

Both Individual and Community Factors Influence Whether Women in Rural Mali Receive Maternal Care

In rural Mali, where few women obtain maternal health care, use of prenatal and delivery services is influenced by both individual and community factors, according to a cross-sectional study of women who had recently given birth.¹ The odds of receiving prenatal care in the first trimester, four or more prenatal visits, attended delivery and institutional delivery are all negatively related to the number of personal barriers to care and positively related to the level of household wealth, whereas women's odds of receiving care are elevated if their neighbors have medium or high levels of use of prenatal care. Overall, although factors associated with types of care vary, individual factors explain more of the variation in receipt of care than do community factors.

The study used data from the 2001 Mali Demographic and Health Survey on rural women aged 15–49 who had had a live birth in the preceding five years. Characteristics of the women's communities were obtained from the DHS community and household questionnaires; characteristics of the women themselves, including prenatal and delivery care for their most recent live birth, were obtained from the women's questionnaire.

Analyses were based on 6,178 live births to women living in 264 rural communities. Overall, 15% of the births had benefited from prenatal care in the first trimester; 22%, from four or more prenatal visits; 29%, from attendance by a trained medical provider; and 26%, from delivery in a medical facility.

The births took place in communities that had, on average, only one medical facility within five kilometers; only a tenth occurred within five kilometers of a facility offering emergency obstetric care. For seven in 10, there was no emergency auto transportation available and the nearest public transportation was at least 15 minutes away. Nearly four in 10 births occurred at least 10 kilometers from the nearest source of prenatal care or delivery care. One-half took place in communities where the level of education was low; one-seventh, in communities with a high proportion of poor households; and more than one-third, in commu-

nities with low uptake of prenatal care.

Fully 90% of births were to women who did not have any education. The current birth was their fifth, on average. More than eight in 10 women were long-term residents, having lived in their community for at least five years. Half had not received any prenatal care, slightly more than a third had received care but were not counseled about pregnancy complications, and the rest received care with counseling.

In bivariate analyses, personal barriers had a consistent relationship to receipt of medical care. Regardless of the barrier—whether it was not knowing where to go for care, having to get permission to go, difficulty obtaining money for treatment, distance to a medical facility, finding transportation, not wanting to go alone or concern about not being able to have a female provider—women who reported that the barrier was a “big problem” were significantly less likely to have received each of the four types of maternal health care than were their counterparts who reported that the barrier was “no problem.”

In terms of community factors, multivariate analyses showed that women's odds of receiving prenatal care in the first trimester rose with the number of health facilities within five kilometers (odds ratio, 1.1) and were higher in communities having a medium or high level of prenatal care uptake rather than a low level (2.5–3.9). Women's odds of receiving at least four prenatal visits were elevated if the nearest public transportation was less than 15 minutes away instead of more (1.4) and if their neighbors' uptake of prenatal care was medium or high rather than low (3.5–6.3); the odds were reduced if their community had a high rather than low level of education (0.4) and a medium rather than low percentage of women of the same ethnicity (0.7).

Women's odds of having a delivery attended by trained medical personnel were elevated if their neighbors' uptake of prenatal care was medium or high (odds ratio, 1.8–5.4); the odds were reduced if the nearest source of delivery care was 1–29 kilometers away instead of within the community (0.3–0.5). Finally,

women were more likely to deliver in a medical facility if their neighbors' uptake of prenatal care was medium or high (1.8–8.4), whereas they were less likely to do so if the nearest source of delivery care was 5–29 kilometers away (0.4–0.5).

In terms of individual-level factors, multivariate analyses showed that women's odds of obtaining prenatal care in the first trimester and their odds of making four or more prenatal visits were positively associated with household wealth (odds ratios, 1.4 and 1.5, respectively), but negatively associated with the number of personal barriers to receiving medical care (0.9 each). The odds were elevated if women had any education instead of none (1.6 and 1.5) and if they were short-term residents and had previously lived in an urban area, as compared with short-term residents who had previously lived in a rural area (1.6 and 1.9). For prenatal care in the first trimester, the odds were negatively associated with the number of children in their household younger than five (0.9) and with birth order (0.9).

