

**The Influence of Intrafamilial Power on Maternal Health Care in Mali:
Perspectives of Women, Men, and Mothers-in-Law**

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ABSTRACT:

Background. Research and programs have traditionally sought to understand and influence maternal health by focusing on the knowledge, attitudes and practices of recently-pregnant women. Yet, evidence from diverse settings suggests that women often have limited control over their own reproductive health decisions.

Objective. This study explores intrafamilial power dynamics and the relative influence of women, their husbands, and their mothers-in-law on maternal health care practices.

Methods. In two rural districts of central Mali, parallel surveys were administered to women, their husbands, and their mothers-in-law. Respondents were presented with eight sets of scale items assessing agreement with constructs of gender, power, and health. Logistic regression was performed to model associations with women's antenatal care frequency, antenatal care timing, place of delivery, and postnatal care.

Results. After adjusting for socio-demographic characteristics and other significant covariates, husbands' preferences and opinions were not significantly associated with any of the outcomes. In contrast, the preferences and opinions of mothers-in-law had strong effects on the maternal health behaviors of their daughters-in-law. From the perspective of the index women, constructs related to self-efficacy, perceptions of the value of women, and attitudes towards health services were independently associated with preventative and health-seeking practices.

Discussion. These results indicate that interventions focusing only on women or at the level of the couple are insufficient to advance women's reproductive health in patriarchal societies such as Mali. Future research and programmatic efforts need to address gender norms and consider the influence of other family members such as mothers-in-law.

Word count: 246

After decades of policies and programs aiming to improve reproductive health worldwide, high maternal morbidity and mortality persist in many resource-poor settings, particularly in sub-Saharan Africa.¹⁻³ The predominant approach to mitigating this problem has been to target the knowledge, attitudes, and practices of women of reproductive age, in addition to strengthening the provision of health services. While educating and designing services for women is undoubtedly important, this focus assumes that women have control over their maternal healthcare decisions. In contrast, evidence from diverse settings indicates that women often have only partial if any autonomy over their reproductive and sexual health.⁴⁻⁸ Not only do husbands have significant influence on the behavior and actions of their wives,^{7,9,10} studies have found that other household members, especially mothers-in-law (MIL), also exert control over younger women.^{5,11-13}

Maternal morbidity and mortality are largely preventable through the provision of antenatal care (ANC), institutional delivery, and timely postnatal care.^{8,14-17} Yet, in sub-Saharan Africa, fewer than 50 percent of women receive the recommended four or more ANC visits from a skilled provider, the majority deliver in the home, and few receive postnatal care.^{17,18} Contributing to this low coverage, limited access to preventative and curative services,^{8,19} inadequate health infrastructure and personnel,^{8,20,21} and inability to pay,^{8,20,21} have been recognized as formidable barriers to receipt of maternal health care. However, recent research indicates that supply side factors do not fully explain the variability in care-seeking practices;^{7,12,22} in some settings, substantial gaps in coverage remain even after controlling for the availability of services.

Accordingly, researchers and program planners have begun to appreciate the complexity of contextual influences on maternal health practices, adopting an approach that recognizes that

individual attitudes and behaviors are products of their social and cultural environments.^{23,24} Still, most studies have focused exclusively on women as the target population, aiming to understand and influence barriers and facilitators from their perspective. This narrow focus is incongruent with the sociocultural context in which women hold low status and are subject to the preferences and beliefs of their husbands and elder relatives.²⁵⁻²⁷

However, interpersonal power has proven difficult to measure, such that the power dynamics within a household and how they influence decisions on maternal health are not fully understood.^{6,28-30} In light of this gap, this paper aims to explore the link between household power dynamics and the maternal health behaviors of married women in rural Mali. Specifically, it assesses the relative influence of the preferences and beliefs of women, their husbands, and their MIL on women's ANC frequency, ANC timing, place of delivery, and receipt of postnatal care. These findings will contribute to understanding of the interpersonal and societal factors that influence maternal health behaviors, thereby informing the design of strategic programs and policies to improve the health and rights of women in resource-poor settings characterized by high maternal mortality.

