-Involved (women only or joint)	1.91 (1.38-2.63)	1.63 (1.21-2.21)
Concordant 2: Women Uninvolved (men only or other)	1.22 (0.86-1.73)	1.30 (0.95-1.78)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	1.57 (1.19-2.08)	1.34 (1.01-1.77)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	ref	ref

Table A2.3: Adjusted Poisson regression between couple concordance of women's involvement in contraceptive decision making and current modern contraceptive use women's intention (M2), and men's intention (M3) to use modern FP in 3 months, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=961).

Variable	M2: Adjusted (women's intent FP in 3 m)	M3: Adjusted (men's intent to use modern FP in 3m
Couple concordance of women's involvement in contraceptive decision making	RR (95% CI)	RR (95% CI)
Concordant 1 (women and men agree): Women-Involved (women only or joint)	ref	ref
Concordant 2: Women Uninvolved (men only or other)	0.93 (0.78-1.11)	0.83 (0.58-1.20)
Discordant 1: Women-Report Women Involved and Men-Report Women Uninvolved	0.85 (0.70-1.03)	0.93 (0.77-1.13)
Discordant 2: Women-Report Women Uninvolved and Men-Report Women Involved	0.82 (0.62-1.07)	0.**68 (0.51-0.89)**

Note:
M2: Main adjusted model Table 2.2 + women's intention to use contraceptives in next 3 months.
M3: Main adjusted model Table 2.2 + men's intention to use contraceptives in next 3 months.

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CHAPTER 3: Association of traditional marital practices with contraceptive decision-making, couple communication, and method use among couples in rural Maharashtra, India.

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ABSTRACT

Objectives: Traditional social practices around marriage, such as non-involvement of prospective brides in choice of mate and timing of marriage, child/early marriage, dowry, and purdah (separation of women from men), compromise women's agency at the time of marriage and may affect contraceptive practices in marriage as well. This paper examines the associations between these traditional marital practices and contraceptive behaviors, including women's control over contraceptive decision-making, couples' communication about contraception, and whether married women have ever used contraceptives, in rural Maharashtra, India.

Methods: Married women aged 18–29 years (N=1200) and their husbands were surveyed in Maharashtra, India, between September 2018 and June 2019. We used multivariable regressions to examine the association between five marginalizing social practices, i.e., marital choice of whom and when to marry, child marriage, dowry, and purdah, and three family planning behavioral outcomes: women's involvement in contraceptive decision-making, marital communication about contraception (with husband), and whether they have ever used modern contraception, adjusting for demographic and parity confounders.

Results: The wife as the primary decision-maker on who to marry was reported by 15.6%; when to marry by 9.4%; child marriage by 17.8%; purdah was reported by 9.7%; and dowry by 12.3% of the wives. Wives who were the primary decision-makers on who to marry had higher odds of ever having communicated with their husband on pregnancy prevention (AOR 1.76, 95% CI 1.16, 2.68), and ever using modern contraceptives (AOR 2.19, 95% CI 1.52, 3.16). Wives who were the primary decision-makers on when to marry also had higher odds of ever having used modern contraceptives (AOR 1.86, 95% CI 1.21, 2.93). We did not find an association between any of the traditional marital practices and women's involvement in contraceptive decision-making.

Conclusion: Traditional marital practices remain common in rural India and have complex associations with contraceptive autonomy and use in marriage. Women's marital choice is the only assessed marital practice associated with outcomes of the focus of contraceptive communication and use. These findings suggest that women's involvement in marital choice may facilitate couples' engagement related to family planning, possibly via the establishment of better communication between partners.

Implications: Marital choice is associated with both contraceptive communication and use. Intervention programs could benefit from including a focus on women's marital agency, which could facilitate their contraceptive agency in marriage.

KEYWORDS: Martial agency, marital choice, dowry, purdah, child marriage, contraceptive use, couple communication, contraceptive decision-making

INTRODUCTION

Gender-based social practices that marginalize women and girls continue to be prevalent across the world. It is estimated that 38% of girls in Sub-Saharan Africa and 30% of girls in South Asia marry as children (before age 18) (1). The estimated rate of child marriage in India is 27% (as reported by respondents aged 20-24 years at the time of the survey) (2), and women often have limited marital decision-making control (on deciding whom and at what age to marry). Early and child marriage leads to poor reproductive health, education, and economic outcomes (3-6). In these contexts, dowry (a method of payment through money, property, or gifts made by the bride's family to the groom and his family) is longitudinally associated with women's poor self-rated general health (7).

Similarly, gender as a performance indicator in the form of veiling (*purdah* among Muslims or *ghunghat* among Hindus, referring to covering the head and face to reduce women's contact both inside and outside their homes, especially around male members and elders of the

husband's family) also may marginalize women and act as a barrier to healthcare utilization (8, 9). These marginalizing social practices are rooted in gender-based power structures of patrilineal (male-line descent) and patrilocal (couple residing with the husband's parents) norms, where in-laws have a strong influence on the couple's health and fertility behaviors (10-13). There is widespread and inter-generational transfer of social norms on whom and when to marry, as well as contraception use, fertility desires and the acceptability of domestic violence (14, 15).

This ongoing pervasiveness of traditional marital practices can reinforce traditional expectations of early fertility in marriage due to pro-natal social norms, and non-use of contraception until the desired number and sex of children are achieved. These practices are tied to marriage mainly driven by parents, in-laws, and the extended family. These can create an environment where women have lower status or agency at marriage, leading to lower decision-making control (9, 14, 16, 17).

Although we know how lack of agency as sustained in marriage affects contraceptive use (18-20), there is still a lack of understanding of how agency at the time of marriage affects contraceptive use. Qualitative data documents that women in India have low decision-making autonomy, especially for marital choice (21), and that agency in marriage (e.g., decision-making control) can act as a barrier to women's use of to family planning (22). However, a further quantitative assessment is needed to explore how socially marginalizing practices measuring agency at marriage (marital choice, dowry, and *purdah*) affect women's involvement in contraceptive decision-making, contraceptive communication with their husbands, and contraceptive use. We set out to examine the influence of women's agency at the time of marriage on family planning behaviors later in their marriage in an overall gender-unfriendly environment.

This paper aims to study marital agency measured by marginalizing gender-based social practices around marriage, including women's involvement with marital choice, early marriage,

purdah, and dowry, and whether they are associated with women's involvement in contraceptive decision-making, communication about contraception in marriage, and whether they ever use modern contraceptive methods. We hypothesize that traditional marital practices will be associated with lower odds of female decision-making control in marriage, lower odds of marital contraceptive communication, and lower odds of ever using contraception. The findings will have implications for research to consider traditional marital practices as risk factors and for programs to create awareness of the harmful health effects related to them for effective family planning behaviors that avert unwanted and unintended pregnancies.

METHODS

Sample

We used a cross-sectional baseline sample from 1,201 couples enrolled in CHARM2 [Counseling Husbands and wives to Achieve Reproductive Health and Marital Equity], a two-arm cluster randomized controlled trial (RCT) evaluating a gender-synchronized, gender-transformative family planning intervention in Junnar block, Pune district, Maharashtra, India. CHARM2 aims to increase knowledge about contraceptives, prevent unintended pregnancy, and decrease interpersonal violence. Couples who were not currently married or cohabiting, or who reported sterilization or infertility, were not eligible to participate in the study. Trained gender-matched interviewers collected self-report data using electronic tablets between September 2018 and June 2019. A detailed protocol for CHARM2 is published elsewhere (23). The sample includes wives aged 18 to 29 years and their husbands. The current analytic sample of 1,200 couples further excluded one couple with missing information on the IPV independent variable. The IRBs of the University of California San Diego, ICMR-National Institute for Research in Reproductive Health in India, and Population Council approved the protocol, and all participants gave written informed consent before they participated in the study.

Measures

The dependent variables were: a) women's involvement in contraceptive decision-making developed from the survey item, "Would you say that using or not using contraception is mainly your decision, your husband's decision, joint decision by both, your mother, mother in law, elderly head of household, your sibling, your husband's sibling or someone else?" categorized with responses of Yes (woman's or joint decision) or No (husband's or other's decision); b) marital contraceptive communication, derived from the survey item, "Have you and your husband ever discussed what to use or do to prevent or stop a pregnancy?" with responses of Yes or No; and c) contraceptive use ever with responses of Yes or No. 'Modern contraceptive use ever' was established from survey items, "Have you ever used any methods to delay or avoid pregnancy?" with response options Yes or No, and "Which methods have you ever used?". Methods including pills, IUD or Copper-T, PPIUD, injectable, male condom, female condom, emergency contraceptive pill, and Lactational Amenorrhea Method (LAM) were considered to be modern methods of contraception. We focused on the women's perspective on the selection of outcome variables, since we aim to understand her agency based on the way her marriage started (24).

Independent variables were the traditional marginalizing marital practices, used as a proxy for measuring agency at marriage. These include: women's involvement in marital choice of mate, developed using survey item, "Who was the primary person to decide whom you married?" with response options "Self, Mother, Father, Brother, Sister, Aunt, Uncle, Grandmother, Grandfather, Community leader, Religious leader, Other (specify)"; and women's involvement in marital choice on marital timing, developed using the survey item, "Who was the primary person to decide when you should get married?" with response options "Self, Mother, Father, Brother, Sister, Aunt, Uncle, Grandmother, Grandfather, Community leader, Religious leader, Other (specify)". Both variables were categorized into dichotomous variables of Self and

Other as the primary decision-maker. Child marriage (wife <18 years as yes, no) was ascertained from the survey item, “How old were you when you (first) got married?” categorized as Yes if married before age 18, and No if married at 18 or later. The practice of *purdah* variable used the survey item “Do you practice *purdah*?” with response options Yes, No. The practice of dowry variables used the survey item “When you got married, did your family give any nuptial gifts or money (dowry) to the boy's family?” with response options Yes, No.

Since the measurement of traditional marital practices is quite new in quantitative research, there is a lack of validated measures. The survey items we used were developed by the US and India-based CHARM2 investigator team with guidance from their prior qualitative research in the region. They were tested in pilot interviews of the survey with 20 couples from the target population.

Additional variables selected a priori as confounders, based on previous literature and the authors’ expertise, were wife’s age (Continuous), wife’s education (None or Primary, Secondary or Higher), husband’s education (None or Primary, Secondary or Higher), caste (General, Scheduled Caste/Scheduled Tribe/Other Backward Castes), parity (0, 1, 2-5), any living son (Yes, No), below poverty line status (Yes, No), wife’s knowledge of contraceptive methods (Continuous). We also adjusted for the experience of intimate partner violence (physical and/or sexual) categorized as Yes, No. Considering dowry-related outcomes of domestic violence and dowry deaths (25-27), intimate partner violence may play a large role in contraceptive use.