Women's odds of having a delivery attended by trained medical personnel rose with household wealth (odds ratio, 1.6); they were elevated if the women were short-term residents and had previously lived in an urban area (2.0), and if they had received prenatal care along with counseling about pregnancy complications, as compared with prenatal care without counseling (1.4). However, the odds were negatively associated with number of personal barriers to medical care (0.9) and were reduced if women had not received any prenatal care (0.2). The same factors were associated with the odds of having an institutional delivery.

Final analyses looked at how well the measured factors explained why women's odds of receiving maternal health care differed. Individual factors explained a larger proportion of the variation than community factors across all four measures of maternal health care use; however, the contribution of individual factors was greater for prenatal care in the first trimester (ratio of community-level variance

to total variance, 0.1) and for four or more prenatal visits (0.2) than for delivery attendance by a trained medical provider (0.4) or delivery in a medical facility (0.4). Even after individual and community factors were taken into account, differences in use between communities remained significant, suggesting that unmeasured factors were also at play.

The author suggests that possible strategies for increasing use of maternal health care in this population might include improving public transportation, adding more medical facilities, encouraging women living in remote areas to move closer to medical facilities when their due date approaches, ensuring that the poor

have access to health care, empowering women socially and economically, teaching maternal health in schools and adult programs, and engaging women's partners and families in discussions about appropriate care during pregnancy and delivery. "As barriers to the utilization of maternal health services are multilevel, comprehensive (and multisectoral) programs are needed in rural communities..." she concludes.—S. London

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In India, Visual Inspection of the Cervix Provides A Viable Alternative to Pap and HPV Tests

Visual inspection of the cervix following application of acetic acid is an effective method of reducing the incidence of and mortality from cervical cancer in developing countries, according to findings from a randomized trial conducted in Tamil Nadu, India.¹ During up to seven years of follow-up, the incidence of cervical cancer was reduced by 25% among women who lived in areas where visual inspection was offered, and mortality from the disease was reduced by 35%, compared with the incidence and mortality in areas without screening. The benefits of screening were especially great for women aged 30–39.

Although the Pap smear and, to an increasing extent, testing for the human papillomavirus (HPV) are the gold standards for screening for cervical cancer and its precursor lesions, these approaches are difficult to implement in developing countries. Visual inspection—even when performed only once in a woman's lifetime—may be an acceptable alternative, but its effectiveness in real-world settings had not been adequately assessed.

In the new trial, researchers randomly chose 57 municipal units in Dindigul, Tamil Nadu, as sites for a visual inspection intervention. All healthy women aged 30–59 in these areas who had an intact uterus and no history of cervical cancer were interviewed, educated about cervical cancer and given a printed invitation to attend an upcoming screening. At the screening clinics, specially trained nurses examined each woman's cervix after applying 4% acetic acid; women who had well-defined lesions or cervical growths upon inspection were offered

immediate colposcopy and, if appropriate, biopsy, followed by cryotherapy to remove any precancerous lesions. Women with suspected invasive cancer were referred for treatment. The vast majority of screenings were performed in 2000–2003, although a small fraction were performed later.

To serve as a comparison group, women in 56 other randomly selected municipal units (authorities in a 57th area did not wish to participate) were interviewed and educated about cervical cancer but were not screened; instead, they were given information about relevant government and private sector services and encouraged to use those facilities. The researchers note that the use of an unscreened control group was ethically appropriate because organized screening programs do not currently exist in India; in fact, only two women in the study had ever undergone cervical cancer screening.