BACKGROUND

Interpersonal power encompasses both “power to,” which describes the ability of an individual to complete an action or behavior, and “power over,” which refers to the ability to influence or control another person or to complete an act in the face of opposition.³¹ Both of these manifestations of power are influenced by social and normative prescriptions related to gender,³¹ and a growing body of research has shown that low female autonomy is associated with lower use of maternal health services.^{8,32-35}

A challenge to research on power dynamics, however, is the lack of a clear, operational definition of power.^{6,30} To measure its effects, researchers have defined a core set of indicators and constructs that are believed to drive or reflect power dynamics. The most basic approach is to collect data on proxy measures, analyzing the influence of characteristics that have been associated with spousal inequity such as disparities in age, education, employment, or asset sharing.²⁹ More direct measures include scales comprised of items addressing decision-making power,^{4,35-37} perceptions of gender equity,^{10,38,39} or self-efficacy.⁴⁰

However, evidence suggests that power relations are shaped by constructs at the individual, interpersonal, and societal levels,^{29,30} the effects of which cannot be fully understood in isolation. As such, researchers have increasingly begun analyzing the effects of multiple constructs and indices simultaneously. Adopting this multidimensional approach, studies have measured power through various combinations of indicators including decision-making power, control over financial resources, freedom of movement, relationship control, attitudes towards or experience of intimate partner violence, and perceived self-efficacy.^{6,12,33,41-44}

Although these studies have demonstrated that interpersonal power dynamics impact maternal health behavior, the previous approaches to measuring power have been limited in their ability to capture complex household relationships and fully explain patterns in health behaviors and outcomes. Notably, few studies have systematically assessed power from the perspectives of other key household members.

A handful of studies have included husbands, but these studies have been limited in how they measured interpersonal power. Some, for example, focused only on proxy indicators of power,^{9,29} while others measured only one construct.^{10,45} An additional common limitation is that data from male respondents was not linked to data from their female partners,^{10,32} which is

important in order to understand power dynamics and their effects at the household level. Although several studies have included MIL,^{12,13,46} these studies have not systematically analyzed MIL's power and influence to identify relevant constructs and their specific effects. Most of these studies have been qualitative, conducting interviews and focus group discussions with women, husbands, and MIL to explore the influence of the different participant groups on the maternal health practices of the younger women.^{12,13,46} Though these qualitative investigations are valuable, quantitative studies that conduct statistical modeling and analysis are needed to contribute to the understanding of the nature and implications of power relations at the household level.

Malian Context

Women in Mali are disadvantaged from a young age: educational opportunities for girls are limited,⁴⁷ harmful practices such as female genital cutting affect over 90 percent of girls and women,⁴⁸ and arranged marriage is common.²⁷ At marriage, women go to live with their husbands' family, where men have legally recognized authority.^{4,27,49} As of 2006, nearly 40 percent of marriages in Mali were polygamous.⁵⁰

Mali has one of the world's highest fertility rates (TFR 6.6), yet use of modern maternal health services is low.⁵⁰ Most women (70%) obtained at least one ANC visit during their most recent pregnancy, yet only 35 percent received the recommended four or more visits and 30 percent received their first visit within three months gestation.⁵⁰ Fewer than half of the women (45%) who gave birth in the five years preceding the 2006 DHS delivered in a health facility, and only 22 percent received postnatal care within 48 hours postpartum.⁵⁰ As a result of inadequate levels of preventative care, coupled with limited access to treatment for complications, the most

recent DHS reported a maternal mortality ratio (MMR) of 464 deaths per 100,000 live births for the period from 2000 to 2006 and an infant mortality rate (IMR) of 96 deaths per 1,000 live births for 2001 to 2006.⁵⁰ Other estimates put the MMR as high as 830 deaths per 100,000 live births and the IMR at 103 deaths per 1,000 live births.⁴⁷

METHODS

Data

This analysis uses data collected in Mali for the Projet Espoir (Project Hope) Baseline Survey (PEBS) through the collaborative efforts of CARE International, CARE Mali, and Emory University. The PEBS was conducted in June and July 2011 in Bandiagara and Bankass, two rural districts in the Mopti region of central Mali. This paper contributes to the project's larger goal of identifying and addressing underlying social determinants of poor maternal health in northern Mali. Ethical approval was obtained from the Emory University IRB and the Malian Ministry of Health IRB.

The Mopti region is rural and predominantly agricultural, with the lowest levels of education in the country. Although men and women have roughly equal educational profiles overall, recent data show that educational attainment is improving at a higher rate for men than for women among younger cohorts.⁵⁰ Gender disparities are also evident in the mean age at marriage, which is 17 among women and 27 among men.⁵⁰ On average, women give birth to their first child at age 19, and the total fertility in the region is 6.3.⁵⁰ Although two-thirds of women in Mopti received at least one ANC visit in their most recent pregnancy, only 30 percent delivered in a health facility and 15 percent received postnatal care within 48 hours of delivery.⁵⁰

