A Deviance Approach to Understanding Use of Maternal Health Care Services in Bangladesh

CONTEXT: *Use of maternal health care can reduce maternal morbidity and mortality in countries like Bangladesh, where rates of these outcomes are high. Community characteristics are associated with use of maternal care services, but it is unclear whether deviation from community norms is associated with service use.*

METHODS: *Data from the 2014 Bangladesh Demographic and Health Survey on 4,106 ever-married women aged 15–49 were used to examine relationships between women's deviation from their communities on socioeconomic, fertility and other characteristics and use of maternal health care (antenatal care, delivery care, postpartum care and a composite measure). Characteristics were examined at the individual and community levels and as deviance variables that indicated whether respondents differed from local norms in a positive way (e.g., being employed when others were not) or a negative way (being unemployed when others had jobs). Associations were identified using logistic regression.*

RESULTS: *Sixty-three percent of women had had postpartum care; smaller proportions had had delivery care (40%), antenatal care (27%) or all three types (17%). Several deviance variables were associated with service use. Negative deviance on women's employment was associated with antenatal care (odds ratio, 1.3); positive deviance on violence justification, exposure to family planning messages and husband's employment was associated with delivery care (1.3–4.8); positive deviance on husband's employment was associated with not receiving postpartum care (0.7); and negative deviance on women's employment and positive deviance on age at marriage were associated with receipt of all three services (1.4–1.7).*

CONCLUSION: *Understanding associations between deviation from community norms and receipt of maternal health care may provide deeper understanding of variation within communities regarding whether women use services.*

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Although the global maternal mortality ratio dropped by 44% between 1990 and 2015,[1] maternal mortality remains high. Approximately 303,000 women died from complications of pregnancy and childbirth in 2015,[1] and for every such death, 20–30 women experience chronic maternal morbidity.[2] In Bangladesh, 5,500 women died of pregnancy- and childbirth-related causes in 2015, equivalent to a maternal mortality ratio of 176 per 100,000 live births.[1] Although this figure represents a decline from the ratio of 242 per 100,000 in 2010,[1] much work is needed if Bangladesh is to reduce its maternal mortality ratio to less than 70 deaths per 100,000 live births by 2030, the global target specified in the United Nations' Sustainable Development Goals.[3] Improving women's use of maternal health care services is important for reducing both maternal morbidity and mortality.[4] Given the high rates of maternal morbidity and mortality in Bangladesh, we need greater understanding of the factors that facilitate the use of maternal health care services.

Studies have identified a variety of individual-level characteristics that are associated with use of maternal health care, including maternal age and education, household wealth, parity, husband's occupation and woman's autonomy.[5] However, recent work has recognized the potential role of the community in women's utilization of services.[6–11] In particular, evidence indicates that a community's economic prosperity, gender norms, fertility norms and provision of health care services are all associated with women's use of maternal health care.[8,9] For example, a study conducted in six African countries found that women's likelihood of delivering in a facility was positively associated with their community's levels of women's educational attainment and previous use of delivery care, and of men's approval of family planning.[8] The study also found that the mean parity in the community was negatively associated with a woman's likelihood of delivering in a facility.[8] Another study, conducted in Bangladesh, Egypt and Rwanda, found that residing in a community where women had higher levels of health knowledge and decision-making autonomy was associated with greater use of antenatal care and delivery care.[9] Collectively, these studies suggest that living in communities where social scripts place greater value on women and on women's rights, autonomy and socioeconomic opportunities may be positively associated with the use of maternal health care services.

