Published in final edited form as:

Stud Fam Plann. 2010 December ; 41(4): 263–276.

The Quality of Family Relationships and Maternal Health Care Use in India

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Abstract

Marital quality is well established as a determinant of health in Western contexts, yet the importance of relationship quality to health in non-Western contexts is largely limited to a focus on domestic violence. Using the Women's Reproductive Histories Survey, this paper examines whether women with higher quality family relationships are more likely to use maternal health care in Madhya Pradesh, India. Results show that among nuclear families, women with better marital relationships are more likely to use antenatal care and deliver in a health facility. Among joint families, women who have better relationships with their in-laws are more likely to use antenatal care. The results further suggest that women's agency mediates some, but not all, of the effect of relationship quality on maternal health care use.

Introduction

There is a large literature focused on Western countries that establishes a connection between marital quality and health. The strength of a marital relationship is associated with better health, including better self-rated health, less physical illness, and less depression (Ross et al. 1990; Umberson et al. 2006; Waite et al. 2009). Marital quality and status also benefits maternal health. In the United States and Britain, marital quality or status increases the odds of timely and adequate antenatal care, improves emotional well-being during and after pregnancy, and reduces high risk behaviors like drinking and smoking during pregnancy (Kimbrow 2008; Kiernan and Pickett 2006; MacDonald et al. 1992; Albrecht et al. 1994).

In non-Western countries, the link between family relationship quality and health is conceptualized largely through the growing literature on domestic violence. Women who experience violence in the home are significantly more likely to have poor self-reported health, suicidal thoughts, and experience other health problems (Ellsberg et al. 2008). This violence impacts maternal health because it takes place during pregnancy (Karmaliani et al. 2008; INCLIN 2000; Ahmed et al. 2006) and the health effects appear to be long lasting (Ellsberg et al. 2008). Domestic violence is also associated with adverse pregnancy outcomes, including fetal mortality and low birth weight (Jejeebhoy 1998; Ahmed et al. 2006; Bullock and McFarlane 1989). However, focusing exclusively on domestic violence conceptualizes family relationships as varying in quality from negative to neutral. Domestic violence is not well correlated with positive dimensions of relationship quality, like

satisfaction, love, and communication (Hoelter et al. 2004; Amato and Booth 1995). Thus, the category of not experiencing domestic violence cannot be used as a proxy for relationship quality overall or for positive dimensions of relationship quality. In other words, research on domestic violence does not capture the potential health benefits of high quality relationships.

Outside of the work on domestic violence, the link between family relationship quality and maternal health in non-Western contexts has been largely neglected. Two studies that draw on qualitative data suggest that family relationship quality does affect women's use of maternal health care in Pakistan (Mumtaz and Salway 2007) and India (Allendorf 2010). However, it appears that the only studies that test for a positive association between family relationship quality and maternal health care using survey data do so unintentionally. A handful of studies that explore the determinants of maternal health care include measures in their analysis that can also be conceptualized as indicators of family relationship quality. They find that social support from family and friends or spousal communication about family planning – both of which may reflect relationship quality – are associated with maternal health care use in Jamaica (McCaw-Binns et al. 1995), Turkey (Erci 2003), Nepal (Furuta and Salway 2006), and Pakistan (Mumtaz and Salway 2007). These studies provide indirect evidence for a beneficial role of relationship quality, but are limited for that purpose by a focus on other questions.

It is likely that high quality family relationships can benefit maternal health in non-Western contexts, as they do in Western contexts. Thus, it is important to establish whether similar links exist in non-Western contexts. Additionally, exploring the connection between relationship quality and health in non-Western contexts may add to our understanding of such connections because context may affect the strength and nature of these links. This study sets out to contribute to such an endeavor by examining whether women with higher quality family relationships are more likely to use maternal health care in one non-Western setting. Specifically, this study examines whether women who have higher quality relationships with their husbands and in-laws are more likely to use antenatal care and deliver in a health facility in Madhya Pradesh, India.

Contextual Background

Maternal Health Context

Worldwide, South Asia's level of maternal mortality is higher than other regions, with the exception of Sub Saharan Africa (WHO 2007). Like the broader region, India has high levels of maternal mortality with a maternal mortality ratio of 254 deaths per 100,000 live births in 2004-06 (SRS 2009). In the state of Madhya Pradesh, the maternal mortality ratio is even higher at 335 deaths per 100,000 live births (ibid). Since most life threatening complications cannot be predicted, the provision of emergency obstetric care is the most effective intervention for reducing maternal mortality (Gay et al. 2003; Maine and Rosenfeld 1999). Some kinds of emergency obstetric care, such as obstetric surgery and banked blood, are usually only available in health facilities. Skilled birth attendants can also provide some care in the home however. Skilled birth attendants also help ensure safe deliveries by recognizing danger signs and referring women to health facilities when complications arise during home

deliveries. Although, the effectiveness of such referrals is contingent upon a woman being able to travel quickly to a health facility that provides the necessary services. Antenatal care also promotes maternal health by treating women for pre-existing conditions, managing anemia through iron and folic acid supplementation, and increasing the likelihood of delivery in a health facility (Bloom et al. 1999; Villar and Bergsojo 1997).