To determine cervical cancer incidence and mortality in the intervention and control groups, staff at the Dindigul cancer registry, who were blinded to each woman's intervention status, examined records from hospitals, clinics and pathology laboratories in Dindigul and nine surrounding districts (where cancer patients from Dindigul would likely have been treated); they and other project workers also visited municipal death registration offices, death registries at churches and mosques, and households to collect information about deaths and migrations. Women who had died from cervical cancer were categorized as having lived in an intervention area, a control area or else-

where (i.e., an area not involved in the study).

In total, 49,311 women in the intervention group and 30,958 women in the control group were interviewed. Nearly two-thirds (64%) of women in the intervention group attended a screening, of whom 10% had suspected lesions. Low-grade lesions were diagnosed in 5% of those screened, and high-grade lesions were diagnosed in 1%; sixty-seven women (0.2%) had cervical cancer. Most women (71–81%) with precancerous lesions received cryotherapy or other treatment to remove the growths; there were no instances of severe bleeding or other serious adverse effects from treatment.

Between January 2000, when screening started, and December 2006, when follow-up ended, a total of 158 cases of cervical cancer were diagnosed in the control group and 167 cases (including those detected during screening) in the intervention group; those numbers translate to incidence rates of 89 cases per 100,000 person-years in the control group and 61 per 100,000 person-years in the intervention group, or a 25% lower incidence of cancer in the intervention group (hazard ratio, 0.8) after adjustment for age, education and other characteristics. The reduction in incidence was greatest in women aged 30–39 (0.6). Cancers in the intervention group were more likely than those in the control group to be stage I (20% vs. 10%).

Similarly, the incidence of cervical cancer mortality was substantially lower in the intervention group than in the control group (52 vs. 30 per 100,000 person-years); cervical cancer mortality was reduced for the entire sample (hazard ratio, 0.7) as well as for women aged 30–39 (0.3) and those aged 40–49 (0.6). Women in the intervention group also had reduced rates of all-cause mortality (0.9).

Overall, the findings show that visual inspection is "a simple, feasible and effective method to prevent cervical cancer and death" in developing countries, where Pap screening and "multiple visits and diagnosis and treatment are impractical" and unaffordable. The fact that benefits of visual screening were greatest for women aged 30–39 "makes biological sense," the authors note, because the cervical transformation zone, where cervical cancer occurs, is fully visible in young women but less so in older ones. Visual inspection is not likely to be the ultimate solution to the challenge of reducing cervical cancer in low-resource countries: HPV vaccination is likely to partially address the problem, and an affordable, rapid version of the HPV test (which is more sensi-

tive and specific than visual inspection) is on the horizon and may prove useful in developing countries. In the meantime, the researchers believe that visual inspection screening “should be established in routine health services in India” and other low-resource countries, as the implementation of such screening programs will not only reduce the disease burden but will create the infrastructure that will eventually be needed to administer HPV screening efforts.—*P. Doskoch*

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Both Prenatal and Postnatal Interventions Increase Rates Of Exclusive Breast-Feeding

In a randomized controlled study conducted in Singapore, women who received prenatal education and those who received postnatal support were significantly more likely than those who received routine obstetric care only to be breast-feeding exclusively at six months (relative risks, 2.2 and 2.1, respectively).¹ Compared with the proportion in the routine-care group who breast-fed exclusively, the proportion of women in the prenatal intervention group who did so was significantly higher at six weeks and three months (1.7 and 1.9, respectively); similarly, the proportion of women in the postnatal intervention group who breast-fed exclusively was significantly higher than the proportion who did so in the routine-care group at two weeks, six weeks and three months (1.8, 1.9 and 1.9, respectively). Of the two strategies, postnatal support was slightly more effective in improving the rates of any breast-feeding.