Analysis

Descriptive frequencies and proportions were calculated for the marital practices variables with outcomes of women’s involvement in contraceptive decision-making, couples having ever discussed preventing pregnancy, and having ever used modern contraceptive methods. Multivariable logistic regressions were used to assess whether traditional marital

practices are associated with women's involvement in contraceptive decision-making, having ever discussed preventing pregnancy, and having ever used modern contraception. Models were adjusted for potential confounders listed in the measures section. We did not find collinearity between confounders, with a Variance Inflation Factor (VIF) cutoff of 4 (28).

We also considered exploratory analysis to construct a marital agency scale using the marginalizing social practices items but found that although there are significant descriptive associations (See Appendix Table 3.1) and correlations (See Appendix Table 3.2) between these variables, a scale could not be constructed because they do not hang together when tested for internal consistency (Cronbach's $\alpha = 0.39$). A sensitivity analysis was also conducted to assess the association of dowry and *purdah* with women's involvement in contraceptive decision-making, ever discussing pregnancy prevention with their husband, and ever using contraceptives, after adjusting for religion, and adjusting for religion instead of caste with other confounders (See Appendix Table 3.3). We also carried out a Poisson regression with robust variance estimation for the confidence intervals for the outcome of ever using modern contraception. This limits any inflation of effect sizes which may be seen in logistic regression since some use of modern contraceptives is not rare in this sample (29, 30) (See Appendix Table 3.4). All analyses were performed on STATA version 15.0 (31).

RESULTS

Among wives 15.6% reported being the primary decision-maker on who to marry, and 9.4% reported that they had been the primary decision-maker on when to marry. When asked about their age at marriage, 17.8% of wives reported that they were married before the age of 18. *Purdah* was practiced by 9.7% of wives, and dowry practice was reported by 12.3% of wives (See Table 3.1).

Modern contraception was used at some time by 58.1% of the couples as reported by wives, while current (past 3 months) use of contraception was reported by 37.9% of wives.

Contraceptive communication with husbands was reported by 72.9% of wives. The majority of wives (82.2%) reported that they were involved in contraceptive decision-making, jointly with husbands or alone (See Table 3.1).

In the multivariable analysis, traditional marital practices did not show any significant association with women's involvement in contraceptive decision-making (See Table 3.2). After adjusting for potential confounders (AOR 1.76, 95% CI 1.16, 2.68), wives who were primary decision-makers about who to marry had higher odds of ever discussing pregnancy prevention with their husbands (AOR 1.76, 95% CI 1.16-2.68). Dowry practices were also associated with having ever discussed pregnancy prevention with their husbands in the unadjusted model (OR 1.77, 95% CI 1.14, 2.74; AOR 1.65, 95% CI 1.02, 2.67). *Purdah* was also associated with having ever discussed pregnancy prevention with their husbands in the unadjusted model; this association was maintained as a trend in multivariable analysis but significance was not sustained (OR 0.60, 95% CI 0.40-0.89, AOR 0.65, 95% CI 0.41-1.02) (See Table 3.3).

The assessment of the association between traditional marital practices with ever using modern contraception ever, showed that wives who were the primary decision-makers on who to marry had higher odds of ever using modern contraception in the unadjusted analysis (OR 1.55, 95% CI 1.12, 2.16), and this association was sustained when adjusted for other potential confounders (AOR 2.19, 95% CI 1.52, 3.16). Wives who were the primary decision-makers about when to marry also had higher odds of ever using modern contraception when adjusted for confounders (AOR 1.86 95% CI 1.21, 2.93) (See Table 3.4). *Purdah* practice showed an association in the unadjusted analysis (OR 0.67 95% CI 0.46, 0.98), but this association remained as a trend that did not meet statistical significance in the adjusted analysis. None of the other socially marginalizing practices, including primary decision-making about when to

marry, child marriage, and dowry, showed a significant association with ever using modern contraceptives.

Since the *purdah* practice was expected to be more commonly followed among those who follow the Muslim religion, and dowry among those who follow the Hindu religion, we conducted a sensitivity analysis to assess the association of these marginalizing social practices with women's involvement in contraceptive decision-making, ever discussing pregnancy prevention with the husband, and ever using modern contraceptives, after adjusting for religion with other practices only, and religion instead of caste with other confounders. The Poisson regression analysis for the outcome, 'ever modern contraceptive use' showed an estimate similar to the main analysis. The results for both sensitivity analyses are reported in Appendix Table A3.3 and Table A3.4 respectively.

DISCUSSION

Our findings show that only about one in six women report being the primary decision-maker on who to marry. Even fewer, about one in thirteen, were the primary decision-makers on when to marry, and when asked about their actual age at marriage, over one in six women were married as children, before the age of 18. Other marginalized practices included *purdah*, practiced by one in twelve women and dowry, practiced when one in thirteen women got married.

Wives being the primary decision-maker on who to marry had higher odds of ever discussing pregnancy prevention with their husband and higher odds of ever using modern contraception. These findings indicate that when women are the primary decision-makers on who to marry, it facilitates the discussion between the couple on their fertility desires, such as prevention of any unwanted pregnancy and using a modern method of contraception. Wives who were the primary decision-makers on when to marry also had higher odds of ever using modern contraception. Thus, this lack of marital choice in who and when to marry may be

harmful to women's fertility-related agency in the long term and may need to be considered for the prevention of unintended pregnancy among couples in rural India. The value of focusing on social norms around marital choice has been demonstrated in previous literature (14, 32), and there have been effective interventions that aim to delay marriage and increase contraceptive access in India (33). Building on this, our findings suggest that these interventions need to be expanded to consider women's agency at the time of marriage and, beyond timing, to include choice of partner to influence couples' communication around contraception. Qualitative work has also emphasized this need to understand the nuanced marital decision-making process to better equip programs supporting women's health (21).

Although the choice of who to marry is associated with ever discussing pregnancy prevention with the husband, we do not know the nature of this discussion, so further research is needed to clarify the content of couple communication. This is to avoid any assumptions of such communications being a respectful and joint discussion for shared decision-making, specifically about the actual use of contraception. This may be evident in the lack of association of marital choice with women's involvement in contraceptive decision-making. None of the traditional marital practices were associated with women's involvement in contraceptive decision-making.

Our study shed light on the impact of marital agency, but it did not show some of the associations we expected. For example, child marriage has previously been established as an important predictor of low contraceptive non-use and other poor reproductive health outcomes (3, 34). The association estimates for dowry and *purdah* in analysis with couple communication had confidence intervals close to 1, implying that there may not be a meaningful difference between those who report them and those who do not. These practices are a form of performance of gender and may not be directly influential on family planning behaviors. Another reason for this lack of some of the associations may be due to a small sample size, affecting the power of the analysis. For example, in our sample, only 22 women reported *purdah* and 32

reported dowry among those who reported not being involved in contraceptive decision-making. Studies specifically designed to assess marginalizing practices may be needed to better understand the effect of these practices on reproductive health outcomes such as contraceptive use. The prevalence of the marginalizing social practices may also be lower in this sample compared to other samples from India, affecting the power of our analysis. For instance, dowry practice is more prevalent in northern states of India like Bihar and Uttar Pradesh, compared to the state of Maharashtra, where our sample was from (9, 35). Furthermore, given the complexity of women's agency as a construct, there may be other mechanisms, such as access to resources, individual attitudes, and social norms, that can have a higher influence on traditional marital practices and their impact. Evidence directly measuring social norms around girls' age at marriage has highlighted their influence on outcomes of education (36).

The cross-sectional nature of the data precludes the assumption of causality, so findings must be interpreted with caution. Our findings are also not representative or generalizable nationally to India and are specific to this sample. Study variables were self-reported, so are subject to recall bias and social desirability bias; for example, there may be underreporting of dowry incidents and child marriage because these practices are illegal in India. Overreporting of contraception use may also occur because participants interested in contraception may be the ones self-selecting to enroll in the CHARM2 intervention study. For this reason, we also conducted a Poisson regression analysis to inspect any inflation of reported estimates.

Furthermore, there may be a selection bias for the outcomes because sterilized couples are not enrolled in the CHARM2 intervention study sample, which led to an underestimation of modern contraceptive use. Women in India tend not to use contraceptives until the desired parity and sex composition of their children is achieved, after which a majority opt for permanent contraceptives like female sterilization (2, 37). Because sterilized women were not included, we were not able to assess women who may be susceptible due to fertility pressures. There is a need for research and programs to understand and promote the use of long- and short-acting

reversible contraceptives to effectively meet the needs of couples. Evidence shows that there are differences by method type, given that discreet or covert use of contraceptive methods such as IUD can undermine women's family planning agency in contexts where they face fertility pressures (38). Therefore, future analyses may need to identify marginalizing practices and social norms that may drive the use of some methods but not others.

We examined an understudied area of structural factors that affect women's agency in public health. Our findings reveal that women's mate choice for marriage facilitates discussions with their husbands around pregnancy prevention. Additionally, women's mate choice and choice in the timing of their marriage facilitates modern contraceptive use. This suggests that experiencing these marginalizing practices may have some long-term effects on spousal communication and contraceptive use. Thus, programs in India need to target marital choice beyond just delay in marriage, to improve women's agency, thereby fostering more couple communication and contraceptive use.

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Chapter 3, titled "Association of traditional marital practices with contraceptive decision-making, couple communication, and method use among couples in rural Maharashtra, India.", in part, is currently being prepared for submission for publication. The co-authors include Nicole E Johns, Mohan Ghule, Madhusudana Battala, Shahina Begum, Niranjan Saggurti, Jay Silverman, Elizabeth Reed, Tarik Benmarhnia, Susan Kiene, Sarah Averbach, and Anita Raj. The dissertation author, Anvita Dixit, is the primary investigator and author of this material.