These interventions are all promoted in policies and programs in India. The Reproductive and Child Health Programme recommends three antenatal care check-ups during pregnancy (Ministry of Health and Family Welfare [India] 2008). Check-ups are supposed to include abdominal examinations, blood pressure checks, tetanus toxoid injections, provision of iron folic acid supplementation, and counseling on nutrition, delivery preparation, and other issues (Maternal Health Division [India] 2005). The Indian National Population Policy and National Health Policy also promote emergency obstetric care, skilled delivery attendance, and referral services in the case of complications. To promote the use of maternal health care, the central government also instituted the *Janani Suraksha Yojana* program which pays women who meet certain criteria to complete three antenatal visits and deliver in a health facility (Ministry of Health and Family Welfare [India] 2005). It should be noted that this cash transfer program was not in place when the data from this study were collected however.

In India, maternal health care services are available through both the public and private sectors. Antenatal care is provided for free by the government at primary and sub health centers in rural areas and in government hospitals and urban health posts in urban areas. Alternatively, antenatal care can be purchased in the private sector through private doctors, hospitals, and other facilities. Most routine delivery care is also provided for free at government hospitals. However, government hospitals do charge for medical supplies, medicines, and non-routine procedures, such as caesarian deliveries. The indirect expenses of delivering in a hospital, including transportation and opportunity costs, can also add substantially to families' delivery costs. Private hospitals charge for all delivery services and are often beyond families' financial means.

In Madhya Pradesh, the use of maternal health care has increased over time, but is still limited in coverage and quality. The proportion of women that used antenatal care rose from half of women in 1995-99 to nearly three-quarters in 1999-2004 (IIPS 2001; IIPS et al. 2006). While the majority of women now obtain antenatal care, it is often incomplete. Only 6% of women in 1999-2004 had the recommended three or more visits, began care in the first trimester, and had two or more tetanus toxoid injections and iron and folic acid supplementation. Delivering in a health facility has also increased over time, but is less widespread (IIPS et al. 2006). The percent of deliveries that took place in a health facility rose from 22% in 1995-99 to 28% in 1999-2004 (IIPS 2001; IIPS et al. 2006). The majority of births take place at home, of which only 10% are attended by health professionals (IIPS et al. 2006).

Two barriers that discourage women from using maternal health care are the availability and cost of these services. The lack of nearby services is especially problematic in the case of home deliveries. If women experience a complication during delivery, it can take a

substantial amount of time to reach a health facility and many women are not able to do so in time (Ganatra et al. 1998). In Madhya Pradesh, specifically, 7% of women who did not deliver in a health facility said they did so because delivering in a health facility cost too much and another 4% said it was because the facility was too far away (IIPS et al. 2006). Similarly, 10% of women who did not use antenatal care said they did not use it because it cost too much and a further 10% said it was because the facility was too far away (ibid).

Family Context

In much of India, the experience of family relationship quality is shaped by the joint family system. In an archetypal joint family, an older married couple resides along with their sons, daughters-in-law, unmarried daughters, and grandchildren in a single household. The joint family system incorporates both joint and nuclear forms as family members shift over time. When examined from the life course of a woman, married life is customarily begun as a daughter-in-law in a joint family where she resides with her husband and in-laws. Over time, her joint family transitions into a nuclear family as her parents-in-law die or the family partitions. Joint families partition for a variety of reasons, including becoming too large to occupy a single home and family members migrating to other locations for work. Later in life, as her sons marry and bring their wives into the family, a woman again becomes a member of a joint family, but this time as a mother-in-law. This pattern can be seen in the survey data from Madhya Pradesh used in this study. Ninety percent of respondents began married life in a joint family, but by the time of their third pregnancy just over half of respondents resided in a joint family.

Living in a joint family can put women at odds with their in-laws, especially mothers-in-law. Mothers-in-law and daughters-in-law are often in competition for the affection, attention, and financial support of their respective son and husband. Further, when daughters-in-law enter a joint household they are expected to labor under the direction of their mother-in-law, which can further fuel discord. This pattern of conflict between daughters-in-law and mothers-in-law is often portrayed as the common experience in India (Ranbindranathan 2004; Jeffery et al. 1989). However, some mothers-in-law and daughters-in-law do build loving relationships with each other (e.g. Jeffery and Jeffery 1996; Fuller and Narasimhan 2008).

Despite the primacy of the patrilineal bond over the marital bond in the traditional joint family, and the accompanying ideal that husbands and wives should publicly avoid each other, love and other high quality aspects of marital relationships are also valued and experienced in India. In West Bengal, villagers said that love and understanding, as well as balancing wives with other family members, are important characteristics of a good marriage (Allendorf 2009). Similarly, most north Indian men interviewed by Derne (1995) said they believed in husband-wife avoidance, yet a substantial proportion forged close, loving relationships with their own wives.

It should also be noted that in India, many couples are married through arranged marriages, in which family members are primarily responsible for choosing their spouse. In arranged marriages, couples are often not expected, nor encouraged, to form loving attachments before marriage. However, as noted above, this does not mean that they do not form such

attachments after marriage. There are also indications that the emotional bond between married couples is growing in importance in India. When arranging marriages, family members increasingly take young couples' potential for companionship and emotional compatibility into account (Fuller and Narasimhan 2008). Young couples are also given greater privacy after marriage to develop marital bonds (Seymour 1999; Wadley 1994). Other qualitative studies further suggest that young people are increasingly involved in the choice of their spouses and what are locally, and somewhat inaccurately, referred to as "love marriages" are becoming more common (Mody 2007; Allendorf 2009; Netting 2009).