Most global research examining the relationship between community characteristics and use of maternal health care has analyzed potential community effects as though they apply equally to all women within communities.[6,7,9–11] However, some individuals may deviate from community norms, and this deviance may be related to health outcomes.[12,13] Deviance is a well-established concept and can be explored using a statistical approach in which it is defined as being different from the average.[13] In the context of global maternal health programming, it is useful to focus on two groups of people who deviate from community norms: women who are positively deviant and those who are negatively deviant. Positive deviance can be defined as individuals' having better outcomes than other persons in their community or, using a strengths-based lens, as individuals' succeeding despite facing hardships that contribute to vulnerability.[12–18] Women who are positively deviant may help inform public health programming by serving as models for how to improve the health of other women in the community.[14,17] Negative deviance is defined as being less successful than others in one's community; individuals who are negatively deviant may be especially hard to reach through interventions. To help women who are negatively deviant obtain maternal health services, public health programs need to focus on these individuals' specific needs.[19]

Some research has examined the relationship between deviance and maternal and child health;[14,16,20–22] however, this research has focused primarily on pregnancy outcomes and children's health (especially child nutrition), rather than on the use of maternal health care services. To better understand how deviance from community norms is related to the use of maternal health care services in Bangladesh, we examined the relationship of positive and negative deviance (on a variety of socioeconomic and other characteristics) with women's use of antenatal, delivery and postpartum care.

METHODS

The data used in this analysis are from the 2014 Bangladesh Demographic and Health Survey (DHS), which collected information from a nationally representative sample of ever-married women aged 15–49. The DHS used a two-stage sampling design. First, primary sampling units (PSUs), determined from the most recent (2011) Bangladesh Population and Housing Census, were selected. Interviews were then conducted with members of 20–30 randomly selected households from each PSU. The DHS asked respondents about each birth they had had in the past five years (i.e., 2009–2014); to reduce bias in women's recall of maternal health care use, we limited our analysis to the most recent birth women had had during that time. Women were excluded from the sample if they had not provided data on one or more of the variables of interest; 6,855 women had had a birth in the past five years, but after exclusion of 2,582 respondents (38%) who were

missing data on one or more outcomes and 167 (4%) who were missing data on one or more independent variables, the sample consisted of 4,106 women.

Measures

•*Outcomes.* We used four binary outcomes to assess women's use of maternal health care: use of antenatal care, use of delivery care, use of postpartum care and a composite measure of use of all three types of care. Use of antenatal care was defined as having had at least four antenatal care visits with a trained professional (doctor, nurse, midwife or paramedic), in accordance with World Health Organization (WHO) recommendations.[4] Although WHO specifies that the initial antenatal care visit should take place during the first trimester, the Bangladesh DHS did not collect information on the timing of visits, so our operationalization of antenatal care use did not take into account when visits occurred. Women were considered to have had delivery care if they had delivered in any private or public health facility with the help of a trained professional. The measure of postpartum care indicated whether women had had a postpartum checkup within three days of delivery (the time frame recommended by WHO).[23] Finally, the composite variable measured whether women had obtained all three types of maternal health care services.

•*Community-level variables.* Because community-level variables are not included in the DHS, we created aggregate variables using data from each community (PSU), an approach that has been used in other studies of reproductive health outcomes.[8,9,24–27] To do this, we simply calculated the mean (for continuous variables) or proportion (for dichotomous variables) for each variable using all of the responses in a given PSU. The specific community-level variables included in the analysis are detailed in the sections below.

•*Deviance variables.* The deviance variables identified women who were above or below the average for their community for each relevant measure. They were created by calculating and comparing the difference between a woman's individual response and the aggregate community variable, taking into account, in some cases, the difference between the value for the community and that for the country as a whole. In general, a respondent was classified as being positively deviant if she had a "better" outcome than the average woman in her community, and as being negatively deviant if she had a "worse" outcome than the average woman in her community. For some measures, the direction of a woman's deviation from the community average is not inherently "positive" or "negative"; for example, having an age at marriage that differs substantially from that of other community members may have negative consequences, regardless if the woman is much younger or much older than the community average. However, in these instances, we labeled one direction of deviance as "positive" and the other as "negative" to facilitate discussion of the results. Specific deviance variables are described in more detail below.