The World Health Organization recommends exclusive breast-feeding—that is, breast milk only, without formula or water—for the first six months of an infant’s life, and partial breast-feeding for up to 24 months thereafter. However, relatively few women are able to establish and maintain the practice. To determine whether professional support could help women initiate and maintain breast-feeding, researchers recruited 450 healthy pregnant women attending prenatal clinics at a tertiary hospital in Singapore between February 2004 and May 2006. The women were eligible if they

delivered at 34 weeks or later, intended to breast-feed and had no illness that would prevent them from doing so. The women were randomized into three groups: those who received routine obstetric care only; those who also received one prenatal breast-feeding education session that included the opportunity to speak to a lactation consultant; and those who also received two sessions of postnatal lactation support (one before discharge and the other at the first postnatal visit). At a baseline prenatal interview, the women were asked about their demographic characteristics and prior experiences with breast-feeding; they were also given a diary to track infant feeding for six months. The researchers examined the rates of exclusive, predominant, partial and no breast-feeding at two-week, six-week, three-month and six-month follow-up interviews; modified Cox regression analysis was used for pair-wise comparisons of breast-feeding rates across study groups. Descriptive statistics were analyzed on an intention-to-treat basis.

The mean age of the women was 29.4 years, and 90% had household incomes of less than S\$5,000 (US\$3,294). Sixty-four percent of the women had a primary education or less, and 60% had had more than one child; 56% had breast-fed previously. Across the three study groups, the most common mode of delivery (76% vaginal births), mean gestational age (39.2 weeks) and mean birth weight (3179 g) were also similar.

At six weeks, 17% of women receiving routine care only and 29% of those in the prenatal intervention group were breast-feeding exclusively. Those proportions were 13% and 24%, respectively, at three months, and 9% and 19% at six months. Those receiving the prenatal intervention were significantly more likely than those receiving routine care only to be practicing exclusive breast-feeding at six weeks, three months and six months, with relative risks of 1.7, 1.9 and 2.2, respectively.

Among women who received the postnatal intervention, 38% were breast-feeding exclusively at two weeks, 31% at six weeks, 24% at three months and 22% at six months. The proportion exclusively breast-feeding was significantly higher in the postnatal intervention group than in the routine-care group at all four points, with relative risks of 1.8, 1.9, 1.9 and 2.1, respectively.

Although there was no significant difference in the rate of exclusive breast-feeding at two weeks between women in the postnatal intervention group and women in the prenatal in-

tervention group, women who had received the postnatal intervention were more likely than those who had received the prenatal intervention to be exclusively or predominantly breast-feeding (relative risk, 1.5). In addition, the proportion practicing any type of breast-feeding at six weeks was higher in the postnatal intervention group than in either of the other groups (1.2 each).

According to the authors, the “[l]ack of breast feeding is significantly associated with higher use and cost of health care” and promotion of the practice leads to “[i]mproved short and long term health of breast fed children [and] improved wellbeing for mothers who have breast fed.” They suggest that “[f]uture research...compare the specific cost effectiveness of...strategies for improvement of breast feeding practice.”—*L. Melhado*

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Filipino Youth Whose Parents Have an Equitable Marriage Tend to Delay First Sex

Young people in the Philippines are less likely to have sex by age 22 if their parents have a relatively equitable marital relationship, according to findings from a longitudinal, population-based study.¹ However, the specific marital characteristics associated with delayed first sex differ for females and males. Young women are less likely to have sex by age 22 if, during their preteen years, their father turned all of his income over to their mother, their father did not physically abuse their mother, and their household and family were well-kept. Young men, meanwhile, are less likely to have sex if their parents made household decisions jointly during their son’s preteen years.