Theoretical Framework

Before turning to the analysis, it is important to first explain why women with higher quality relationships would be more likely to use maternal health care. The logic behind this hypothesis can be found in theory from the literature on women's agency – the ability of women to make decisions about household issues, their own mobility, and other matters – and its links to health and well-being. While the results are not entirely consistent, research on women's agency in South Asia suggests that when women have greater agency they are more likely to use maternal health care (Bloom et al. 2001; Mistry et al. 2009; Bhatia and Cleland 1995; Allendorf 2007). Similarly, research that compares the effect of women's versus men's income, finds that women's income is more strongly associated with positive health outcomes (e.g. Thomas 1990). This variation in health outcomes by women's agency and income are often attributed to differences in underlying preferences among family members. It is believed that women have a stronger preference to realize good health for themselves and their children in comparison to husbands and other family members. Thus, when women possess the power to realize their preferences, better health outcomes are the result.

I hypothesize that when family members have high quality relationships they will all prefer that the woman be in good health. In other words, if a husband or mother-in-law feels strongly about their wife or daughter-in-law it is just as important to them, as it is to the woman herself, that she experience a safe pregnancy and delivery. Thus, when bonded by high quality relationships, family members will be more likely to encourage or even force women to use maternal health care and engage in other activities that facilitate such care, such as paying for health care costs, accompanying women to health facilities, and communicating about health-related information (Allendorf 2010).

As described above, this link between family relationship quality and maternal health care use may also have important implications for the connection between women's agency and health. I hypothesize that when family members are bonded by high quality relationships they all prefer to do their best to secure women's good health. This suggests that when family members are bonded by high quality relationships it does not matter who in the household makes decisions about maternal health because their underlying preferences are the same. If given the opportunity, both the loving family member and the woman herself will choose behaviors that promote her well-being. Thus, *either* high quality family relationships *or* high levels of women's agency may be sufficient to obtain better maternal

health. In other words, women's agency may act as a moderating factor between relationship quality and maternal health care.

At the same time, women's agency may be a mediating factor. Family relationship quality is also a source of women's agency. Women who have higher quality family relationships also exercise more choice in household spending and their own mobility (Allendorf 2009). Above, I hypothesize that when family members are bonded by high quality relationships it may not matter who makes household decisions because underlying preferences are the same. However, higher levels of women's agency may make it more likely that preferences for good health are realized in reality. For example, a loving husband may prefer that his wife get antenatal care, but he may not be in the home to accompany her to health services and make sure she does so. In this case, a woman may be more likely to get antenatal care if she has more decision-making power over her own mobility and can go by herself to a health facility without seeking permission or being accompanied by a family member. Similarly, if she can make spending decisions on her own, without having to ask family members for money, it will be easier for her to pay for health services and, thus, perhaps more likely to use them. Thus, the effect of family relationship quality on maternal health may be mediated, at least in part, through women's agency. In other words, women who have stronger relationships with family members exercise greater agency, which in turn leads to greater maternal health care use.

Another moderating factor in the link between family relationship quality and maternal health are beliefs about what health behaviors are beneficial. Drawing on semi-structured interviews with families in West Bengal, I found that family members bonded by high quality relationships do their best to realize women's good health according to their beliefs about what constitutes good health practices (Allendorf 2010). Thus, high quality relationships spur people to engage in practices which they believe are beneficial, but may actually be neutral or even harmful. This suggests that high quality family relationships should only increase the likelihood of using maternal health care when family members believe that such care is beneficial. This link may be especially important because there are many in India who believe that routine antenatal care and delivering in a health facility are neither necessary nor beneficial (Bandyopadhyay and MacPherson 1998). In Madhya Pradesh, 56% of women who delivered at home said their reason for not going to a health facility was that it was not necessary and an additional 7% said their reason was that they could get better care at home (IIPS et al. 2006). Similarly, 66% of women who did not use antenatal care said their reason was that antenatal care is not necessary or customary (ibid).

Data and Methods

Data

Data for this analysis come from the 2002 Women's Reproductive Histories Survey (WRHS), a survey of 2,444 married women aged 15-39 with at least one child in Madhya Pradesh, India. Madhya Pradesh is a state with a population of 60 million located in the geographic heart of India with Uttar Pradesh to the north and Maharashtra to the south. Respondents were selected through a stratified cluster sample with a response rate of 97%. The sampling process was similar to that of the Indian National Family Health Survey

(NFHS). First, one district was selected randomly from each of the six geographic regions in Madhya Pradesh. Then, in each selected district, ten primary sampling units (PSUs) were selected by probability proportion to size sampling, with an over sample of urban areas. A household listing was then conducted in the selected PSUs and 40 households with eligible women were randomly selected from each PSU. If a selected household contained more than one eligible woman, only one was randomly chosen.

The Women's Reproductive Histories Survey was designed to collect information on women's experiences of abortion (Malhotra et al. 2003; Edmeades et al. 2010a). Thus, it focused on collecting a detailed history of women's reproductive lives, including knowledge and use of family planning and abortion and fertility preferences. Women's reproductive histories were collected using a “narrative” life-history technique, which was intended to increase the reporting of sensitive information on abortion (Edmeades et al. 2010b). This “narrative” life-history technique collected retrospective data by taking women through the story of their married lives using a chronological framework. Women were asked about the circumstances of their lives immediately after marriage, after their first pregnancy ended, and after each successive pregnancy.

Following this chronological framework, the 2,444 respondents' reproductive histories are divided into pregnancy intervals, each of which has a set of retrospective questions referring to the circumstances at the start of the interval. The first pregnancy interval begins at the time of marriage and ends at the first pregnancy. Later pregnancy intervals are demarcated by a pregnancy at the beginning and end of the interval. All analyses shown below use this pregnancy interval, rather than the respondent, as the unit of analysis. The pregnancy intervals that are included in the analytical sample are further limited to meet two criteria. First, the pregnancy interval must have ended in a birth, rather than a spontaneous or induced abortion. Second, to reduce the amount of bias due to recall error, the birth must have occurred within the fifteen years before the survey. These limitations result in an analytical sample of 7,031 pregnancy intervals that ended in a birth within the fifteen years prior to the survey.