The sample for the study comprised 544 randomly selected households: 275 in Bandiagara and 269 in Bankass. Criteria for inclusion in the study were that a household contained a woman who had given birth in the past twelve months (the index woman) and that her husband was also present to be interviewed. In order to capture a range of opinions and perspectives within a household, the data collectors set out to conduct separate interviews with the index woman, her husband, and her MIL. From the 544 households sampled, 544 women, 527 husbands, and 356 MIL completed the questionnaire. Ten households were dropped on account of survey responses that indicated that the woman was not currently married or that she had not given birth in the past twelve months. For this analysis, the sample was further restricted to the subset of households in which the index woman, her husband, and her MIL completed the survey, yielding a final sample of 317 households, with 3 interviews per household. The women sampled from the households in which the husband and/or MIL were not present were more likely to have married later ($p=0.005$), to be older at the time of the survey ($p=0.025$), and to be in monogamous marriages ($p<0.001$), but there were no differences in other demographic factors.

Parallel questionnaires were administered to each household member, collecting data on background information and socio-demographic characteristics, as well as responses to eight sets of scale items regarding maternal health, gender, and intrafamilial power (described below). The questionnaire administered to the index women also covered current contraceptive use, birth history, maternal health practices, and care-seeking behavior during the most recent pregnancy.

Variables

As indicators of the index women's maternal health behavior, four dichotomous outcome variables were created to measure: [1] ANC frequency (receipt of four or more ANC visits), [2] ANC timing (receipt of the first ANC visit within four months gestation), [3] delivery care with a skilled provider (delivery at a health facility), and [4] postnatal care (receipt of an examination from a skilled provider within 48 hours postpartum) in the most recent pregnancy. Skilled providers are operationally defined as nurses, midwives, physicians, and health or clinical officers.

To quantify power dynamics, the primary covariates for the analyses are a series of indices based on the eight sets of scale items shown in Table 1. The items address agreement with traditional practices in pregnancy and childbirth, the value of women, marital conduct and responsibilities, attitudes towards health services (CS-COM), perceptions of the index woman's ability to act on her reproductive health preferences (efficacy), trust and respect, overall household power, and decision-making power. Presented with each statement or question, respondents were prompted to indicate their agreement or opinion by pointing to a picture of a ladder where each rung represented a number from one (bottom rung) to ten (top rung); one indicated total disagreement or no influence and 10 represented total agreement or total influence. The items were administered to all three household respondent groups (women, husbands, and MIL) with the exception of the items concerning trust and respect, which were asked only of the index women.

[Insert Table 1]

From the questions on overall household power, a single scale was created to indicate women's view of the balance of power at the couple level by subtracting their perceptions of their own power from their perceptions of their husbands' power. For example, if the index woman perceived her power to be a four on the ladder and her husband's power to be a ten, her household power score would be a six; higher scores indicate greater power imbalances.

To reduce the data from each of the remaining sets of scale items to a single index representing the central construct, principal components analyses (PCAs) were performed separately on responses from index women, husbands, and MIL using STATA version 12.0 (StataCorp LP, 2011). From the data on household decision-making, a new set of variables was created by subtracting each respondent's rating of the decision-making power of the index woman from that of her husband. Prior to PCA, all scale items with inverse directionality to the rest of the items were reverse coded. To ensure comparability in the resulting indices across the three respondents, any item that was negatively correlated with the remainder of the items was dropped from all analyses. The final indices were built using the first factors (principal components) identified through orthogonal variance maximizing rotation. Items were assigned weights relative to their contribution to the variance of the first factor. Scale properties are presented below in Table 2.

[Insert Table 2]

In addition to these primary covariates, other measures of household and individual-level characteristics were included in the analysis. In recognition of their documented influence on fertility and reproductive health outcomes,^{3,30,31,35,51,52} data on women's parity, age at marriage,

ability to decide whom they married, and ethnicity were included as control variables. Additionally, research on polygamous unions has suggested that the rank of the wife influences her status and health.⁵³⁻⁵⁵ To account for this factor, a variable was created to represent the index woman's marital status as the only wife, the first wife, or a subsequent co-wife.

Age, educational attainment, and employment status have also been shown to influence both power and reproductive health.^{3,22,31,44,51} Yet, research on spousal power dynamics suggests that the relative difference in status between a husband and wife is more important than absolute measures.³⁰ As such, data on these three demographic indicators for women and for their husbands were combined to create variables representing the differences between husband and wife. Due to small numbers of households in which both the husband and wife were educated (n=13), a single category was created to indicate equal education, representing households in which both partners had some education and households in which both partners had no education. To be consistent, the same categorization was used for patterns of employment.