Table 3.1: Traditional marital practices and sociodemographic characteristics by women's involvement in contraceptive decision-making, ever discussing pregnancy prevention, and ever using modern contraceptive methods, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable	Overall, n (%)	Women's involvement in contraceptive decision-making		Discussion on pregnancy prevention (ever)		Modern contraceptive use (ever)	
		Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
Primary decision maker on who to marry							
Self	187 (15.58%)	162 (16.43%)	25 (11.68%)	147 (16.80%)	40 (12.31%)	125 (17.93%)	62 (12.33%)
Other#	1013 (84.42%)	824 (83.57%)	189 (88.32%)	728 (83.20%)	285 (87.69%)	572 (82.07%)	441 (87.67%)
Primary decision maker on when to marry							
Self	113 (9.42%)	95 (9.37%)	18 (8.41%)	81 (9.26%)	32 (9.85%)	73 (10.47%)	40 (7.95%)
Other#	1087 (90.58%)	891 (90.37%)	196 (91.59%)	660 (90.74%)	293 (90.15%)	624 (89.53%)	463 (92.05%)
Child marriage (wife <18)							
Yes	214 (17.83%)	166 (16.84%)	48 (22.43%)	145 (16.57%)	69 (21.23%)	115 (16.50%)	99 (19.68%)
No	986 (82.17%)	820 (83.16%)	166 (77.57%)	730 (83.43%)	256 (78.77%)	582 (83.50%)	404 (80.32%)
***Purdah* practice**							
Yes	116 (9.67%)	94 (9.53%)	22 (10.28%)	73 (7.69%)	43 (12.82%)	57 (8.18%)	59 (11.73%)
No	1084 (90.33%)	892 (90.47%)	192 (89.72%)	802 (91.66%)	282 (86.77%)	640 (91.82%)	444 (88.27%)
Dowry practice							
Yes	148 (12.33%)	116 (11.76%)	32 (14.95%)	121 (13.83%)	27 (8.31%)	91 (13.06%)	57 (11.33%)
No	1052 (87.67%)	870 (88.24%)	182 (85.05%)	754 (86.17%)	298 (91.69%)	606 (86.94%)	446 (88.67%)
Age in years (Mean, SD) Range 18-29	23.87 (2.96)	23.90 (2.91)	23.73 (3.20)	24.15 (2.92)	23.11 (2.95)	24.42 (2.84)	23.10 (2.96)
Education							
No education or Primary	169 (14.08%)	116 (11.76%)	53 (24.77%)	101 (11.54%)	68 (20.92%)	84 (12.05%)	85 (16.90%)
Secondary or higher	1031 (85.92%)	870 (88.24%)	161 (75.23%)	774 (88.46%)	257 (79.08%)	613 (87.95%)	418 (83.10%)
Husband's education							
No education or Primary	174 (14.50%)	138 (14.00%)	36 (16.82%)	110 (12.57%)	64 (19.69%)	85 (12.20%)	89 (17.69%)
Secondary or higher	1026 (85.50%)	848 (86.00%)	178 (83.18%)	765 (87.43%)	261 (80.31%)	612 (87.80%)	414 (82.31%)
Caste							
General	817 (68.08%)	663 (67.24%)	154 (71.96%)	606 (69.92%)	211 (64.92%)	482 (69.15%)	335 (66.60%)
SC/ST/OBC**	383 (31.92%)	323 (32.76%)	60 (28.04%)	269 (30.74%)	114 (35.08%)	215 (30.85%)	168 (33.40%)

Table 3.1 continued: Traditional marital practices and sociodemographic characteristics by women's involvement in contraceptive decision-making, ever discussing pregnancy prevention, and ever using modern contraceptive methods, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable	Overall, n (%)	Women's involvement in contraceptive decision-making		Discussion on pregnancy prevention (ever)		Modern contraceptive use (ever)	
		Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
Below Poverty Line (BPL) card holder							
Yes	296 (24.67%)	233 (23.63%)	63 (29.44%)	213 (24.34%)	83 (25.54%)	157 (22.53%)	139 (27.63%)
No	904 (75.33%)	753 (76.37%)	151 (70.56%)	662 (75.66%)	242 (74.46%)	540 (77.47%)	364 (72.37%)
Parity							
0	196 (16.33%)	157 (15.92%)	39 (18.22%)	96 (10.97%)	100 (30.77%)	57 (8.18%)	139 (27.63%)
1	644 (53.67%)	533 (54.06%)	111 (51.87%)	495 (56.57%)	149 (45.85%)	390 (55.95%)	254 (50.50%)
2	315 (26.35%)	55 (25.70%)	260 (26.37%)	254 (29.03%)	61 (18.77%)	219 (31.42%)	96 (19.09%)
3+	45 (3.75%)	9 (4.21%)	36 (3.65%)	30 (3.43%)	15 (4.62%)	31 (4.45%)	14 (2.78%)
Any living sons							
Yes	556 (46.33%)	467 (47.36%)	89 (41.59%)	439 (50.17%)	117 (36.00%)	364 (52.22%)	192 (38.17%)
No	644 (53.67%)	519 (52.64%)	125 (58.41%)	436 (49.83%)	208 (64.00%)	333 (47.78%)	311 (61.83%)
Knowledge of contraceptive methods (Mean, Range)	4.12 (0-12)	4.21	3.70	4.49	3.10	4.42	3.69
IPV (Physical or Sexual)							
Yes	141 (11.75%)	97 (9.84%)	44 (20.56%)	99 (11.31%)	42 (12.92%)	81 (11.62%)	60 (11.93%)
No	1059 (88.25%)	889 (90.16%)	170 (79.44%)	776 (88.69%)	283 (87.08%)	616 (88.38%)	443 (88.07%)
Total N	**1,200** (100%)	**986** (100%)	**214** (100%)	**875** (100%)	**325** (100%)	**622** (100%)	**379** (100%)

Mean (SD/range) are reported for continuous variables. Proportions are reported for categorical variables.
[#] Other includes Mother/Father/Uncle/Brother/etc.
*Other religion includes Muslim/Buddhist/Jain/Christian/Other
** SC: Scheduled Caste, ST: Scheduled Tribe, OBC: Other Backward Caste

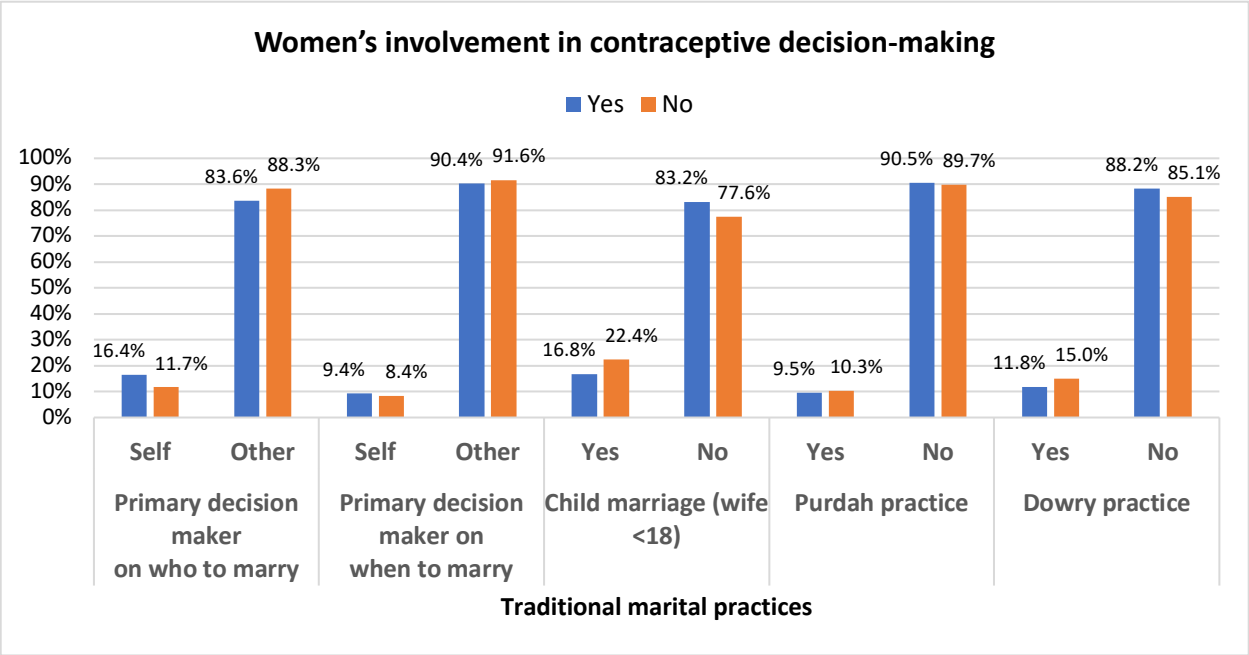

Figure 3.1: Prevalence of traditional marital practices and women's involvement in contraceptive decision-making among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

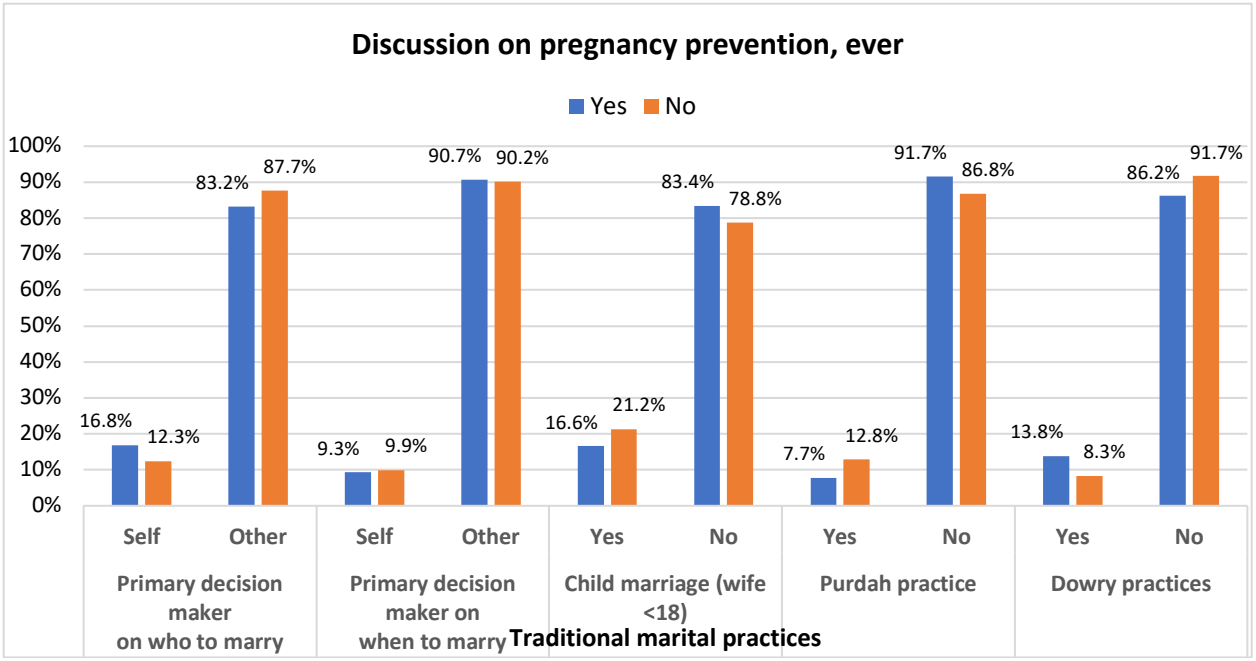

Figure 3.2: Prevalence of traditional marital practices and having ever discussed pregnancy prevention with husband among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