Retrospective data are, of course, open to recall error. To reduce recall error, the chronological framework anchored the periods recalled to times just after marriage and pregnancies. Salient events in people's lives, especially those that are tied to respondents' lifestyles and self-identity, are less prone to recall error (Beckett et al. 2001). For Indian women, marriage and pregnancies are especially important events that define their lives and identities and are, thus, highly salient. So, respondents should be better able to accurately recall the circumstances of their lives just after these events compared to other periods in their lives. More broadly, studies of retrospective data in low income countries have found that the quality of long term retrospective reports is relatively high overall and especially high for salient events like those examined here (Panis and Lillard 1994; Beckett et al. 2001).

To gain further perspective on the amount of recall error present in these data, health outcomes from the WRHS were compared to comparable measures for Madhya Pradesh provided by the first and second rounds of the NFHS and the Sample Registration System.

In the interest of brevity, these analyses are not presented here, but are available in Allendorf (2009). The differences in reporting of antenatal and delivery care use between the WRHS and NFHS do not become larger as the period recalled in the WRHS becomes more distant in time, indicating that recall error is not a major problem for the WRHS health measures. The comparison does suggest, however, that antenatal care is generally underreported in the WRHS, regardless of how recent the pregnancy is. Further, the annual infant mortality rates as calculated using the retrospective data from the WRHS are extremely close to those provided by the Sample Registration System. The rates provided by the Sample Registration System are based on registration of vital events at a sample of locations in Madhya Pradesh and do not include any bias due to recall error. Thus, this result further suggests that the retrospective data are of relatively high quality.

Measures

Dependent Variables: Maternal Health Care Use—The analysis includes two measures of maternal health care use: antenatal care and delivery in a health facility, which I will refer to as a hospital delivery. Antenatal care is a dichotomous variable indicating whether the respondent had one or more antenatal check-ups with a health professional during the pregnancy. One-third of the pregnancies had antenatal care (table 1). Hospital delivery is a dichotomous variable indicating whether the delivery took place in a health facility, including a government hospital, private nursing home (hospital), or other health facility. One fifth of the deliveries took place in a health facility (table 1). This analysis does not explicitly focus on whether women had a skilled delivery attendant at the birth, but it does examine it indirectly. Only 12.9% of the births that had a skilled birth attendant took place in the home. Thus, delivering in a health facility and being attended by a skilled birth attendant have a correlation of 0.9 and yield very similar results.

Independent Variables: Family Relationship Quality—The quality of the relationship with the respondent's in-laws is an ordinal measure of the overall state of the relationship. Women were asked how their relations with their in-laws were at the start of the pregnancy interval. An immediate follow up question than asked whether they all got along well or if there were difficulties and problems at that time. Respondents could indicate that they had many, some, or very few difficulties with their in-laws. If women did not have in-laws at the time, they could also respond that the question was not applicable. Since the time reference for the question is the start of the pregnancy interval, it is anchored on the time just after marriage for the first pregnancy and, for later pregnancies, just after the end of the previous pregnancy.

The measure of the quality of the marital relationship comes from a similar set of questions asked in reference to their husband. Women were asked how relations with their husband were just after marriage or after their last pregnancy ended, whether they got along well or if there were difficulties and problems at that time. Respondents could respond that they had many, some, or very few difficulties with their husband.

Both the husband and in-law relations measures share a limitation. Ideally, testing this hypothesis requires a measure of relationship quality that can identify the best family

relationships, such as the top fifth of the distribution. However, roughly three-quarters of women said they have very few difficulties with their husband and about half said they have very few difficulties with their in-laws. Thus, these two measures do not identify the “best” quality relationships (table 1).

Independent Variables: Women's Agency—There are two measures of women's agency – an indicator of women's ability to make decisions about their own mobility and another of their ability to make decisions about spending – both of which refer to the pregnancy interval. For mobility, women were asked in reference to the beginning of the pregnancy of the interval, “What kind of restrictions did you face personally? Were you able to come and go as you pleased, or did you have to seek permission?” Response categories include 1) too many restrictions; 2) several restrictions; 3) a few restrictions; and 4) no restrictions. For spending, respondents were asked, “Were you able to spend money as you pleased, or did you have to seek permission?” The response categories included 1) only with permission; 2) usually with permission; 3) sometimes with permission; and 4) without permission.

Independent Variables: Controls—Other factors which are known to affect health care use and are also associated with family relationship quality are included as controls, including urban residence, caste, parity, the year of birth, education, and household wealth. The women's age at the birth was included in earlier models, but is not included in the final models presented here because it is highly correlated with parity and does not change the estimation of the effect of relationship quality. Religion is also not included in the final models presented here for similar reasons. All measures are based solely on the respondents' reports. Apart from household wealth, the measures of these controls are straightforwardly defined through the text provided in the tables.

Household wealth is measured by a question on how easy it was to meet household expenses at the beginning of the pregnancy interval. The ordinal measure includes four response categories, ranging from easy to difficult. This measure is a subjective measure of household wealth. So, to assess its quality, I compared the same measure of ease of meeting expenses that referred to the time of survey to a more commonly used index of household wealth. The index of household wealth was created using principle components analysis with a variety of questions on ownership of consumer durables at the time of survey. The polychoric correlation between the ease of meeting household expenses and the wealth index created by principle components analysis is 0.55. This correlation suggests that the ease of meeting expenses is an adequate, but not ideal, indicator of household wealth.