Analysis

Using STATA version 12.0 (StataCorp LP, 2011), bivariate unadjusted associations between the independent variables and each of the four dependent variables were calculated through logistic regression. An alpha of 0.10 was used as the level of significance. After checking for collinearity, all independent variables that were significantly associated with the dependent variables in the bivariate analyses were loaded into multivariable logistic regression models to generate adjusted associations.

Starting with the full models, the variables with the highest non-significant adjusted associations were removed one at a time. After dropping each variable, the beta estimates of the

remaining factors were examined to ensure that they were not substantially affected; if an adjusted beta coefficient changed by 10 percent or more, the dropped variable was re-entered into the model to control for confounding. This process was repeated for each outcome until the most parsimonious model was reached.

RESULTS

Descriptive statistics

Of the 317 households included in this analysis, slightly under half (46%) were polygamous, and the woman surveyed was the first wife in 59 percent of the polygamous unions. Regardless of the type of union, women in the sample married young (mean age at marriage 17) and only around half (55%) had a say in whom they married (Table 3). Most women had already delivered one or more children at the time of the most recent birth, averaging 2.9 prior births per woman. Slightly under one third of the sample (33%) had experienced the death of a child in the first 12 months of life.

[Insert Table 3]

At the time of the survey, the mean age of the index women was 25.2 years, while the mean age of their husbands was 36.5 years; among the 175 couples in which both partners knew their age, husbands were on average 10 years older than their wives. Educational attainment was low for both men and women, and in the vast majority of couples (88%), the husband and wife had equal education. In contrast, employment was far more prevalent among husbands; in one

third of the couples (33%), the husband generated income but the wife did not, whereas women were the sole generators of income in only 14 percent of the couples.

The levels of maternal health care reported by the index women for their most recent pregnancy were low. Only 27 percent of women reported receipt of four or more ANC visits and 34 percent reported receipt of the first visit within four months gestation. Similarly, 22 percent of women delivered in an institution and nearly one fourth (24%) received postnatal care from a skilled provider within 48 hours postpartum.

ANC frequency

After adjusting for all four variables that were significantly associated with ANC frequency in the unadjusted analysis, the index women's age at first marriage and parity, as well as MIL's perceptions of the efficacy of their daughters-in-law remained significant (Table 4). As age at marriage increased, the odds of receiving four or more ANC visits dropped off to the point of being 95 percent lower among women who married after age 20 relative to those who married before age 16 (OR 0.05). Additionally, the adjusted odds of frequent ANC increased with the number of live births, peaking among women for whom the most recent birth was their fourth or fifth (OR 5.22). Adding in the perspective of MIL, women whose MIL considered them to have higher personal efficacy were significantly more likely to obtain four or more ANC visits (OR 1.34).

[Insert Table 4]

ANC timing

The adjusted odds of receiving the first ANC visit within four months gestation were influenced only by spousal educational attainment, women's perceptions of the value of women,

and women's attitudes towards the CS-COM (Table 5). Relative to couples in which the wife was educated and the husband was not, the odds of receiving early ANC were four times higher among couples with equal educational attainment (OR 4.10). Women who perceived the value of women to be low also had higher adjusted odds of early ANC (OR 1.45), as did women who expressed positive attitudes towards the CS-COM (OR 1.54).

[Insert Table 5]

Institutional delivery

As shown in Table 6, a total of four factors were independently associated with institutional delivery. Even after adjusting for other variables, women who did not themselves earn any income but whose husbands did had 60 percent lower odds of delivering in an institution compared to women who earned income and whose husbands did not (OR 0.40). From among the indices, having a MIL who strongly agreed with traditional and cultural practices surrounding pregnancy and childbirth was associated with lower adjusted odds of institutional delivery (OR 0.70). On the other hand, the odds of institutional delivery were higher among women whose MIL viewed their sons to have higher decision-making power than their daughters-in-law (OR 1.64). The strongest predictor of institutional delivery, however, was the index women's perception of their self-efficacy, which was positively associated with delivering in an institution (OR 1.82).

[Insert Table 6]

Postnatal care

As with institutional delivery, the opinions and perspectives of MIL emerged as strong predictors of postnatal care. MIL's higher agreement with traditional practices was significantly associated with lower adjusted odds of their daughters-in-law receiving postnatal care (OR 0.70), while their belief that their sons had more decision-making power than their daughters-in-law was associated with an increased odds of postnatal care (OR 1.39). From the perspective of the index women, more positive attitudes towards the CS-COM and higher perceived self-efficacy were associated with higher odds of postnatal care (OR 1.40) and OR 1.56, respectively).