• *Socioeconomic and demographic characteristics.* In Bangladesh (and worldwide), women's access to and use of maternal health care differs by their socioeconomic status and demographic characteristics.[28] Research in resource-poor settings suggests that both household and community wealth are positively associated with use of maternal health care,[5,29] perhaps because wealthier individuals have greater access to care, and wealthier communities can allocate more resources for services, than their less wealthy counterparts. The education level and employment status of a woman and her husband are also associated with use of maternal health care services; compared with others, educated and employed individuals may be more knowledgeable about, and have more resources for, obtaining care.[5] A husband's education and employment status may be especially important in settings where men often make decisions about health care, because husbands' employment and education levels are positively associated with women's autonomy.[5]

Therefore, our analysis included several measures of demographic and socioeconomic characteristics. At the individual level, we controlled for each respondent's age and place of residence (urban or rural). Individual-level socioeconomic characteristics included household wealth, which was assessed using a wealth index that reflected ownership of durable goods, such as televisions and bicycles, and housing characteristics, such as types of water access and sanitation facilities; scores were categorized by quintile (poorest, poorer, middle, richer, richest). We also included variables indicating women's and husbands' completed level of education (classified as none, primary, secondary or more than secondary) and whether a woman and her husband were employed. The variable for husband's employment specifically indicated whether he was employed in the nonagricultural sector; men who worked in agriculture (23% of husbands) were classified as unemployed, because they were likely subsistence farmers, and we wanted to adjust for access to wages that could increase the likelihood of health care use.* All variables concerning husbands were created using information provided by their wives in the DHS women's questionnaire.

Community-level socioeconomic variables were the proportion of women in the community whose wealth index score was in the poorest quintile, the proportion of women who had at least a secondary education, the proportion of husbands who had at least a secondary education, the proportion of women who were employed and the proportion of husbands who were employed in the nonagricultural sector. For each of these measures, we created deviance variables indicating respondents' individual deviation from the community-level value (Table 1). For community variables quantified using proportions, women were classified as deviant if they did not have the specific characteristic and the proportion of women in the community who had

that characteristic was greater than or equal to the national average (i.e., the entire sample of 4,106 women), or if they did have the specific characteristic and the proportion of women in the community who had that characteristic was less than the national average. For example, women were considered to be negatively deviant for education if they did not have at least a secondary education and the proportion of women in the community who had at least a secondary education was greater than or equal to the national average; they were considered positively deviant if they had at least a secondary education and the proportion of women in the community with at least a secondary education was less than the national average. The reference group for deviance variables was women whose individual response matched the community norm (e.g., women who had at least a secondary education and lived in a community where the proportion of women with at least a secondary education was greater than or equal to the national average).

• *Gender and fertility variables.* Attitudes toward gender norms and fertility norms in a community, as well as deviation from these attitudes, may be associated with use of maternal health care services. These norms may influence both a woman's ability and her motivation to obtain care.[8] Specifically, previous research has found that variables related to a woman's autonomy (such as age at marriage[30,31] and experiences of violence[32,33]) are associated with use of maternal health care. In addition, a woman's fertility experiences and fertility preferences may be associated with use of care.[5] Therefore, our analysis included individual-level variables for gender- and fertility-related characteristics: age at marriage (determined by the age at cohabitation), parity, ideal number of children and justification of intimate partner violence. The last was measured using a five-point scale that indicated the number of the following scenarios in which the respondent believed that a man is justified in beating his wife: the woman went out without telling her husband; she neglected the children; she argued with her husband; she refused to have sex; and she burned food. Higher scores indicate greater belief that violence is justified.

Community-level variables were mean age at marriage, mean number of births, mean ideal number of children and mean violence justification score. For the corresponding deviance variables (Table 1), women were considered deviant if their individual response was at least two standard deviations above or below their community's mean; women whose response was within two standard deviations of her community's mean served as the reference group. The direction of deviance (positive or negative) varied depending on the specific variable; for example, women who were at least two standard deviations below their community's mean score for violence justification were considered to be positively deviant, while those who were at least two standard deviations below the community mean for age at marriage were considered negatively deviant.

• *Health media exposure.* Health knowledge and exposure to health messages in the media may be associated with the use of reproductive health care,[24] including

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*Because many women did not indicate their occupation, and because the proportion of women who reported working in agriculture was small (2% of those who provided their occupation), we did not classify female agricultural workers as unemployed.