All of the variables in the analysis refer to the time of the pregnancy interval or are constant over time after marriage, with the exception of urban residence. The measure of urban residence refers to the time of survey, rather than the pregnancy interval. This mismatch in the time reference introduces error into the urban residence measure for respondents that moved between rural and urban areas between marriage and the survey. If a respondent moved, pregnancy intervals that she experienced before the move are categorized incorrectly. I used data from the second round of the NFHS in Madhya Pradesh to roughly estimate how much error this timing mismatch introduces. After they were married, 17% of the women

surveyed in the NFHS moved from an urban to rural area or vice versa. This result suggests that the amount of error in the urban residence measure is not substantial, but is not negligible either.

One variable that affects health care use, which is not included in the analysis, is the availability of health care services. The WHRS did not ask whether there is a health center in the village or how far away the nearest health facility is. The availability of health services should be partially controlled for, however, through correlations with urban residence and year of birth. Nine percent of women in urban India say that distance to a health facility is a big problem in accessing care, compared to 33% in rural areas (IIPS and ORC Macro 2007). Similarly, the percent of rural neighborhoods surveyed in the NFHS in Madhya Pradesh that had a primary or sub health center located in the village increased from 17% in 1992-93 to 24% in 1998-99 (Author's calculation). This lack of a control for the availability of health services presents a limitation. This limitation may not be too severe however. The lack of a control for health services will only affect the estimation of the affect of relationship quality on health care use if the availability of services is correlated with *both* maternal health care use and family relationship quality. Previous studies show that the availability of maternal health services does increase women's use of such services (e.g. Frankenberg et al. 2009). However, there is not a strong theoretical reason to believe that the provision of health services is correlated with high quality family relationships. This assumption is also supported by the fact that the affects of relationship quality are relatively constant when the sample is limited to urban residents, where nearly all women have access to health services (results not shown).

Methods

Multivariate logistic regression is used to test whether women with higher quality family relationships are more likely to use maternal health care when controlling for potentially confounding factors. All analyses adjust for the survey design, urban oversampling, and clustering of pregnancy intervals on the respondent using Stata's survey options. The analyses are carried out separately by family structure since the effect of the family relationship variables are likely to vary by family context. Further, interpretation of the results is enhanced by better understanding the family context in which women live.

Family structure is divided into two categories: joint and nuclear. Joint refers to intervals in which women resided with their in-laws. Due to the pattern of women beginning married life in joint families and then transitioning into nuclear families over time, pregnancies that take place within joint families are more likely to occur among younger and, thus, more educated mothers (table 1). Joint families are also wealthier on average than nuclear families and less likely to be members of scheduled castes or tribes (table 1).

The analysis for antenatal care is also carried out for a restricted sample in a limited attempt to control for beliefs about antenatal care. As described above, when women and their family members do not believe antenatal care is beneficial, higher relationship quality should not result in a greater likelihood of antenatal care use. The WHRS does provide some information on the respondents' beliefs about antenatal care. If women did not go for an antenatal check-up they were asked a follow-up question on why they had not and one

response option was that such care is unnecessary. Thus, to control for the belief that antenatal care is not necessary, the analysis for antenatal care is also carried out with a restricted sample that does not include the 1,929 pregnancies for which the respondent said the only reason that she did not get antenatal care was because it was unnecessary. Ideally, it would be best to control for all respondent's opinions about the usefulness of antenatal care and hospital delivery, as well as in-laws' and husbands' opinions, but no measures like these are available in the WRHS. It should also be noted that women who believed antenatal care is unnecessary, but still received it, are still included in the restricted sample.

Results

Family Relationship Quality and Maternal Health Care Use

The odds ratios for the logistic regression models of antenatal care appear in table 2. The tables show results for both the full and restricted samples for antenatal care. Since the restricted sample is the preferred sample, I report the results of the restricted sample in the text. The quality of relations with in-laws on antenatal care appears to differ by family structure. In joint families, the results are consistent with the hypothesis that women with high quality relationships are more likely to use antenatal care. The odds of using antenatal care are one and a half times greater if a woman has very few difficulties with her in-laws. For a woman who is average on all other characteristics in the model, this effect translates into an increase of 0.08 in the predicted probability of receiving antenatal care in a joint family – from 0.73 to 0.81 if she has very few difficulties with her in-laws compared to many or some. By contrast, in nuclear families there is no effect of in-law relations on antenatal care. The F statistic from an adjusted Wald test for the significance of in-law relations is not statistically significant. Given that women reside with their in-laws in joint families and in-laws are more likely to be decision-makers in joint families, it is not surprising that the in-law relationship would be more important among joint families. To see if this difference by family structure is statistically significant, however, I tested the significance of the interaction terms from a pooled model, where all pregnancies from both joint and nuclear families are combined, with an adjusted Wald test. The interaction of family structure and in-law relations is not significant, indicating that the effect of in-law relations does not differ significantly between joint and nuclear families (results not shown).

Similarly, the effect of the quality of the marital relationship also appears to differ by family type. In nuclear families, the effect of relations with husband follows the hypothesis that women with higher marital quality are more likely to use antenatal care. The odds of getting antenatal care are four times greater if a woman has very few difficulties with her husband compared to many difficulties. For a woman who is average on all other characteristics in the model, this odds ratio translates into an increase of 0.30 in the predicted probability of using antenatal care – from 0.50 to 0.80 in nuclear families. Among joint families, however, there is no effect of husband relations. The F statistic from an adjusted Wald test of husband relations has a p-value of 0.56. This apparent difference in the effect of husband relations by family type is marginally significant. In the pooled model, the adjusted Wald test for the significance of the interaction between relations with husband and family type has a two-tailed p-value of 0.07 (results not shown).