[Insert Table 7]

DISCUSSION

By collecting parallel data from women, their husbands and their MIL, this study provided rich contextual insights into the layers of influence that shape maternal health in rural Mali. The results of the analyses indicate that the relevant factors and constructs vary considerably across the four maternal health indicators, though patterns in the associations hint at the underlying mechanisms and processes that drive power dynamics within a family. Among this sample of women in Mali, the role of MIL in determining patterns of reproductive health was significant, suggesting a need for targeting of research and programmatic efforts towards the attitudes and knowledge of MIL.

In particular, the influence of MIL's agreement with traditional and cultural practices on the place of delivery and postnatal care of the index women suggests that the decision on whether to seek modern, institutional healthcare falls – at least in part – under the domain of the

MIL. The women's own opinions regarding these practices had no bearing on the care they received. MIL who adhere to and believe in the efficacy of these practices may see institutional care as unnecessary or even detrimental, such that they discourage their daughters-in-law from seeking care from trained providers. In forming these beliefs and opinions, MIL may be drawing on their own maternal health care experiences: if they did not receive modern health care, they may be unlikely to view it as important for their daughter-in-law.

While MIL have some direct power over maternal health decisions, the models also revealed that MIL's perception of the balance of decision-making power between their sons and daughters-in-law is an influential factor on women's delivery and postnatal care. From the PCA, the items that were found to weigh most heavily in the index of decision-making power addressed issues such as whether to circumcise a girl, where to give birth, and how many children to have. Women whose MIL reported that their sons had more control over these decisions than did their daughters-in-law were more likely to deliver in institutions and to obtain timely postnatal care. These results are unexpected and indicate the complexity of the decision-making processes. One possible explanation is that MIL who consider questions of fertility and childbirth to be men's decisions may be less likely to intervene and impose their own views. In contrast, MIL who perceive these issues to be more in women's domain may assert their dominance as the women of higher status and insist on a more traditional delivery. This interpretation assumes that the husbands are more accepting of modern, institutional healthcare than their mothers, however, and merits further investigation.

A third construct from the perspective of MIL that was found to shape women's health-seeking was the perception of the daughter-in-law's self-efficacy. The presence of a MIL who supports and believes in the personal efficacy of her daughter-in-law may indicate more

equitable gender norms in the household and greater trust and communication between the women. In turn, women's perception of their own personal efficacy was found to have strong effects on their maternal health behaviors: women who viewed themselves as having higher self-efficacy were more likely to deliver in an institution and obtain postnatal care. The importance of self-efficacy has been noted in other studies, which have shown that having confidence in one's personal agency is positively associated with adoption of preventative health behaviors.^{40,43} Promoting self-efficacy entails reducing perceived barriers and teaching skills; for example, programs that encourage participants to practice partner communication and to discuss and challenge problematic attitudes and norms have been shown to increase self-efficacy and promote behavior change.⁵⁶ Furthermore, programs addressing these gender and power dynamics among women currently of reproductive age have the potential to shift attitudes and norms regarding roles and decisions in the household, thus improving the experiences of future generations of women.

A surprising finding was that women who reported stronger agreement with statements asserting a low status of women were more likely to obtain early ANC. In the patriarchal social context of Malian society, it is possible that women who express agreement with the notion that women should be obedient are more likely to be young co-wives in arranged marriages, wherein having a successful birth is paramount and highly valued by the spouses' family. If ANC is perceived as a means of ensuring a healthy birth, husbands and other family members may facilitate early care-seeking. Alternatively, women themselves may see ANC as a means to having a successful birth, thereby conforming to what is expected of them in fulfilling their role as women.³¹ Further research exploring the link between maternal health behavior and women's

perception of the value of women is needed to validate and better understand this unexpected association.

Women's attitudes towards the health center (CS-COM) also influenced their maternal health care. Although attitudes towards the CS-COM are not necessarily indicative of power dynamics, the fact that women's opinions influenced service utilization even after adjusting for all other factors suggests that women had some agency over their personal health care. In recognition of this association, health centers should focus on improving the quality of services, and more importantly, making women aware of the range and quality of services available to them. Investment in quality will require more than obtaining better equipment and stocking supplies; the items that were central to the index through the PCA dealt with perceptions of how women are treated at the facilities, the overall service quality, and the information that is provided. This is consistent with findings from a variety of settings that indicate that disrespect and abuse at health facilities influence health-seeking behavior.^{32,59-62}

Together, these findings point to the need for interventions that target a range of stakeholders at multiple levels. This study highlighted that decisions regarding maternal health care are not made at the individual or the dyadic level; the values and opinions of other family members and the broader social and cultural context play an influential role. Informed by these results, CARE USA and CARE Mali have developed a package of interventions including: couple counseling on prenatal care and birth planning, development of male-friendly services for prenatal care and delivery to encourage male engagement, and extended family meetings in order to involve other decision makers such as MIL or brothers-in-law in planning for pregnancy care and delivery. Community action groups have also been formed to reinforce the acceptability of shifting social norms and to increase community responsibility for the health of pregnant

women. By intervening at multiple levels within the community, this suite of interventions aims to tackle the prevailing social and cultural norms that negatively influence maternal health behaviors and outcomes, complementing more traditional service-strengthening interventions in the health facilities.