Although numerous studies have examined parental factors associated with age at first sex, most of this work has been conducted in the United States, and little of it has explored parents’ marital relationship and the mother’s status. The authors of the current study sought to address these limitations by analyzing data from the Cebu Longitudinal Health and Nutrition Survey, a study that has been following more than 3,000 women who gave birth in

1983–1984 in the Philippines' second largest metropolitan area. Since the initial (1983–1984) survey, five follow-up surveys have been conducted; the three most recent included not only the mothers but the children who were born in 1983–1984. The new analysis included social and demographic data, and information about mothers' status in the household, collected in 1994–1995; key characteristics included whether the mother worked outside the home, whether she contributed more than half of the family's income and whether the father turned over all of his income to his wife (women typically control the family budget in the Philippines). In addition, interviewers judged whether the mother was "high status"—whether she, her child and the household were well-kept. Other data drawn from the 1994–1995 survey included whether the father had ever beaten the mother, whether household decisions (e.g., major purchases, contraceptive use) were made jointly by the parents, and the child's educational attainment and performance. The primary outcome—the age at which the son or daughter had first had sex—was assessed in 2005, when the children were aged 20–22. Analyses, including descriptive statistics and Cox proportional hazards models, focused on the 1,661 mother-and-child pairs for whom data from the relevant follow-up surveys were available; data for males and females were analyzed separately.

At the time of the 1994–1995 survey (conducted when the mothers' mean age was 38 and the children were aged 9–11), about three-fourths of mothers worked outside the home, a similar proportion lived in urban areas and slightly more than two-fifths were classified as high status. Twenty-five percent of fathers turned over all of their income to their wives. Most household decisions (an average of 4.3 out of a possible five) were made either jointly or by the mothers alone. About one in eight mothers reported that their husbands had beaten them.

At the 2005 follow-up, the children's mean age was 21. Many of them (51% of daughters and 35% of sons) attended church at least three times a week. Daughters had completed an average of 11 years of schooling; sons, 10 years. Only 12% of daughters and 5% of sons had married. However, 47% of daughters and 67% of sons reported that they had had sexual intercourse; the vast majority of these respondents (91% of daughters and 98% of sons) had had sex outside of marriage. Mean age at first intercourse among sexually exper-

rienced respondents was 18 for both daughters and sons.

The characteristics associated with sexual debut by age 22 differed between males and females. Sons had an elevated risk of having had sex if they lived in an urban area (hazards ratio, 1.7); their risk rose with household wealth (1.2) and decreased with each additional year of their mother's age (0.98) and each additional decision that their parents made jointly (0.95). In contrast, daughters had an elevated risk of having had sex if their father had beaten their mother (1.4), and a reduced risk if their father had turned over all of his income to their mother (0.7) or their mother had high status (0.8). Their risk declined with each additional year of education (0.8).

The authors acknowledge two main limitations of the study. First, as with all surveys, respondents may not have accurately reported their sexual behavior because of embarrassment, recall errors or other factors; the researchers, however, note that the proportion of young people who had ever had sex was similar to that reported in other Filipino surveys.

In China, Women Who Give Birth to Girls Face An Increased Risk of Postpartum Depression

Chinese women enrolled in a cohort study to identify factors associated with postpartum depression were more likely to suffer from the condition if they had given birth to a girl instead of a boy.¹ The risk of depression was also elevated among women older than 25, those who considered their living conditions dissatisfactory and those who had had at least four previous pregnancies.

The findings of the few studies that have examined the issue of fetal gender and postpartum depression have varied across cultures, with those in Asian societies finding an association and those in Western societies finding no evidence of a link. Because the Chinese literature lacks studies that go beyond descriptive data, the researchers conducted a cohort study among women who had recently given birth in Changsha, the capital of Hunan Province.

Women aged 18–40 were recruited when they visited the obstetric unit of any of four participating hospitals for a postpartum exam between September 2004 and January 2005. Women who had a psychological illness or a history of psychological illness, or who had had

Another potential problem is that about half of the original sample had been lost to follow-up, although the baseline characteristics of drop-outs generally resembled those of participants who remained in the study.

Because several aspects of parents' marital relationships, such as whether they made decisions cooperatively, were associated with their children's sexual behavior years later, the authors point out, parents should keep in mind that "a family atmosphere that values women and fosters gender equity and cooperative decision making may lead to delayed first intercourse among children." Moreover, they say, families, schools, religious institutions and health programs in the Philippines "must acknowledge that premarital sex is widespread... and do more to prepare young people to make healthy, responsible, informed decisions about sexual activity."—P. Doskoch

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major pregnancy and obstetric complications were excluded from the sample, as these factors could be associated with postpartum depression. After collecting clinical and demographic information from the women, research nurses assessed them for postpartum depression using the Chinese version of the Edinburgh Postnatal Depression Scale.