The odds ratios from the models of hospital delivery also appear in table 2. The quality of relations with in-laws does not appear to have an effect on hospital delivery in both joint and nuclear families. The odds ratios for very few difficulties with in-laws are 1.08 and 1.05 respectively for nuclear and joint families. According to adjusted Wald tests, the affect of in-law relations is not significant in joint families, but it is significant in nuclear families. However, this significance in nuclear families appears to be driven by the difference between women who have in-laws versus those who do not. In nuclear families, women that do not have in-laws have 1.66 greater odds of having a hospital delivery.

As with antenatal care, the results of relations with husband are mixed for hospital delivery. In nuclear families, better husband relations have a significant and positive effect on the odds of a hospital delivery. Compared to women who have many difficulties with their husbands, women who have very few or some difficulties double their odds of having a hospital delivery in nuclear families. For women who are average on all other characteristics in the model, this effect translates into a total increase of 0.12 in the predicted probability of a hospital delivery in nuclear families – from 0.13 for women who have many difficulties with their husbands to 0.25 for women who have very few difficulties. By contrast, relations with husband have no effect on hospital delivery among joint families. The F statistic from an adjusted Wald test of husband relations is not significant. This difference in the effect of husband relations by family type is significant. In the pooled model, the test of significance of the interaction of family type by husband relations has a two-tailed p-value of 0.01 (results not shown).

Moderation or Mediation?: The Role of Women's Agency

I examined whether there is a moderating connection between family relationship quality and women's agency by testing the significance of an interaction of women's agency and relationship quality. The interaction of the measures as defined above had sparse cells. So, I collapsed categories to create dichotomous measures of relationship quality and women's agency. Due to problems with multicollinearity, I tested the significance of each relationship variable and agency variable separately in models with controls. For example, I tested the interaction of husband relationship quality and mobility in a model with controls for ease of meeting household expenses, urban residence, parity, year of birth, education, and caste (but not controls for spending power or relationship quality with in-laws).

The results do not support the hypothesis that there is an interaction between women's agency and family relationship quality (results not shown). Overall, the interactions did not approach statistical significance. In a couple of cases, they are marginally significant, but would no longer approach significance if adjustments for multiple tests of significance were taken into account. Moreover, the odds ratios suggest that, if anything, the interaction between relationship quality and women's agency is one of an accelerator effect, rather than a substitution effect. In other words, the odds ratios suggest that having both good relationship quality and a high level of agency has a stronger effect than just the separate benefits of the two summed together. I hypothesized that either good relationship quality or high levels of women's agency may be sufficient by themselves to increase health care use. If this were true, having only good relationship quality, only high agency, or both good

relationship quality and high agency should all have the same sized effect on health care use. Thus, the results lack significance and suggest a pattern that, even if it was significant, is not consistent with the moderation hypothesis. This lack of support for my hypothesis of an interaction may be due in part to the limitations of the family relationship measures. As noted above, my hypothesis is about exceptionally strong and loving family relationships, but the measures are only able to compare average quality relationships to very poor relationships.

I also examined whether women's agency is a mediator of the effect of family relationship quality on maternal health care. I addressed this hypothesis by adding the two measures of women's agency as additional independent variables into the models, to see how the odds ratios for relationship quality change when agency is controlled for. The two measures of women's agency have a polychoric correlation of 0.7, which suggests that including both in a model at the same time would lead to multicollinearity. Indeed, the standard errors for the agency measures are larger in models where both measures are included simultaneously. Thus, these models do not provide the best measure of the effect of women's agency on maternal health care. However, since I am interested only in how adding agency to the model impacts the results for relationship quality, I included both measures of agency. Including both measures provides a more thorough control for agency and is, thus, a more conservative test of whether the effects of relationship quality on maternal health care persist when controlling for agency.

As shown in table 3, the results support the role of women's agency as a mediator of marital quality. When women's agency is added to the model, the effect of husband relations on antenatal care and hospital delivery in nuclear families becomes smaller and loses statistical significance. In the restricted sample, the odds ratio of accessing antenatal care for women in nuclear families with very few difficulties with their husband is reduced from 4.05 to 1.91 when agency is added to the model (table 3). Similarly, in nuclear families the odds of delivering in a hospital for women who have very few difficulties with their husband is reduced from 2.27 to 1.58 when agency is added to the model (table 3). This result suggests that most, but not quite all, of the effect of marital quality on maternal health care is due to gains in women's agency.

Women's agency is also a mediator of the effect of in-law relations on delivery care, but not to the same extent as husband relations. In-law relations had an effect on antenatal care among joint families. When agency is added to the model of antenatal care among joint families, the odds ratio for in-law relations is reduced from 1.52 to 1.41 and retains its significance (table 3). Since the odds ratio becomes closer to one, agency does appear to mediate part of the effect of in-law relations. However, in-law relations continues to have a significant effect on antenatal care even when agency is controlled and, compared to husband relations above, the odds ratio is not reduced to the same extent.

Discussion and Conclusion

These results provide support for the hypothesis that women with high quality family relationships are more likely to use maternal health care. In nuclear families, women with

very few difficulties with their husbands are more likely to use antenatal care and deliver in a health facility. In joint families, women who have better relations with their in-laws are also significantly more likely to use antenatal care. The results do not provide unmitigated support for the role of family relationship quality in determining maternal health care use however. In joint families, husband relations have no effect on antenatal care or hospital delivery. Further, the quality of in-law relations has no effect in nuclear families, nor does it affect hospital delivery in joint families. These variations reinforce the importance of family structure. Husbands' customarily have greater decision-making power in nuclear families. Thus, it makes sense that the role of husbands is more important in nuclear families. Further, to the extent that in-law relations do play a role, it is logical that that role would be more important in joint families where in-laws reside with young women and often exercise the primary decision-making power in the household.