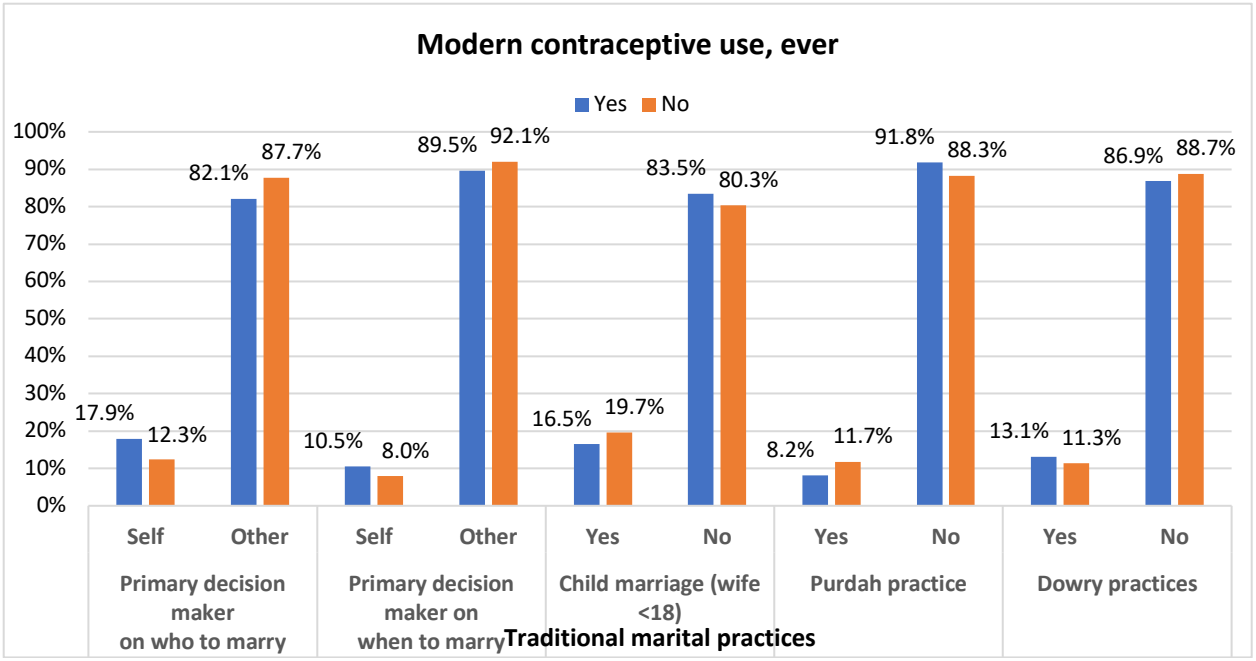

Figure 3.3: Prevalence of traditional marital practices and having ever used modern contraception among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Table 3.2: Unadjusted and adjusted logistic regression between traditional marital practices with women's report of women's involvement in contraceptive decision-making, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable		Women's involvement in contraceptive decision-making	
		Unadjusted	Adjusted
		OR (95% CI)	OR (95% CI)
Primary decision maker on who to marry	Self	1.49 (0.95-2.33)	1.41 (0.88-2.27)
	Other*	ref	ref
Primary decision maker on when to marry	Self	1.16 (0.68-1.97)	1.12 (0.64-1.95)
	Other*	ref	ref
Child marriage (wife <18)	Yes	0.70 (0.49-1.00)	0.77 (0.50-1.18)
	No	ref	ref
Purdah practice	Yes	0.92 (0.56-1.50)	1.06 (0.63-1.78)
	No	ref	ref
Dowry practices	Yes	0.76 (0.50-1.16)	0.78 (0.50-1.21)
	No	ref	ref

Note: Adjusted models for each marginalizing social practices variable (who to marry, when to marry, child marriage, *purdah* and dowry) include age, education, husband's education, caste, parity, son preference, Below Poverty Line status, knowledge of family planning methods, and any (physical or sexual) IPV. Child marriage was additionally adjusted for in models for the other four marginalizing social practices.
*Other includes Mother/Father/Uncle/Brother/etc.

Table 3.3: Unadjusted and adjusted logistic regression between traditional marital practices and having ever discussed preventing pregnancy with husband among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable		Discussion with husband on preventing pregnancy (ever)	
		Unadjusted	Adjusted
		OR (95% CI)	OR (95% CI)
Primary decision maker on who to marry	**Self**	1.44 (0.99-2.09)	**1.76 (1.16-2.68)**
	Other*	ref	ref
Primary decision maker on when to marry	**Self**	0.93 (0.61-1.44)	1.15 (0.71-1.87)
	Other*	ref	ref
Child marriage (wife <18)	**Yes**	0.74 (0.53-1.01)	0.87 (0.59-1.30)
	No	ref	ref
***Purdah* practice**	**Yes**	**0.60 (0.40-0.89)**	0.65 (0.41-1.02)
	No	**ref**	ref
Dowry practices	**Yes**	**1.77 (1.14-2.74)**	**1.65 (1.02-2.67)**
	No		ref

Note: Adjusted models for each marginalizing social practices variable (who to marry, when to marry, child marriage, purdah and dowry) include age, education, husband's education, caste, parity, son preference, Below Poverty Line status, knowledge of family planning methods, and physical or sexual IPV. Child marriage was additionally adjusted for in models for the other four marginalizing social practices.
*Other includes Mother/Father/Uncle/Brother/etc.

Table 3.4: Unadjusted and adjusted logistic regression between traditional marital practices and having ever used modern contraceptive methods, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable		Modern contraceptive use (ever)	
		Unadjusted	Adjusted
		OR (95% CI)	OR (95% CI)
Primary decision maker on who to marry	**Self**	**1.55 (1.12-2.16)**	**2.19 (1.52-3.16)**
	Other*	ref	ref
Primary decision maker on when to marry	**Self**	1.35 (0.90-2.03)	**1.86 (1.21-2.93)**
	Other*	ref	ref
Child marriage (wife <18)	**Yes**	0.81 (0.60-1.08)	0.94 (0.65-1.11)
	No	ref	ref
***Purdah* practice**	**Yes**	**0.67 (0.46-0.98)**	0.71 (0.46-1.09)
	No	ref	ref
Dowry practices	**Yes**	1.17 (0.82-1.67)	1.95 (0.65-1.40)
	No	ref	ref

Note: Adjusted models for each Marginalizing social practices variables (who to marry, when to marry, child marriage, purdah and dowry) include age, education, husband's education, caste, parity, son preference, Below Poverty Line status, knowledge of family planning methods, and physical or sexual IPV. Child marriage was additionally adjusted for in models for the other four marginalizing social practices.
*Other includes Mother/Father/Uncle/Brother/etc.

APPENDIX

Table A3.1: Associations between marital choice on whom and when to marry, child marriage, purdah and dowry, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable		Primary decision maker on who to marry		Chi-square (p-value)	Primary decision maker on when to marry		Chi-square (p-value)	Child marriage (wife <18)		Chi-square (p-value)	Purdah practice		Chi-square (p-value)
		Self	**Other***		**Self**	**Other***		**Yes**	**No**		**Yes**	**No**	
Primary decision maker on when to marry	**Self**	83 (44.39%)	30 (2.96%)	317.55 (**<0.001**)	-	-	-	-	-	-	-	-	-
	Other*	104 (55.61%)	983 (97.04%)		-	-	-	-	-	-	-	-	-
Child marriage (wife <18)	**Yes**	17 (9.09%)	197 (19.45%)	11.55 (**0.001**)	8 (7.08%)	206 (18.95%)	9.84 (**0.002**)	-	-	-	-	-	-
	No	170 (90.91%)	816 (80.55%)		105 (92.92%)	881 (81.05%)		-	-	-	-	-	-
***Purdah* practice**	**Yes**	12 (6.42%)	104 (10.27%)	2.68 (0.102)	3 (2.65%)	113 (10.40%)	7.02 (**0.008**)	23 (10.75%)	93 (9.43%)	0.35 (0.555)	-	-	-
	No	175 (93.58%)	909 (89.73%)		110 (97.35%)	974 (89.60%)		191 (89.25%)	893 (90.57%)		-	-	-
Dowry practice	**Yes**	6 (3.21%)	142 (14.02%)	17.06 (**<0.001**)	3 (2.65%)	145 (13.34%)	10.81 (**0.001**)	24 (11.21%)	124 (12.58%)	0.30 (0.583)	27 (23.28%)	121 (11.16%)	14.22 (**<0.001**)
	No	181 (96.79%)	871 (85.98%)		110 (97.35%)	942 (86.66%)		190 (88.79%)	862 (87.42%)		89 (76.72%)	963 (88.84%)	

[#] Other includes Mother/Father/Uncle/Brother/etc.

Table A3.2: Pearson's correlation matrix of traditional marital practices variables among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable	Primary decision maker on who to marry		Primary decision maker on when to marry		Child marriage (wife <18)		Purdah practice		Dowry practices	
	r	p-value	r	p-value	r	p-value	r	p-value	r	p-value
Primary decision maker on who to marry	1	-	-	-	-	-	-	-	-	-
Primary decision maker on when to marry	0.514	**0.000**	1	-	-	-	-	-	-	-
Child marriage (wife <18)	-0.098	**0.007**	-0.091	**0.002**	1	-	-	-	-	-
***Purdah* practice**	-0.047	0.102	-0.076	**0.008**	0.017	0.555	1	-	-	-
Dowry practices	-.0119	**0.000**	-0.095	**0.001**	-0.016	0.583	0.109	**0.002**	1	-

Table A3.3: Sensitivity analysis of the association of *purdah* and dowry practices with women's involvement in contraceptive decision-making, ever discussing pregnancy prevention with husband, and ever using modern contraceptive methods, after adjusting for religion, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable		Women's involvement in contraceptive decision-making		Discussion on pregnancy prevention (ever)		Modern contraceptive use (ever)	
		Adjusted 1	Adjusted 2	Adjusted 1	Adjusted 2	Adjusted 1	Adjusted 2
		OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
***Purdah* practice**	**Yes**	1.03 (0.61-1.74)	1.25 (0.73-2.17)	0.70 (0.46-1.08)	0.76 (0.47-1.22)	**0.61 (0.41-0.92)**	0.64 (0.41-1.00)
	No	ref	ref	ref	ref	ref	ref
Dowry practice	**Yes**	0.78 (0.51-1.19)	0.78 (0.50-1.21)	**1.88 (1.21-2.94)**	**1.64 (1.01-2.66)**	1.16 (0.82-1.66)	0.90 (0.62-1.32)
	No	ref	ref	ref	ref	ref	ref

Note: Adjusted 1 models for dowry and purdah = adjusted for religion. Adjusted 2 models for dowry and *purdah* include religion + age, education, husband's education, parity, son preference, Below Poverty Line status, knowledge of family planning methods, physical or sexual IPV (not caste), and child marriage.
*Other includes Mother/Father/Uncle/Brother/etc.