The 300 women in the sample were, on average, 28 years old, and almost all (99%) were married. About two-thirds (61%) had given birth via cesarean section, and nearly one-fifth (17%) had postpartum depression. None knew the sex of their infant before birth. Women who had given birth to a boy and those who had delivered a girl were similar in age, marital status and education. Higher education, classified as 15 years or more, was slightly more common among women who had had a boy (24%) than among those who had had a girl (19%). Nine percent of women who had given birth to a girl reported having had three or fewer prenatal care visits, compared with only 1% of those whose baby was a boy. However, four in 10 women in each group reported nine or more prenatal care visits. More than 40%

in each group reported very satisfactory living conditions, but only 6% of women who gave birth to a girl reported dissatisfactory living conditions, compared with 17% of women who gave birth to a boy.

This was the first pregnancy for about half of the women in both groups. The proportion of women who had a spontaneous vaginal delivery for this birth was twice as high among women who gave birth to a boy as among those who gave birth to a girl (40% vs. 23%). Sixteen percent of women who gave birth to a boy had had four or more pregnancies previously compared with 9% of those who gave birth to a girl. The majority of women had a cesarean section, but this mode of delivery was more common among women who gave birth to a girl than among those who gave birth to a boy (70% vs. 55%).

Women who gave birth to a girl tended to live in higher income households than those who gave birth to a boy. Some 55% of each group lived in middle-income households (with earnings of 1,000–2,000 yuan per month). However, 29% of women who delivered a girl and 11% of those who delivered a boy lived in households with higher income, while 16% of women who gave birth to a girl and 36% of those who gave birth to a boy lived in households with lower income.

Twenty-five percent of women who gave

birth to a girl had postpartum depression, compared with 12% of women who gave birth to a boy. Among women who had had fewer than nine prenatal care visits, 21% were depressed, compared with 13% of those who had had nine or more visits. Nearly one-fifth (19%) of women older than 25 were depressed, while only 8% of women aged 25 or younger fell into this category. Depression was more common among women who had had at least four previous pregnancies than among those who had had three or fewer (24% vs. 15–18%). The proportion of women with postpartum depression did not differ between women who delivered via cesarean section and those who delivered vaginally (17–18%). About 38% of women who reported dissatisfactory living conditions had postpartum depression, compared with 14–15% of those who reported satisfactory or very satisfactory living conditions. Interestingly, the proportion of women with postpartum depression rose with the level of household income; 13–15% of women in households earning 2,000 yuan or less monthly were depressed, while 30% of women in the highest household income bracket had depression.

In a multivariate regression analysis, women who delivered a girl had significantly higher odds of postpartum depression than those who gave birth to a boy (odds ratio, 2.8). Compared with women for whom this was the first

pregnancy, those who had had four or more previous pregnancies had a risk of postpartum depression almost three times as high (2.9). For women who reported dissatisfactory living conditions, the odds of postnatal depression were seven times as high as for those who reported very satisfactory living conditions (7.4).

The investigators acknowledge that their sample was too small for a stratified analysis and that a selection bias may have occurred if women who were very depressed or who had no feelings of postpartum depression decided not to participate. Another factor that could create bias, they note, is that the sample included only women who returned for a postpartum checkup rather than all women who gave birth in the four participating hospitals. Because prenatal factors do not appear to have been associated with the occurrence of postpartum depression, the investigators suggest that if a woman gives birth to a girl, a lack of familial support—stemming from a desire for sons to carry on the family name and provide economic support to their parents—may make her more vulnerable to postpartum depression.
—S. Ramashwar

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