Limitations

This study has several limitations. First, this analysis lacked the ability to determine causality due to the cross-sectional design of the study. Second, all data were based on self-report, introducing possible recall or social desirability biases. Additionally, the households included for this analysis represents a subset of the original sample. Because a primary focus of this study was to explore the influence of other family members, the restriction to households in which a MIL completed the survey was necessary. Studies that allow for comparisons in power dynamics between households with and without MIL and that explore the influence of other household members would be useful to help clarify these patterns.

Because of sample size limitations, the finding that women who married later were less likely to obtain four or more antenatal visits should be interpreted with caution. This finding seems to contradict previously observed patterns that suggest that higher age at marriage grants women more time to obtain education,³¹ which confers greater social support, negotiation skills, and appreciation for the importance of reproductive health services.^{29,31} However, the small number of women in our sample who married at older ages limits the reliability of this estimate.

Also of note, the measure of postnatal care within 48 hours of delivery may not reflect any purposive health-seeking; women who delivered in an institution likely received – or assumed that they received – a postpartum checkup by default. Future studies should develop

alternative measures of postnatal care that more accurately capture an element of agency in postpartum care seeking.

Finally, the small number of items related to each construct limited the internal consistency of the indices, as reflected by low Cronbach's alpha reliability coefficients. Subsequent studies should incorporate cognitive interviewing and in-depth qualitative research to inform the development of scale items and definitions, identify more items for inclusion, and systematically validate the scales to test that they truly capture relevant constructs. Finally, this exploratory analysis focused solely on individual and household variables; it did not control for community-level factors that have been found to be significantly associated with reproductive health indicators in other studies. These community factors include accessibility of health facilities,^{8,15,57} exposure to mass media,^{9,35,44,51} average educational attainment in the community,^{8,36} and community norms.³⁶ Future research should assess the combined effects at all three levels.

CONCLUSION

Although Mali has a strong patriarchal society, it seems that women—older women in particular—exert control over maternal health decisions. In this analysis, the husbands' perspectives and opinions did not emerge as independent predictors in any of the final models. This finding contradicts previous studies that have reported that husbands' opinions and attitudes influence fertility and childbearing.^{4,7,10,35,58} Most of these past studies, however, did not measure multiple complex constructs of power and few considered the effects of MIL and husbands together. The present analyses suggest that the influence of MIL may overshadow the role of men in maternal health decision-making in some societies.

The slow progress in sub-Saharan Africa towards the goal of reducing maternal morbidity and mortality suggests a need for programs and policies that recognize the influence of factors at the family, societal, and cultural levels. Particularly in patriarchal societies with low gender equity, intrafamilial power dynamics need to be addressed. This study contributes to existing literature in revealing that women in Mali do not have independent control over their own maternal health decisions; social norms, gender scripts, and intrafamilial hierarchies impede preventative and health-seeking behaviors. However, experience has shown that neither gender constructs nor family dynamics are static.^{30,59} Given the profound implications for health and rights, there is a critical need for well-designed, evidence-based interventions to achieve a more equitable balance of power within households and at the community level.

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WORD COUNT: 5,130

Table 1. Scale items included in the indices

Agreement with traditional and cultural practices: *I would like to ask you about some things that might happen to a pregnant woman. For each statement, I would like you to indicate how much you agree with it.*

- For a week after she has given birth, a woman should be given hot food only
- A woman can use traditional herbs as an enema during pregnancy to relieve constipation
- The baby should not be breastfed until all of the colostrum has been removed
- A woman must obey her husband during pregnancy to make sure she has an easy delivery
- A woman should not bathe after sunset

Value of women: *I'm going to read you some statements and for each one I'd like you to tell me whether you agree or disagree with it.*

- Women have the least say in household decisions
- Women cannot make household decisions alone
- It is more important to have sons than daughters
- If a woman dies in childbirth, she can be replaced by the family with another woman
- Women should not be allowed to decide who they marry
- A woman should not start her own economic activities without the consent of her in-laws