TABLE 1. Definitions of community-level and deviance variables

Measure	Community-level variable	Deviance variables	
		Negative deviance	Positive deviance
Socioeconomic			
Wealth	Proportion of women in the poorest wealth index quintile	Respondent is in the poorest quintile and the proportion of women in her community in the poorest quintile is less than the national average	Respondent is not in the poorest quintile and the proportion of women in her community in the poorest quintile is at least the national average
Woman's education	Proportion of women with a secondary or higher education	Respondent does not have a secondary or higher education and the proportion of women in her community with a secondary or higher education is at least the national average	Respondent has a secondary or higher education and the proportion of women in her community with a secondary or higher education is less than the national average
Husband's education	Proportion of husbands with a secondary or higher education	Respondent's husband does not have a secondary or higher education and the proportion of husbands in the community with a secondary or higher education is at least the national average	Respondent's husband has a secondary or higher education and the proportion of husbands in the community with a secondary or higher education is less than the national average
Woman's employment	Proportion of women who are employed	Respondent is not employed and the proportion of women in her community who are employed is at least the national average	Respondent is employed and the proportion of women in her community who are employed is less than the national average
Husband's employment†	Proportion of husbands who are employed	Respondent's husband is not employed and the proportion of husbands in the community who are employed is at least the national average	Respondent's husband is employed and the proportion of husbands in the community who are employed is less than the national average
Gender/fertility			
Parity	Mean parity	Respondent's parity is at least two standard deviations above the community mean	Respondent's parity is at least two standard deviations below the community mean
Age at marriage	Mean age at marriage	Respondent's age at marriage is at least two standard deviations below the community mean	Respondent's age at marriage is at least two standard deviations above the community mean
Ideal no. of children	Mean ideal number of children	Respondent's ideal number of children is at least two standard deviations above the community mean	Respondent's ideal number of children is at least two standard deviations below the community mean
Violence justification	Mean score on violence justification scale	Respondent's violence justification score is at least two standard deviations above the community mean (more justification)	Respondent's violence justification score is at least two standard deviations below the community mean (less justification)
Media			
Exposure to family planning messages	Proportion of women who heard or saw family planning messages	Respondent did not hear or see family planning messages and the proportion of women in her community who heard or saw such messages is at least the national average	Respondent heard or saw family planning messages and the proportion of women in her community who heard or saw such messages is less than the national average

†Refers to employment in nonagricultural sectors.

maternal health care.[9] As a proxy for exposure to health media, we included a variable indicating whether women had heard or seen family planning messages via television, radio or newspapers. The corresponding community-level variable indicated the proportion of women in a community who had heard or seen family planning messages from one of the aforementioned sources. A woman was considered negatively deviant if she had not heard or seen family planning messages but lived in a community where the proportion of women who had heard or seen such messages was greater than or equal to the national average; she was considered positively deviant if she had heard or seen family planning messages and lived in a community where the proportion of women who had heard or seen messages was less than the national average. Women whose responses were the same as their community norm were the reference group.

Analysis

Data were analyzed using Stata 14. We fit four separate random-effects logistic regression models, one for each outcome of interest (antenatal care, delivery care, postpartum care and the composite variable). We first fit a stepwise logistic regression model for each outcome using all individual-level, community-level and deviance variables. Then we fit four separate random-effects logistic regression models using only the variables that were significantly associated with each outcome. The PSU was included as the random-effects term. This multilevel approach allowed each community to have its own intercept, which accounted for the hierarchical structure of the data and determined whether unobserved heterogeneity (residual PSU-level variation) remained after adjustment for the variables included in the models.