Table A3.4: Unadjusted and adjusted Poisson regression between traditional marital practices and having ever used modern contraceptive methods, among married couples enrolled in CHARM2 in rural Maharashtra, India (N=1,200).

Variable		Modern contraceptive use (ever)	
		Unadjusted	Adjusted
		RR (95% CI)	RR (95% CI)
Primary decision maker on who to marry	**Self**	**1.17 (1.00-1.38)**	**2.29 (1.12-1.49)**
	Other*	ref	ref
Primary decision maker on when to marry	**Self**	1.12 (0.96-1.32)	**1.25 (1.06-1.48)**
	Other*	ref	ref
Child marriage (wife <18)	**Yes**	0.92 (0.77-1.10)	0.97 (0.82-1.16)
	No	ref	ref
***Purdah* practice**	**Yes**	**0.83 (0.72-0.96)**	0.88 (0.77-1.00)
	No	ref	ref
Dowry practices	**Yes**	1.08 (0.97-1.20)	1.00 (0.90-1.12)
	No	ref	ref

Note: Adjusted models for each marginalizing social practices variable (who to marry, when to marry, child marriage, *purdah* and dowry) include age, education, husband's education, caste, parity, son preference, Below Poverty Line status, knowledge of family planning methods, and physical or sexual IPV. Child marriage was additionally adjusted for in models for the other four marginalizing social practices.
*Other includes Mother/Father/Uncle/Brother/etc.

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CHAPTER 4: Association between early-in-marriage fertility pressure from in-laws and family planning behaviors, among married adolescent girls in Bihar and Uttar Pradesh, India.

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ABSTRACT

Background: Married adolescent girls are vulnerable to risky sexual and reproductive health outcomes. We examined the association of fertility pressure from in-laws early in marriage with ever using contraceptives, parity, time until first birth, and couple communication about family size, among married adolescent girls.

Methods: Data were taken from a cross-sectional survey study with married girls aged 15-19 years (N=4,893) from September 2015 to July 2016 in Bihar and Uttar Pradesh, India. Multivariable regression assessed associations between in-laws' fertility pressure and each outcome, adjusting for sociodemographic covariates.

Results: We found that 1 in 5 girls experienced pressure from in-laws to have a child immediately after marriage. In-laws' fertility pressure was associated with lower parity (Adj. β Coef. -0.10, 95% CI -0.17, -0.37) and couple communication about family size (AOR=1.77, 95% CI 1.39, 2.26), but not contraceptive use or time until birth. **Conclusions**: Our study adds to the literature identifying that in-laws' pressure on fertility is common, affects couple communication about family size, and may be more likely for those yet to have a child, but may have little effect on impeding contraceptive use in a context where such use is not normative.

KEYWORDS: In-laws' pressure, married adolescent girls, fertility, family planning, India

INTRODUCTION

Contraceptive use and family planning reduce unplanned pregnancy and prevent maternal and newborn morbidity and mortality (1), and may be particularly important for adolescent girls. Globally among girls aged 15-19, one in six is married and about 16 million give birth annually (2, 3), They often lack knowledge, agency, and resources to make family planning decisions (4). Their agency, specifically their decision-making ability, is a key driver of

family planning and fertility behaviors like contraceptive use (5). However, the issue is complex in India, due to strong patrilocal (married couples living with or near husbands' parents) and patrilineal (defining descent solely through the father/male line) practices, where women and girls often lack control over family planning and fertility decisions such as timing of pregnancy, family size, and contraception, due to influences from the extended family (6, 7). Fertility pressures from in-laws may be a particular concern, especially for adolescent wives, who are more likely to be in joint families or residing near in-laws (8).

India is committed to increasing modern contraceptive use, and increasing female age at first birth, while prioritizing adolescent health policy (9-11). However social norms related to family planning and gender equality (e.g., early marriage, son-preference, pro-fertility norms, and toxic masculine ideology leading to violence and reproductive coercion by husbands and in-laws) continue to hold back progress on these issues (12, 13), with Bihar and Uttar Pradesh lagging more than India as a whole. Indicators such as high fertility rates (3.4 in Bihar, 2.7 in UP vs. 2.2 national average), child marriage (41.9% in Bihar, 22.9% in UP, and 27.9% nationally at 18-29 years), and falling contraceptive use (from 41.3% to 32.1% in Bihar, 42.4% to 39.8% in UP, and 55.8% to 51.5% nationally in the last decade) in the populous states of Bihar (99 million) and Uttar Pradesh (200 million) debilitate national progress. The most vulnerable are adolescent girls who live in rural areas, who have lower educational attainment, and who marry young, which leads to a myriad poor outcomes (8). These state contexts allow us to understand pressures of a gender inequitable ecosystem on vulnerable married adolescents and their fertility outcomes. There is growing evidence on social norms and practices showing that pronatalism (socially desirable pro-birth norms), pregnancy early in marriage, and fertility decisions determined by husband and in-laws limit women's agency to practice beneficial family planning and fertility behaviors (7, 14, 15). These practices are rooted in gender-based power, where male members (usually husbands), followed often by older women or mothers in-laws (as the husband's family), often have decision-making control over family planning and fertility that

are extended family decisions and not nuclear (i.e., husband and wife) decisions (16, 17). In such contexts, adolescent girls may have limited or no power over their reproductive health, including use of family planning services (18).

Assessments of female family planning and fertility behaviors and experience of coercion have largely focused on girls' parental characteristics, such as mother's education, parental wealth, husband's influence or women's household decision-making, but lack understanding of in-laws' influence. However, pressure from in-laws is conceptually complex, since in-laws are likely to have an influence both directly on the girl and indirectly through husbands, and this in-laws' influence is associated with a higher likelihood of larger desired family size if a couple is living in an extended family (19).

Study of in-laws' pressure has been largely limited to qualitative examination of in-laws' influence over fertility decisions and the association with family planning and fertility outcomes has not been well established. No previous surveys quantified how in-laws' pressure to have a child immediately after marriage influences family planning and fertility behaviors among adolescent girls, which is important because girls may be most sensitive and vulnerable to such pressures immediately after marriage. Further, assessments have not looked at whether women report their perception of feeling in-laws' pressure to have a child immediately after marriage, or whether in-laws' pressure may influence couple communication on family size and actual number of children. It is well established that women's decision-making, couple communication, and agreement on contraception and fertility lead to increased contraceptive use (20, 21). Even though couple communication is associated with contraceptive use, research has not examined whether in-laws' fertility pressure affects this communication. Moreover, it is crucial to conceptualize and study in-laws' pressure because the evidence on consequences of in-laws' control over women's fertility extends to extreme forms, such as intimate partner violence and

reproductive coercion (behaviors of husbands and in-laws that interfere with women's fertility decisions) (22-24).

We assessed the association of early-in-marriage fertility pressure from in-laws and the following contraceptive and fertility behaviors: having ever used contraception, parity, time until birth, and couple communication about family size, among a sample of married adolescent girls aged 15-19 years in the states of Bihar and Uttar Pradesh (UP) in India. Findings from this study may inform public healthcare guidelines and policies to include in-laws in family planning intervention programming to reduce the risk of undesirable fertility outcomes, especially for high-needs populations in India and similar country contexts.

METHODS

Study design

We analyzed data from a cross-sectional survey of 5,206 married adolescent girls aged 15-19 years from the "Understanding lives of adolescents and young adults" (UDAYA) study conducted from September 2015 to January 2016 in Uttar Pradesh (N=1,798) and January-July 2016 in Bihar (N=3,408). A stratified multistage systematic sampling for rural and urban sampling units was used in both states, from which systematic sampling for boys and girls of specific age categories (boys 10-14, girls 10-14, boys 15-19, girls 15-19, married girls 15-19) was carried out to yield the desired survey sample size providing state representative estimates using weighted data (25).

Data collection

Trained field research investigators conducted in-person interviews with adolescents with parents/guardians' consent. Self-report data were collected on socio-demographics, media exposure, parental interaction/relationship, communication, mobility and decision-making,

gender and self-efficacy, sexual reproductive matters, connectedness and friendship, marriage process and life, sexual experiences, health-seeking, substance use and violence, political participation, and biomarkers. Data quality and fieldwork were monitored by trained field coordinators and Population Council research staff.

Measures

The dependent variables were (a1) 'contraceptive use ever', established from the survey question, "Have you/your husband ever used any method to prevent or delay pregnancy?" with response categories Yes, No; (a2) 'ever modern contraception use', calculated from "Which method(s) did you/he use?" and categorized as none, traditional (rhythm, withdrawal, and other), and modern (pill, IUD [Intrauterine Device], injectables, implants, condom, diaphragm, foam/jelly, female sterilization, male sterilization, female condom, and LAM [Lactational Amenorrhea Method]); (b) 'parity', from the question, "Have you ever given birth to a live child? If yes, how many live births?", with continuous responses ranging from 0 to 3 (2 girls who reported having had 4 children were also marked as 3 children); (c) 'time until birth', from the difference between 'Age at first birth' and 'Age at marriage', with continuous responses ranging from 0 to 7 years; (d) 'couple communication about number of children', from "Did you and your husband ever discuss about how many children to have before the first time you became pregnant?", with response categories Yes, No/Don't remember.

The independent variable of in-laws' pressure to have a child immediately after marriage was measured from the question, "Did your in-laws' or other family members pressure you to have a child immediately after marriage?", with response categories Yes, No.

We included confounding variables including age (continuous, range 15-19 years), education (continuous, range 0-15), residence (Urban, Rural), religion (Hindu, Non-Hindu), caste (General, Scheduled caste/tribe, Other backward castes, Other/Don't know), time since

marriage (continuous, range 0-11 years), wealth index quintile as a marker of household socioeconomic status, and state (UP, Bihar).

For descriptive purposes we looked at whether girls reported fear of being called barren, using the survey question; “Were you afraid that your in-laws and others would call you barren if you didn’t have a child soon after you got married?”, with response categories Yes, No.

Statistical analysis

Our inference focused on married girls, so the analytic dataset excluded girls who were currently not married or cohabiting with their husbands. Survey-specific weights were used for all analyses to ensure state-representative estimates (25). One-way and two-way descriptive frequencies and weighted proportions were calculated for the independent variable with dependent variables. Logistic and linear multivariable regressions were used to model the relationship between in-laws’ pressure to have a child immediately after marriage with a1) ever having used contraception; a2) ever having used modern contraceptive methods, as a multinomial regression sensitivity analysis; b) parity; c) time until birth; and d) couple communication about number of children, adjusting for confounders which were chosen a priori based on literature and author expertise. Further, state-stratified exploratory analysis was carried out in recognition of differences in health systems in the two states (see Appendix). No collinearity was found between confounders, using a Variance Inflation Factor (VIF) cutoff of 4 (26). All analyses were conducted using STATA 14.0 (27).