Marital conduct and responsibility: *I am going to read some statements about how married men and women may act with each other. For each of these statements, I would like you to indicate how much you agree with it*

- It's a woman's responsibility to avoid getting pregnant
- A man can hit his wife if she refuses to have sex with him
- A man can hit his wife if she refuses to have sex with him during pregnancy
- A man should have the final word about decisions in his home
- A man needs other women even if things with his wife are fine

Attitudes towards the health facility (CS-COM): *I'm going to read you some statements about your local health services and for each one I would like you to tell me whether you agree or disagree with it.*

- The CS-COM provides high quality services
- The staff at the CS-COM are friendly and respect me (the index woman)
- The staff at the CS-COM give me(the index woman) all the information I(he) needs for my(her) wellbeing
- The CS-COM has the equipment needed to provide good care for me(the index woman) in childbirth
- The CS-COM is the safest place for me (the index woman) to deliver her baby
- I (the index woman)am(is) able to get to the CS-COM for delivery if I(he) need(s) to
- The cost of services at the CS-COM is acceptable in relation to the benefits

Perceived efficacy of the index women: *I'm going to read you some statements about how you feel about how you (the index woman) can act and what others may expect of you (her) and for each one I would like you to tell me the extent to which you agree or disagree with it.*

- If I(he) wanted to, I (the index woman) could decide to have only two children
- If I(he) wanted to, I(the index woman) could deliver her baby in a CS-COM
- If I(he) wanted to, I(the index woman) could go to a health center alone

Household power: *I'm going to ask you about the people who live in your household. For each person I would like you to point to how much power you think they have*

- Your husband/self/son *(for index women, husbands, and mothers-in-law, respectively)
- Yourself *(for index women. Husbands and mothers-in-law were asked to rank the power of the first co-wife and other co-wives separately; the data did not allow for distinguishing which responses referred to the index women)

Household decision-making power: *I'm going to read you some decisions that might be made in a family and then list some family members: for each decision I would like you to tell me how much influence that person has for that decision.*

- Decision on how many children to have
- Decision on whether to circumcise a girl
- Decision on where a woman should give birth
- Decision to seek modern healthcare during pregnancy
- Decision on whether to sell the family's animals

Perceptions of household trust and respect (index women only): *I'm going to read you some statements about how you feel about your household and for each one I would like you to tell me whether you agree or disagree with it.*

- I feel my husband trusts me
 - I feel my mother-in-law respects me
 - I feel I am an important member of this family
 - I trust my husband to help me if I need help
 - I trust my mother-in-law to help me if I need help
-

Table 2. Proportion of variance explained by the 1st principal component and Cronbach's alpha reliability coefficient by index and respondent type

	Women		Husbands		Mothers-in-law	
	Proportion of variance explained	Cronbach's Alpha	Proportion of variance explained	Cronbach's Alpha	Proportion of variance explained	Cronbach's Alpha
Agreement with traditional and cultural practices	0.266	0.352	0.261	0.245	0.241	0.323
Value of women	0.362	0.608	0.298	0.524	0.346	0.597
Marital conduct and responsibility	0.278	0.294	0.286	0.301	0.267	0.335
Attitudes towards the health facility	0.317	0.672	0.299	0.681	0.313	0.706
Perceived efficacy of the index women	0.548	0.582	0.451	0.373	0.501	0.501
Difference in perceived decision-making power between husband and wife	0.318	0.397	0.307	0.358	0.301	0.425
Perceptions of household trust and respect*	0.515	0.762	N/A	N/A	N/A	N/A

*Denotes indices that were developed based on women's perceptions only

Table 3. Descriptive Statistics for Select Sample Characteristics (N=317)