The moderating role of beliefs about the usefulness of health care may explain the lack of consistent results for relations with in-laws. As noted above, many people believe that antenatal care and hospital deliveries are neither necessary, nor beneficial. Parents-in-law, who are older and carried out their own childbearing during periods when such health care was not common, are likely to be disproportionately among those who believe such health care is unnecessary. Thus, even when parents-in-law care very much for their daughter-in-law they may not ensure that she gets antenatal care or delivers in a health facility because they do not think such care is beneficial.

The results further suggest that the positive effect of family relationship quality on maternal health care use is mediated in part by women's agency. High quality family relationships bestow greater agency, which in turn helps women secure access to maternal health care. This mediating relationship may arise from the gap between preferences and enacting those preferences in reality. Even when both she and her family members prefer that she receive maternal health care, it may be easier in reality for a woman to actually do so if she has greater agency. For example, the greater mobility and control over money that are inherent in greater agency may make it easier on a practical level for women to use maternal health care.

More broadly, this study may help to make two contributions to the literature. The first contribution is to the literature on marital quality and health that focuses on Western countries. The Indian context illustrates how contextual differences can shape the links between health and relationship quality. Specifically, it raises the importance of family relationships beyond the marital couple, broadening the discussion from marital quality to family relationship quality. Research focused on Western countries is rooted in a nuclear family context, which leads to a focus on the marital couple. The presence of joint families, however, highlights the importance of relationships beyond the marital couple, especially those between women and their in-laws. The Indian context also raises women's agency as a mediating factor in the connection between relationship quality and health. On average, women in Western countries have greater agency than women in India and, thus, women's agency has not emerged as an important mediating factor in Western countries. In other contexts where women have low levels of agency, however, it may also play a mediating role between relationship quality and health.

The second contribution is to research on maternal health in low income countries. In the past two decades, domestic violence has gone from being a neglected public health (Heise 1994) to becoming a burgeoning field in its own right. This important work on violence illustrates how negative interactions with family members *harm* women's health. However, to date this discussion has not been accompanied by a complementary focus on the positive dimensions of family relationships. While women experience abuse at the hands of husbands and in-laws, they also experience love and understanding. Since violence is not well correlated with positive dimensions of relationship quality, it is only by looking explicitly at positive aspects that we can examine how family relationships *benefit* women's health. This study provides one illustration of how good relationships with husbands and in-laws can increase women's maternal health care use in a low income setting. It highlights that in order to fully understand how family relationships influence women's health we must take a holistic approach that examines both positive and negative aspects of relationships.

Acknowledgments

The author would like to thank Michel Guillot, Elizabeth Thomson, Myra Marx Ferree, and M. Giovanna Merli for their helpful comments. The author would also like to thank the International Center for Research on Women for kindly providing access to data from the Women's Reproductive Histories Survey. The research upon which this paper is based was supported by the National Science Foundation and a Fulbright-Hays Fellowship from the Department of Education.

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Table 1

Descriptive statistics for pregnancy intervals that ended in a birth fifteen years previous to the survey. Numbers in parentheses refer to distributions of in-law relations when intervals where women had no in-laws are not included.

	7,031 Total pregnancies %	2,249 Pregnancies in nuclear families %	4,782 Pregnancies in joint families %	Differs significantly between joint and nuclear families
Antenatal care	33.8	32.4	34.4	No
Hospital delivery	20.8	17.8	22.1	Yes
Relations with in-laws				
Many difficulties	6.3 (7.3)	1.5 (3.0)	8.4	Yes
Some difficulties	31.0 (36.4)	12.7 (24.3)	39.3	
Very few difficulties	47.9 (56.2)	38.0 (72.7)	52.3	
No in-laws	14.8 (0)	47.7 (0)	0	
Relations with husband				
Many difficulties	4.4	4.6	4.3	Yes
Some difficulties	21.9	18.1	23.6	
Very few difficulties	73.7	77.3	72.1	
Ease of meeting expenses				
Difficult	22.7	31.7	18.7	Yes
Somewhat difficult	28.8	31.1	27.8	
Neither easy nor difficult	21.2	20.0	21.7	
Easy	27.3	17.3	31.8	
Urban residence	19.5	22.0	18.4	No
Parity				
None	28.3	10.6	36.2	Yes
One	25.1	21.7	26.6	
Two	18.9	21.6	17.7	
Three or more	27.8	46.1	19.5	
Year of birth	mn:1995 sd:5.2	mn:1996 sd:5.0	mn:1995 sd:5.2	Yes
Education				
No schooling	63.6	68.2	61.6	Yes
Less than 10 years	27.3	25.5	28.1	
10 or more years	9.1	6.4	10.3	
Husband's education				
No schooling	30.7	40.3	26.5	Yes
Less than 10 years	39.3	36.5	41.0	
10 or more years	29.9	24.2	32.5	
Caste				
Scheduled caste or tribe	34.6	40.9	31.8	Yes
Other backward caste	40.4	38.1	41.4	
Other	25.1	21.1	26.8	

	7,031 Total pregnancies %	2,249 Pregnancies in nuclear families %	4,782 Pregnancies in joint families %	Differs significantly between joint and nuclear families
Mobility				
Too many restrictions	17.4	11.2	20.1	Yes
Several restrictions	19.8	14.3	22.3	
A few restrictions	39.0	40.4	38.3	
No restrictions	23.9	34.1	19.3	
Spending				
Only with permission	29.0	18.8	33.6	Yes
Usually with permission	24.0	22.4	24.7	
Sometimes with permission	26.8	31.6	24.6	
Without permission	20.2	27.2	17.1	

Table 2

Odds ratios from logistic regression models of maternal health care use by family type.