RESULTS

Sociodemographic characteristics

Table 4.1 presents the sociodemographic characteristics of adolescent girls in the study. The adolescent girls were aged 15 to 19, with a majority being 18 and 19 years old (3,622 of total 4,893 sample). They had a mean education of 6.31 years (SD 0.14), mostly resided in rural

areas (3,013), identified as Hindu (4,097), and belonged to marginalized castes, including Scheduled Caste, Scheduled Tribe, and Other Backward Castes (4,385). Their wealth quintiles were distributed through Q1 poorest (806), Q2 poorer (937), Q3 middle (1,154), Q4 richer (1,233), and Q5 richest (765).

Experience of pressure from in-laws to have a child and family planning and fertility outcomes

Nearly one in five (18.45%) married adolescent girls report experiencing pressure from in-laws or other family members to have a child immediately after marriage, while 81.55% did not report pressure. In this sample, 18.83% girls also reported that they were afraid their in-laws would call them barren if they didn't have a child soon after marriage (Appendix Table A5.5). Among those who reported pressure from in-laws to have a child immediately after marriage, 12.63% reported ever having used any contraception (with overall 8.45% using a modern method), while 15.89% of those who did not report in-laws' pressure report had used contraception at some time.

Among those who reported in-laws' pressure, 87.37% were non-users of contraception, and among those who did not report pressure, 84.11% were non-users of contraception. Further, 66.79% of those who reported in-laws' pressure reported having ever communicated with their husband about the number of children they should have, while 44.79% of those who did not report in-laws' pressure reported that they had had such communication. Among those who reported in-laws' pressure, 33.21% said they had not had or did not know if they had had such communication, while this was the case among 55.21% of those who did not report in-laws' pressure.

The average time from marriage until birth was 1.70 years (SD 1.09) among those who reported in-laws' pressure, and 1.62 years (SD 1.00) among those who did not report in-laws' pressure. The average parity was 0.42 (SD 0.64) among those who reported in-laws' pressure,

and 0.47 (SD 0.64) among those who did not report in-laws' pressure. (Table 4.2). We also conducted an exploratory state-wise analysis (Appendix Table A4.1, Table A4.2, Table A4.3).

Association between pressure from in-laws to have a child and family planning and fertility outcomes

Multivariable analysis indicates that those who report in-laws' pressure to have a child immediately after marriage are more likely to report having discussed with their husbands how many children to have before first pregnancy (AOR=1.77, 95% CI=1.39, 2.26), and to have lower parity (Adj. β Coef. -0.10, 95% CI -0.17, -0.37), after adjusting for confounders (Table 4.3). In-laws' pressure was not associated with having ever used contraception (or 'modern contraceptive use ever', see Appendix Table A4.4), or with time until birth.

A sensitivity analysis to assess the association of in-laws' pressure to have a child immediately after marriage with parity was carried out only among girls who reported at least 1 birth. The estimate continued to be in the same direction, but association decreased in this sample (Adj. β Coef. -0.04, 95% CI -0.10, -0.02).

DISCUSSION

We found that in-laws' pressure to have a child immediately after marriage was a common experience in our sample of married adolescent girls, with almost one in five girls reporting it. This notion of in-laws' pressure has been found in other studies among women that show the influence of mothers-in-law on family planning and fertility decisions (7, 28, 29). In addition, girls feel pressure to prove their fertility early in marriage in this context, since they also reported a fear of being called barren due to lack of a child, although with a caveat that it may be associated with time since marriage.

This fear may stem from a context where girls may be stigmatized for not having a child or are worried about not being able to secure their position in the household quickly by having a

child, and experience stress from fertility pressures despite their young age. Thus, in-laws' pressure may need to be considered when examining girls' family planning and fertility behaviors, and not just restricted to husbands' influences. Previous assessment of attitudes has found that women may be blamed for not having children soon after marriage, which may be considered a sign of infertility or marital happiness (30).

In-laws' pressure to have a child immediately after marriage was associated with couple communication about number of children before first pregnancy, after adjusting for socio-demographics and time since marriage. Although the outcome of higher communication between spouses may seem to be positive or programmatically desirable for family planning interventions, we cannot confirm that it is desired in this population. Reports of communication between girls and their husbands may suggest increased female reproductive agency, but we do not know the nature of their reported communication and whether it took place by choice. Spousal communication needs further scrutiny, since couples' decision-making concordance and quality of relationship have a direct bearing on contraceptive use (20, 31), especially for married adolescent girls with limited agency in a gender-unfriendly context. These reports of communication could have been due to in-laws' pressure, conflicts with husbands, or pressure from husbands. We also do not know about recent or ongoing pressure from in-laws, since we only measured pressure experienced immediately after marriage.

There was an association of in-laws' pressure with lower parity, after adjusting for socio-demographics and time since marriage. Our counter-intuitive findings may be a back effect or reverse causation of girls experiencing in-laws' pressure in response to an absence of or lower parity, which cannot be established temporally from retrospectively collected cross-sectional information. A longitudinal study could explore whether this finding is indicative of girls experiencing pressure from in-laws due to delay in having children. Also, the same association of in-laws' pressure with parity was not sustained in a sensitivity analysis among girls who reported at least one birth. This suggests that in-laws' pressure is experienced by girls with 0 or

low births. Lower parity in adolescence may be attributed to a lower likelihood of pregnancy due to irregular periods, especially among girls with compromised nutritional status in Low-and-Middle-Income-Countries (LMICs) (32, 33).

In-laws' pressure to have a child immediately after marriage was not associated with ever having used contraception or time until birth. We did not see an association with contraception use, perhaps due to a low prevalence of contraception use in this young sample of adolescent girls, who may still be far from meeting their fertility goals. Moreover, women in India do not use contraceptives until the desired parity and sex composition is achieved, after which a majority opt for permanent contraception (8, 34), so adolescent girls may not be using contraception yet, as seen from the 15.29% use of contraceptives reported in this sample and 15.89% use among girls not reporting in-laws' pressure, which is low. These girls may not want to delay their first birth due to pressure felt from pronatal social norms and fear of not meeting expectations; family planning outcomes may not yet be on the radar for these young adolescents.

Previous studies have found that the mother-in-law's desire for a number of grandchildren is associated with their daughter-in-law's preferred family size (35), and the mother-in-law's influence is associated with the daughter-in-law's reporting a low likelihood of visiting a family planning clinic or using modern contraceptives (29). Perhaps husbands are more involved in contraception, but the extended family only exerts pressure on fertility. Thus, these findings add complexity to the literature on other measures of in-laws' control over family planning and fertility, such as desired parity measured in comparison with that desired by mothers-in-law (18, 28, 35), and direct coercion or interference of in-laws in women's family planning access, initiation, or continuation (23).

However, these findings do not clarify how it affects adolescent wives. Furthermore, contradictory findings in a previous national analysis reported (36), showed that living with mothers-in-law can result in increased use of modern contraceptives and institutional delivery

among women and girls aged 15-49 years (37), perhaps due to increased social and financial support from them, but these need further clarification. However, these data are also cross-sectional, thus suggesting a further need for longitudinal studies to confirm the direction of causality.

To minimize bias from a chronological timeline back-effect, we adjusted the multivariable models for time since marriage. Although longitudinal data on adolescents' sexual and reproductive health is warranted, recent cross-sectional data gives the most up-to-date picture of current dynamics to inform policy, given that the indicators and predictors are rapidly changing. Further, there may be other markers of access to family planning services, beyond intra-family relationships, that need distinctive examination to understand the use of family planning per se, especially to understand the absence of the associations that were expected in this analysis.

For example, living with in-laws or joint family has been noted as an impactful variable in previous analyses (29, 37), but our study data lacked such a measure on co-habitation with in-laws. Another limitation of the outcome on parity is that it does not include miscarriages, stillbirths, and abortion. Further study is needed to explain the reasons behind in-laws' pressure, since girls in the current sample also reported that they were afraid their in-laws would call them barren if they didn't have a child soon after marriage. There is a need to understand girls' and couples' fertility goals with recognition that infertility concerns may need to be addressed beyond just family planning. Moreover, pressure from in-laws may be due to son-preference norms in India. Future qualitative work needs to explore son preference and whether it is changing.

To conclude, findings show that in-laws' pressure to have a child immediately after marriage is prevalent in vulnerable contexts. Married adolescent girls who experience such in-laws' pressure are more likely to report communication with their husbands on family size, and a lower parity, but we did not observe associations with having ever used contraceptives or time

until first birth. This gender and power-based family dynamic of in-laws' pressure needs to be accounted for when considering family planning and fertility decision-making. Currently, in-laws or extended family are not included in counseling in family planning programs. Not addressing in-laws' pressure as a form of in-laws' involvement in fertility decision-making may impede the goals of providing person-centered and gender-equitable care (38). Considerations of coercion have been effective in interventions (39, 40), which, given our findings, suggests that there may be value in further research on in-laws' pressure that could inform an intervention approach to pressure in general.

If in-laws prevent girls' agency and continue to be the decision-makers around family planning and fertility, given the belief that these decisions affect the entire household, then there is a need to include them in the family planning conversation during the provision of healthcare services. This is crucial for countries with patrilocal societies like India, where living in extended households is common. However, when future research simplifies the complexity in the value of in-laws' pressure for fertility outcomes, any intervention development must be context-specific and carefully designed to be rooted in improving girls' agency as the entry point, so as not to reinforce in-laws' power as decision-makers. This study shows that in-laws' pressure is an important issue for married adolescent girls, given its prevalence and associations with communication on the desired number of children and parity. However, there is a need for future research to study the causal direction between in-laws' pressure, couple communication and parity, to effectively include in-laws and family in programs.

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Chapter 4, "Association between early in marriage fertility pressure from in-laws' and family planning behaviors, among married adolescent girls in Bihar and Uttar Pradesh, India", in

full, has been submitted for publication to the journal, BMC Reproductive Health. The co-authors include Nandita Bhan, Tarik Benmarhnia, Elizabeth Reed, Susan M. Kiene, Jay Silverman, and Anita Raj. The dissertation author, Anvita Dixit, is the primary investigator and author of this paper.

Table 4.1: Sociodemographic characteristics of married adolescent girls (15-19 years) in Bihar and Uttar Pradesh, India (N=4,893).