	Frequency (%)
CHARACTERISTICS OF THE INDEX WOMAN	
Ethnicity	
Dogon	257 (81.07%)
Peulh	32 (10.09%)
Other	28 (8.83%)
Age at first marriage	
≤ 15	64 (20.19%)
16 to 19	106 (33.44%)
≥ 20	22 (6.94%)
Don't Know	125 (39.43%)
Had a say in who to marry	
No	142 (44.79%)
Yes	175 (55.21%)
Marital status	
Only wife	171 (53.94%)
First wife	86 (27.13%)
Other wife	60 (18.93%)
Parity	
1	40 (12.62%)
2 to 3	124 (39.12%)
4 to 5	76 (23.97%)
≥ 6	77 (24.29%)
Child death in the first year of life	
No	214 (67.51%)
Yes	103 (32.49%)
Prevalence of maternal health care seeking at most recent birth	
Received four or more antenatal visits	87 (27.44%)
Received the first antenatal visit within four months	108 (34.07%)
Delivered in an institution	71 (22.40%)
Received postnatal care within 48 hours postpartum from a skilled provider	75 (23.66%)
CHARACTERISTICS OF THE SPOUSAL UNIT (N=317)	
Age discrepancy (husband's age minus wife's age)	
-5 to 9	89 (28.08%)
>10	86 (27.13%)
Don't know	142 (44.79%)
Education discrepancy	
Wife educated, husband not	21 (6.62%)
Equal educational attainment	264 (83.28%)
Husband works, wife doesn't	32 (10.09%)
Difference in employment status	
Wife works, husband doesn't	45 (14.20%)
Equal employment status	168 (53.00%)
Husband works, wife doesn't	104 (32.81%)

Table 4. Adjusted odds of receiving four or more antenatal visits (N=317 households)

	Odds Ratio (95% CI)
Age at first marriage	
≤ 15	1.00 (reference)
16 – 19	0.42 (0.21, 0.81)**
≥ 20	0.05 (0.01, 0.38)**
Don't Know	0.21 (0.11, 0.42)**
Parity	
1	1.00 (reference)
2 – 3	3.31 (1.15, 9.53)**
4 – 5	5.22 (1.73, 15.71)**
≥ 6	2.63 (0.85, 8.15) [†]
Mothers-in-law's perceptions of the efficacy of their daughters-in-law	1.34 (1.02, 1.76)**

** $p < 0.05$, [†] $p < 0.10$

Table 5. Adjusted odds of receiving the first antenatal visit within four months gestation (N=317 households)

	Odds Ratio (95% CI)
Education discrepancy	
Wife some husband none	1.00 (reference)
Equal educational attainment	4.10 (1.15, 14.62)**
Husband some wife none	2.55 (0.58, 11.21)
Value of women	
Women	1.45 (1.12, 1.89)**
Mothers-in-law	1.17 (0.90, 1.51)
Attitudes Towards Health Center (CS-COM)	
Women	1.54 (1.17, 2.01)**
Husbands	1.17 (0.90, 1.52)

** $p < 0.05$, † $p < 0.10$

Table 6. Adjusted odds of delivering in an institution (N=317 households)

	Odds Ratio (95% CI)
Age at first marriage	
≤ 15	1.00 (reference)
16 – 19	1.13 (0.53, 2.41)
≥ 20	0.35 (0.10, 1.49)
Don't Know	0.50 (0.22, 1.11) [†]
Marital status	
Only wife	1.00 (reference)
First wife	0.59 (0.29, 1.22)
Other wife	1.41 (0.68, 2.94)
Difference in employment status	
Wife works, husband doesn't	1.00 (reference)
Equal employment status	0.66 (0.30, 1.47)
Husband works, wife doesn't	0.40 (0.16, 0.98)**
Mothers-in-law's agreement with traditional and cultural practices	0.70 (0.52, 0.94)**
Index women's perceived self-efficacy	1.82 (1.31, 2.54)**
Mothers-in-law's perceptions of the difference in decision-making power between their sons and daughters-in-law	1.64 (1.18, 2.26)**

** $p < 0.05$, [†] $p < 0.10$

Table 7. Adjusted odds of receiving postnatal care from a skilled provider within 48 hours postpartum (N=317)

	Odds Ratio (95% CI)
Age at first marriage	
≤ 15	1.00 (reference)
16 – 19	1.00 (0.48, 2.07)
≥ 20	0.86 (0.26, 2.80)
Don't Know	0.50 (0.20, 1.25)
Age discrepancy (husband's age minus wife's age)	
-5 to 9	1.00 (reference)
≥ 10	1.31 (0.65, 2.65)
Don't know	0.81 (0.35, 1.87)
Difference in employment status	
Wife works, husband doesn't	1.00 (reference)
Equal employment status	0.84 (0.38, 1.86)
Husband works, wife doesn't	0.46 (0.19, 1.10) [†]
Mothers-in-laws agreement with traditional and cultural Practices	
	0.70 (0.52, 0.93)**
Index women's attitudes towards the health center (CS-COM)	
	1.40 (1.03, 1.90)**
Perceived efficacy of the index women	
Women	1.56 (1.14, 2.15)**
Husbands	1.18 (0.87, 1.61)
Mothers-in-law's perceptions of the difference in decision-making power between their sons and daughters-in-law	
	1.39 (1.02, 1.89)**

** $p < 0.05$, [†] $p < 0.10$

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