	Antenatal Care (<i>Full Sample</i>)		Antenatal Care (<i>Restricted Sample</i>)		Hospital Delivery	
	Nuclear Family n = 2,249	Joint Family n = 4,782	Nuclear Family n = 1,578	Joint Family n = 3,524	Nuclear Family n = 2,249	Joint Family n = 4,782
Relations with in-laws						
Many or some difficulties (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Very few difficulties	1.07	1.27 [†]	0.88	1.52 [*]	1.08	1.05
No in-laws	1.22	-	0.78	-	1.66 [*]	-
Relations with husband						
Many difficulties (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Some difficulties	1.49	0.50 [†]	2.45 [†]	1.01	2.45 [*]	0.78
Very few difficulties	2.33 [*]	0.90	4.05 ^{**}	1.19	2.27 [*]	0.95
Ease of meeting expenses						
Difficult (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Somewhat difficult	1.50 [*]	1.29	1.42	1.27	1.41 [†]	0.98
Neither easy nor difficult	2.22 ^{**}	1.21	2.04 [†]	1.19	1.46	0.81 [†]
Easy	3.20 ^{**}	1.68 ^{**}	3.59 ^{**}	2.15 ^{**}	2.31 ^{**}	0.96
Urban residence	6.62 ^{**}	9.32 ^{**}	9.88 ^{**}	12.21 ^{**}	6.52 ^{**}	7.80 ^{**}
Parity						
None (ref)	1.00	1.00	1.00	1.00	1.00	1.00
One	0.88	0.71 ^{**}	0.91	0.80 [*]	0.59 [*]	0.64 ^{**}
Two	0.72	0.63 ^{**}	0.82	0.79 [†]	0.52 ^{**}	0.48 ^{**}
Three or more	0.52 ^{**}	0.53 ^{**}	0.57 [†]	0.64 ^{**}	0.39 ^{**}	0.41 ^{**}
Year of birth	1.05 [*]	1.10 ^{**}	1.04	1.10 ^{**}	1.04	1.06 ^{**}
Education						
No schooling (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Less than 10 years	3.30 ^{**}	2.20 ^{**}	3.50 ^{**}	2.62 ^{**}	2.24 ^{**}	2.06 ^{**}
10 or more years	8.56 ^{**}	9.26 ^{**}	14.79 ^{**}	13.88 ^{**}	6.21 ^{**}	5.10 ^{**}

	Antenatal Care (Full Sample)			Antenatal Care (Restricted Sample)			Hospital Delivery	
	Nuclear Family n = 2,249	Joint Family n = 4,782	Nuclear Family n = 1,578	Joint Family n = 3,524	Nuclear Family n = 2,249	Joint Family n = 4,782		
Husband's education								
No schooling (ref)	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Less than 10 years	1.47	1.34	1.45	1.06	1.56 [*]	1.53		1.53
10 or more years	1.35	1.83 ^{**}	1.98 [†]	1.67 [*]	1.50	2.08 [*]		2.08 [*]
Caste								
Scheduled caste or tribe	0.58 [†]	0.80	0.67	0.67	0.46 ^{**}	0.51 ^{**}		0.51 ^{**}
Other backward caste	0.87	0.73 [†]	1.17	0.66 [*]	0.72	0.70 [*]		0.70 [*]
Other (ref)	1.00	1.00	1.00	1.00	1.00	1.00		1.00

[†]
p<0.10^{*}
p<0.05^{**}
p<0.01, two-tailed test

Table 3

Odds ratios from logistic regression models of antenatal care use and hospital delivery. All models also include controls for the ease of meeting household expenses, urban residence, parity, year of birth, education, husband's education, and caste.

	Antenatal Care (<i>Restricted Sample</i>)			Hospital Delivery		
	Nuclear Family n = 1,578	Joint Family n = 3,524	Nuclear Family n = 2,249	Joint Family n = 4,782		
Relations with in-laws						
Many or some difficulties (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Very few difficulties	0.88	1.52 [*]	1.08	1.09	1.52 [*]	0.99
No in-laws	0.78	-	1.66 [*]	1.78 [*]	-	-
Relations with husband						
Many difficulties (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Some difficulties	2.45 [†]	1.01	2.45 [*]	1.76	1.01	0.70
Very few difficulties	4.05 ^{**}	1.19	2.27 [*]	1.58	1.19	0.91
Agency in spending						
Only with permission (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Usually with permission	0.87	0.87	2.64 ^{**}	1.14		1.14
Sometimes with permission	1.28	1.39	1.84 [*]	1.27 [†]		1.27 [†]
Without permission	2.07 [†]	2.09 [*]	2.39 ^{**}	1.37 [†]		1.37 [†]
Agency in mobility						
Too many restrictions (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Several restrictions	1.59	1.77 ^{**}	0.80	0.86		0.86
A few restrictions	2.41 [*]	1.73 [*]	1.17	0.93		0.93
No restrictions	3.06 ^{**}	2.06 [*]	1.26	1.03		1.03

[†] p<0.10

^{*} p<0.05

^{**} p<0.01, two-tailed test