	Total		
	Overall N (%)	**In-laws' pressure**	
		Yes, n (%)	**No, n (%)**
Age (years)			
15	117 (1.83%)	20 (1.93%)	97 (1.81%)
16	369 (5.55%)	81 (8.15%)	288 (6.18%)
17	785 (15.26%)	174 (17.25%)	611 (14.81%)
18	1,610 (32.55%)	323 (32.45%)	1,287 (32.57%)
19	2,012 (43.82%)	355 (40.22%)	1,657 (44.63%)
Education (years), mean (SD)	6.31 (0.14)	6.08 (4.68)	6.36 (4.30)
Area of Residence			
Rural	3,013 (85.31%)	622 (88.11%)	2,391 (84.68%)
Urban	1,880 (14.69%)	331 (11.89%)	1,549 (15.32%)
Religion			
Hindu	4,097 (81.66%)	826 (85.29%)	3,271 (80.84%)
Other Religions*	796 (18.34%)	127 (14.71%)	669 (19.16%)
Caste			
General	508 (12.98%)	90 (10.11%)	418 (13.63%)
SC/ST/OBC**	4,385 (87.02%)	863 (89.89%)	3,522 (86.37%)
Time since marriage (years), mean (SD)	2.18 (1.41)	2.29 (1.50)	2.14 (1.38)
Wealth quintile			
Q1 (poorest)	806 (14.56%)	170 (16.79%)	636 (14.05%)
Q2 (poorer)	937 (20.15%)	205 (20.26%)	732 (20.12%)
Q3 (middle)	1,154 (23.36%)	233 (26.88%)	919 (22.56%)
Q4 (richer)	1,233 (24.20%)	234 (22.61%)	999 (24.56%)
Q5 (richest)	765 (17.73%)	111 (13.45%)	654 (18.70%)
Total N	4,893 (100%)	953 (100%)	3,940 (100%))

*Other religions include Muslim, Christian, Buddhist, and Others.

** SC: Scheduled Caste, ST: Scheduled Tribe, OBC: Other Backward Caste

Note: Frequency and weighted proportions are reported for categorical variables. Weighted means and standard deviations are reported for continuous variables.

Table 4.2: Pressure from in-laws to have a child early in marriage by outcomes of ever having used contraception, communication about number of children, time until first birth, and parity, among married adolescent girls (15-19 years) in Bihar and Uttar Pradesh, India (N=4,893, and N=2202 for communication about number of children).

	Overall, n (%)	**Use of contraception (ever), n (%)**		**Communication about number of children, n (%)**		**Time until first birth (0-7 years), mean (SD)**	**Parity (range 0-4 births), mean (SD)**
Pressure from in-laws'	-	Yes	No	Yes	No/Don't know		
Total							
Yes	953 (18.45%)	115 (12.63%)	838 (87.37%)	612 (66.79%)	341 (33.21%)	1.70 (1.09)	0.42 (0.64)
No	3,940 (81.55%)	586 (15.89%)	3,354 (84.11%)	1,787 (44.79%)	2,153 (55.21%)	1.62 (1.00)	0.47 (0.64)
Total N	4,893 (100%)	701 (15.29%)	4,192 (84.71%)	2,765 (57.34%)	2,128 (42.66%)	2,202	4,893

Note: Frequency and weighted proportions are reported for categorical variables. Weighted means and standard deviations are reported for continuous variables.

Table 4. 3: Unadjusted and adjusted logistic and linear regression between pressure from in-laws to have a child early in marriage by outcomes of ever having used contraception, communication about number of children, time until birth, and parity, among married adolescent girls (15-19 years) in Bihar and Uttar Pradesh, India (N=4,893).

	Use of contraception (ever)		**Communication about number of children**		**Time until birth (N=2202)**		**Parity**	
In-laws' pressure to have children	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	β Coef. (95% CI)	β Coef. (95% CI)	β Coef. (95% CI)	β Coef. (95% CI)
No	ref	ref	ref	ref	ref	ref	ref	ref
Yes	0.76 (0.53, 1.11)	0.83 (0.58, 1.20)	**1.64 (1.28, 2.08)**	**1.77 (1.39, 2.26)**	0.08 (-0.09, 0.25)	-0.04 (-0.19, 0.12)	-0.05 (-0.12, 0.01)	**-0.10 (-0.17, -0.37)**

Note: Adjusted for age, education, residence, religion, caste, time since marriage, wealth quintile (combined). OR – odds ratio, CI – confidence interval, ref – reference. ORs and AORs are show for logistic regressions. β Coef. and adjusted β Coef. are shown for linear regressions.

APPENDIX

Table A4.1: Sociodemographic characteristics of the study sample among married adolescent girls (15-19 years) in **Bihar** and **Uttar Pradesh**, India (Bihar N=3,182, UP N=1,711).

	Bihar			UP		
	Overall N (%)	In-laws' pressure		Overall N (%)	In-laws' pressure	
		Yes, n (%)	No, n (%)		Yes, n (%)	No, n (%)
Age (years)						
15	93 (1.83%)	15 (1.74%)	78 (3.19%)	24 (1.24%)	5 (2.11%)	19 (1.09%)
16	280 (9.69%)	64 (8.20%)	216 (10.18%)	89 (4.68%)	17 (8.11%)	72 (4.09%)
17	578 (18.37%)	137 (18.54%)	441 (18.32%)	207 (13.40%)	37 (15.96%)	170 (12.96%)
18	1,042 (31.97%)	245 (33.48%)	797 (31.48%)	568 (32.89%)	78 (31.42%)	490 (33.14%)
19	1,189 (37.14%)	251 (38.04%)	938 (36.84%)	823 (47.78%)	104 (42.40%)	719 (48.71%)
Education (years), mean (SD)	5.63 (0.18)	5.49 (4.13)	5.67 (4.43)	6.70 (4.33)	6.62 (4.61)	6.71 (4.28)
Area of Residence						
Rural	1,871 (90.50%)	455 (92.61%)	1,416 (89.81%)	1,142 (82.23%)	167 (83.62%)	975 (81.99%)
Urban	1,311 (9.50%)	257 (7.39%)	1,054 (10.19%)	569 (17.77%)	74 (16.38%)	495 (18.01%)
Religion						
Hindu	2,746 (87.87%)	627 (88.99%)	2,119 (87.50%)	1,351 (77.97%)	199 (81.59%)	1,152 (77.35%)
Other Religions*	436 (12.13%)	85 (11.01%)	351 (12.50%)	360 (22.03%)	42 (18.41%)	318 (22.65%)
Caste						
General	256 (7.24%)	658 (94.95%)	2,268 (92.76%)	252 (16.39%)	205 (84.84%)	1,254 (83.40%)
SC/ST/OBC**	2,926 (92.76%)	54 (5.05%)	202 (7.96%)	1,459 (83.61%)	36 (15.16%)	216 (16.60%)
Time since marriage (years), mean (SD)	2.18 (1.55)	2.15 (1.29)	2.17 (1.32)	2.16 (1.31)	2.45 (1.49)	2.09 (1.57)
Wealth quintile						
Q1 (poorest)	410 (13.86%)	87 (12.69%)	323 (14.24%)	266 (13.75%)	38 (13.84%)	228 (13.73%)
Q2 (poorer)	524 (19.04%)	141 (20.78%)	383 (18.47%)	350 (21.54%)	49 (23.21%)	301 (21.25%)
Q3 (middle)	655 (22.84%)	147 (21.17%)	508 (23.39%)	414 (24.70%)	69 (28.24%)	345 (24.09%)
Q4 (richer)	805 (26.02%)	179 (29.83%)	626 (24.77%)	419 (23.97%)	57 (20.61%)	362 (24.55%)
Q5 (richest)	788 (18.24%)	158 (15.53%)	630 (19.13%)	262 (16.04%)	28 (14.10%)	234 (16.37%)
Total N	3,182 (100%)	712 (100%)	2,470 (100%)	1,711 (100%)	241 (100%)	1,470 (100%)

*Other religions include Muslim, Christian, Buddhist, and Others.
** SC: Scheduled Caste, ST: Scheduled Tribe, OBC: Other Backward Caste
Note: Frequency and weighted proportions are reported for categorical variables. Weighted means and standard deviations are reported for continuous variables.

Table A4.2: Pressure from in-laws to have a child early in marriage by outcomes of ever having used contraception, communication about number of children, time until first birth, and parity, among married adolescent girls (15-19 years) in Bihar and Uttar Pradesh state wise, India (Bihar N=3,182, and Uttar Pradesh N=1,711, 2202 for communication about number of children).

	Overall, n (%)	**Use of contraception (ever), n (%)**		**Communication about number of children, n (%)**		**Time until first birth (0-7 years), mean (SD)**	**Parity (range 0-4 births), mean (SD)**
Pressure from in-laws'	-	Yes	No	Yes	No/Don't know		
Bihar							
Yes	712 (24.67%)	70 (9.46%)	642 (90.54%)	439 (63.02%)	273 (36.98%)	1.73 (0.99)	0.50 (0.50)
No	2,470 (75.33%)	300 (11.71%)	2,170 (88.29%)	1,306 (51.09%)	1,164 (48.91%)	1.61 (1.13)	0.59 (0.69)
Total N	3,182 (100%)	370 (11.15%)	2,812 (88.85%)	1,745 (54.05%)	1,437 (45.95%)	1,593	3,128
Uttar Pradesh							
Yes	241 (14.64%)	45 (15.80%)	196 (84.20%)	173 (70.55%)	68 (29.45%)	1.65 (1.07)	0.34 (0.59)
No	1,470 (85.36%)	286 (18.08%)	1,184 (81.92%)	847 (57.36%)	623 (42.64%)	1.62 (0.92)	0.41 (0.62)
Total N	1,711 (100%)	331 (17.74%)	1,380 (82.26%)	1,020 (59.30%)	691 (40.70%)	609	1,711

Note: Frequency and weighted proportions are reported for categorical variables. Weighted means and standard deviations are reported for continuous variables.

Table A4.3: Unadjusted and adjusted logistic and linear regression between pressure from in-laws to have a child immediately after marriage by outcomes of ever having used contraception, communication about number of children, time to birth, and parity, among married adolescent girls (15-19 years) in **Bihar** (N=3,182), and **Uttar Pradesh** (N=1,711), India.

	Use of contraception (ever)		**Communication about number of children**		**Time until birth (N=1593)**		**Parity**	
In-laws' pressure to have children	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	β Coef. (95% CI)	β Coef. (95% CI)	β Coef. (95% CI)	β Coef. (95% CI)
Bihar								
No	ref	Ref	Ref	ref	ref	Ref	Ref	ref
Yes	0.78 (0.51, 1.19)	0.77 (0.51, 1.18)	1.62 **(1.17, 2.26)**	1.62 **(1.18, 2.22)**	0.12 (-0.06, 0.29)	0.3 (-0.11, 0.17)	-0.09 **(-0.17, -0.001)**	-0.16 **(-0.27, -0.06)**
Uttar Pradesh								
No	ref	Ref	Ref	ref	ref	Ref	ref	ref
Yes	0.88 (0.52, 1.50)	0.90 (0.52, 1.56)	1.77 **(1.23, 2.54)**	1.85 **(1.29, 2.65)**	0.03 (-0.27, 0.34)	-0.13 (-0.43, 0.16)	-0.07 (-0.17, 0.30)	-0.4 (-0.11, 0.30)

Note: Adjusted for age, education, residence, religion, caste, time since marriage, wealth quintiles for Bihar. OR – odds ratio, CI – confidence interval, ref – reference.

Table A4.4: Sensitivity analysis of unadjusted and adjusted multinomial regression between pressure from in-laws to have a child early in marriage and ever having used modern contraceptives, among married adolescent girls (15-19 years) in Bihar and Uttar Pradesh, India (N=4,893).

	Use of modern contraception (ever)	
Variable	Unadjusted	Adjusted
In-laws' pressure to have children	RRR (95% CI)	RRR (95% CI)
Traditional method		
No	ref	ref
Yes	0. 69 (0.41, 1.17)	0.66 (0.40, 1.10)
Modern method		
No	ref	ref
Yes	0.80 (0.52, 1.25)	0.94 (0.60, 1.46)

Table A4.5: Fear of being called barren for descriptive purposes among married adolescent girls (15-19 years) in Bihar and Uttar Pradesh combined, India (N=4,893).

Fear of being called barren by in-laws' and others	Overall, n (%)	Use of contraception (ever), n (%)		Communication about number of children, n (%)		Time until first birth (0-7 years), mean (SD)	Parity (range 0-4 births), mean (SD)
		Yes	No	Yes	No/Don't know		
No/Can't say	3,920 (81.17%)	605 (16.67%)	3,315 (83.33%)	2,142 (55.10%)	1,778 (44.90%)	1.60 (0.98)	0.50 (0.64)
Yes	973 (18.83%)	96 (9.32%)	877 (90.68%)	623 (67.02%)	350 (32.98%)	1.80 (1.18)	0.44 (0.64)
Total	4,893 (100%)	701 (84.71%)	4,192 (15.29%)	973 (18.83%)	3,920 (81.17%)	2,202	4,893

Note: Frequency and weighted proportions are reported for categorical variables. Weighted means and standard deviations are reported for continuous variables.

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CHAPTER 5: CONCLUSION

Summary of key findings

This dissertation found that women's agency at the levels of family-planning-specific agency, marital agency and family engagement agency has an impact on family planning behaviors among married young couples in rural Maharashtra, India and married adolescent girls in Bihar and Uttar Pradesh, India. Women's family planning specific agency, measured by couples' reporting of women's involvement in contraceptive-specific decision-making is associated with modern contraceptive use. Discordant 2 couples, where women report women were uninvolved but men report women were involved, have lower odds of current modern contraceptive use, compared to Concordant 1 couples, where men and women both agree that women were involved in contraceptive decision-making (Aim 1).

Assessment of marital agency using proxy variables of traditional marital practices showed that primary decision-making on who to marry was also associated with having ever used modern contraception (Aim 2). Finally, when family engagement in family planning decision-making among adolescent girls was examined through in-law pressure to have a child immediately after marriage, findings show that such engagement is associated with lower parity and couple communication about family size, but not contraceptive use or time until birth (Aim 3).

Limitations

The cross-sectional data used in this dissertation mean that the information on women's agency and family planning behaviors were collected at the same time, which is a crucial limitation. It prevents judgments of any temporal relationships between the variables of interest and, thus, it is not appropriate to adduce any causal relationships between women's agency and family planning behaviors. In Chapter 2, I made efforts in a sensitivity analysis to reduce this

bias by assessing covariate balance, using propensity scores, and found that the associations did not differ from my findings in the main analysis.

In Chapter 3, retrospective survey items were used for women's reporting of traditional marital practices at the time of their marriage, and their having ever used modern contraceptives. Finally for Chapter 4, although the cross-sectional nature of the data gave me the benefit of understanding adolescent outcomes in a fast-changing environment, where prior information on these dynamics may be outdated, I note that the counter-intuitive findings of the association of in-laws' pressure with lower parity may be due to reverse causation; it may be that the girls are experiencing in-law pressure because they actually have a lo parity. This emphasized the need for longitudinal study to uncover the effect of in-law pressure over time.

Our samples of married couples in rural Maharashtra and adolescent girls from Bihar and Uttar Pradesh are from contexts of vulnerability, where gender norms affect women's status, promote gender-based violence and limit access to good-quality family planning counseling. I highlight their contexts through detailed description of background variables and include them in the multivariable analysis. As such, the findings of women's agency and family planning behaviors may not be generalizable to all women in India or internationally. Chapter 4 is based on data that is state-representative for the states of Uttar Pradesh and Bihar. The analyses apply state-level weights and combined weights for both states to improve generalizability of the findings to the states. Additionally, the findings do have insights for research and programs in similar country contexts across LMICs. This dissertation was able to take advantage of recent data from couples enrolled in an RCT, and state-representative data on adolescent girls in some of the most gender-inequitable states of India.

Self-report is another weakness that may have led to some inaccuracies in the data. Social desirability biases may lead to an overreporting of behaviors that are more acceptable and less representative of respondents' actual behaviors. This may include use of contraceptives, men's reporting of their wife's involvement in decision-making, as well as

underreporting of child marriage and dowry practice, both of which are outlawed, and intimate-partner violence. Moreover, women in this context may live in an environment where they have internalized pronatal norms and may not be able to identify in-law pressure for children as a "pressure" in the way they define it.

Chapter 2 attempted to examine the effect of intent to use modern contraception, which may reduce a bias in reporting of contraception use. An item used in Chapter 3 asked the age at which women got married, not whether they were married as children, and about nuptial gifts given to the groom's family at the time of marriage, not whether there was a dowry given. Items on intimate partner violence are also framed to follow attitude questions about intimate partner violence in the community outside the respondent's home, and placed at the end of surveys, by which time the interviewer-respondent rapport and comfort in sharing is expected to have increased.

In community settings in India, survey data collection follows an interviewer-driven protocol where interviews are mainly carried out at the respondent's home. However, a lack of privacy from other household or community members, including children, can be difficult to maintain and may have direct bearing on the quality of data on sensitive topics like gender-based violence and contraceptive use. This means that efforts to reduce interviewer bias are continuously needed, through data collection by organizing refresher training and data-collection sharing experiences with trained researchers who monitor data collection. Permissions from community leaders, especially in rural areas, and rapport building to carry out surveys by a team of investigators are essential. These practices are increasingly being documented in research study protocols and have become part of general practice for organizations overseeing data collection in LMICs. The ICMR-National Institute of Research in Reproductive Health, and the Population Council ensured close monitoring and adherence to best survey practices for the data used in this dissertation (1-3).

Contribution to research

This dissertation adds to literature using a unique measure of contraceptive-specific decision-making in Chapter 2. Women's decision-making as a key indicator of their agency and empowerment has been studied in literature, but evidence is limited to household decision-making and is lacking on contraceptive-specific decision-making (4, 5). The analysis presented here goes further into exploring the association of contraceptive decision-making agency with specific types of contraceptive to attempt to explain whether these have an influence on women-controlled methods.

Given the emphasis on female sterilization and low use of LARC in India, insights into improving demand for LARC are much needed in family planning research for the country (6, 7). Discordant 2 couples, where women reported that they were not involved in decision-making, but men reported that women were involved, had lower odds of reporting use of condoms and IUDs, highlighting that the association is not specific to women-controlled methods but both partners have a role in terms of responsibility for men and agency for women.

Moreover, the use of couple reports that include husbands' responses on their wife's involvement in contraceptive decision-making adds to the existing knowledge of women's decision-making agency beyond what is currently known in the literature from women's reports. It provides the opportunity to understand better engagement of male partners in couples' family planning counseling services. When involving men in a way that increases their responsibility in contraceptive decision-making and use, women need to be encouraged to actively participate in decision-making, which increases their agency. There has been a sustained effort to improve couples' counseling through intervention studies with couples across LMICs (8-11). Chapter 2 provides a target for them to better meet couples' needs by involving men in a way that also enhances women's agency.

Chapter 3 examines traditional marital practices rooted in gendered social norms, which have not been quantitatively assessed for effects on family planning, beyond the effects of child

marriage. Issues of marital decision making (12, 13), dowry (14, 15), and purdah (12, 16) have come up unevenly in some health research but have not been assessed together for their implications on family planning. This chapter proposes that there may be some consequences of women's marital agency at the time of marriage and couple-making, for couples' future communication and decision-making around family planning.

I find that these practices are not always associated with contraceptive decision-making and contraceptive use, but variables such as marital choice may facilitate couples' communication around contraception and their contraceptive use.

Finally, Chapter 4 contributes to the knowledge of the involvement of in-laws as key stakeholders in couples' family planning and control over women's agency. This study adds to the knowledge on fertility pressures from mothers-in-law. The association of such pressure with couple communication on the desired number of children and parity, suggests a need to address it during family planning interventions, but in a way that improves girls' agency without reinforcing in-law control.

Directions for future research

Given that women's agency is a latent, multi-dimensional construct, its measurement in reproductive health literature has been varied. This calls for improvement in the area of women's agency measurement for family planning(17-19). Furthermore, understanding of women's operable agency by accounting for the views of key stakeholders, including husbands and in-laws is crucial in the context of India, where pronatal and patrilocal norms are prevalent and husbands and in-laws control decision-making for health. This dissertation is rooted in the Social Cognitive Theory and Empowerment Theory, which guided the selection of appropriate variables and analysis at different levels of agency, i.e., family planning agency, marital agency, and in-law engagement agency.

There is a need to have improved measures of couple constructs for decision-making and discussion around family planning (20), especially since men and women understand gender relations differently (21) (Chapter 2). While literature is growing on understanding early marriage and lack of marital choice (13, 22, 23), improved conceptualization and measurement of marital choice is needed to clarify their influence over family planning behaviors, which is still lacking in literature (Chapter 3). Furthermore, marital choice is used as a proxy for understanding social norms and social norm measures are very limited in literature(18, 24).

Chapter 4 emphasizes the need to study contextual pressures that young married women in India live with. Knowledge on in-law pressure, indicative of pronatalist norms, has increased; however, evidence has not taken into account other gender-unfriendly contextual factors, including the stigma of being called barren if they do not have children early, and contraceptive use being non-normative in their communities.

Qualitative research can explain these findings and question whether in-law pressure is due to son-preference norms, and reveal the quality of couple discussion on whether it is supportive of women's agency or stemming from couple conflict. Explanatory qualitative data can push interventions to better address couples' reproductive health needs beyond contraception use, given that infertility (being called barren) is also a concern. Findings from Paper 2 can be furthered by qualitative explanations of the perception of marital choice in the Indian context and supporting development of improved measures. Further it could also help explain the lack of association with other traditional marital practices variables of dowry and purdah.

Lastly, future research using longitudinal designs is needed to study the causal direction between women's agency (measured in terms of contraceptive decision-making, marital agency, and in-laws' engagement) and family planning behaviors (couple communication, contraceptive use, etc.) to effectively include in-laws and family in programs.

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