To determine whether the four maternal health outcomes were clustered by PSU, we fit multilevel models that included only the outcome and the random intercept; the

TABLE 2. Selected individual-level characteristics of ever-married women aged 15–49 who had had a birth in the past five years, Bangladesh Demographic and Health Survey, 2014

Characteristic	% or mean (N=4,106)
Maternal health care	
Had ≥4 antenatal care visits	26.5
Had delivery care	39.6
Had postpartum care within 3 days	62.6
Had all three types of care	16.8
Age	
15–19	20.8
20–24	34.1
25–29	25.7
30–34	13.6
≥35	5.7
Residence	
Rural	67.4
Urban	32.6
Wealth index quintile	
Poorest	20.0
Poorer	18.8
Middle	19.6
Richer	21.4
Richest	20.4
Woman's education	
None	12.8
Primary	27.1
Secondary	47.9
>Secondary	12.1
Husband's education	
None	21.9
Primary	30.5
Secondary	31.8
>Secondary	15.9
Woman employed	
Yes	21.7
No	78.3
Husband employed	
Yes	76.4
No	23.6
Age at marriage	
≤16	59.0
17–18	25.5
≥19	15.4
Parity	
1	41.0
2–3	45.5
4–5	10.3
≥6	3.1
Mean ideal no. of children	2.17
Mean violence justification score	0.62
Exposed to family planning messages	
Yes	21.1
No	78.9

Notes: All values are percentages unless otherwise indicated. Percentages may not total 100.0 because of rounding.

random effects term for each model was statistically significant, indicating that the outcome varied by PSU and that a multilevel model that took into account the clustering of the data was appropriate. Statistical significance was defined as a p value below .05.

TABLE 3. Selected community-level and deviance characteristics of ever-married women aged 15–49 who had had a birth in the past five years, Bangladesh Demographic and Health Survey, 2014

Characteristic	Community % or mean	Deviance		
		% not deviant	% negatively deviant	% positively deviant
Socioeconomic				
Belongs to poorest wealth quintile	19.9	76.2	2.1	21.7
Woman has ≥secondary education	60.0	72.3	10.8	16.9
Husband has ≥secondary education	47.7	72.0	15.2	12.8
Woman is employed	21.7	70.7	25.0	4.3
Husband is employed	76.3	75.5	3.5	21.0
Gender/fertility				
Parity	2.2†	94.8	4.1	1.2
Age at marriage	16.3†	94.9	1.2	3.8
Ideal no. of children	2.2†	93.9	4.3	1.8
Violence justification score	0.6†	93.1	6.0	0.9
Media				
Exposed to family planning messages	21.1	71.9	24.3	3.8

†Mean value. *Note:* Percentages may not total 100.0 because of rounding. All values are percentages unless otherwise indicated.

RESULTS

Sample Characteristics

Twenty-seven percent of women in the overall sample had had the recommended number of antenatal care visits, 40% had received delivery care in a facility from a trained professional and 63% had had a postnatal checkup; 17% of women had received all three types of care (Table 2). More than half of women were aged 24 or younger, and two-thirds lived in rural areas. A greater proportion of women than men had at least a secondary education (60% vs. 48%), but men were more likely than women to be employed (76% vs. 22%). Three-fifths of women had been 16 or younger when they married.

Eighty-seven percent of women had three or fewer children, and the mean desired number of children was 2.2. Most women felt that intimate partner violence was rarely or never justified (mean scale score, 0.62). Twenty-one percent of women had been exposed to family planning messages through radio, television or newspapers.

The degree of deviance varied across measures (Table 3). For socioeconomic characteristics, 24−29% of women's responses were positively or negatively deviant; for gender and fertility norm variables, 5−7% were deviant. Twenty-eight percent of women's responses were deviant on the family planning message exposure variable.

Antenatal Care

Stepwise analysis identified 10 independent variables that were associated with use of antenatal care; these variables were included in the final multilevel model for antenatal care (Table 4). Women aged 20−24, 25−29, or 35 or older were more likely than those aged 15−19 to have had the recommended four or more antenatal care visits (odds ratios, 1.3−2.3). Women living in rural areas had 37% lower odds of having had at

TABLE 4. Odds ratios (and 95% confidence intervals) from multilevel logistic regression analysis examining associations between selected measures and use of antenatal care

Measure	Odds ratio
INDIVIDUAL LEVEL	
Age	
15–19 (ref)	1.00
20–24	1.30 (1.01–1.67)*
25–29	1.44 (1.06–1.96)*
30–34	1.40 (0.95–2.06)
≥35	2.29 (1.36–3.85)**
Residence	
Urban (ref)	1.00
Rural	0.63 (0.50–0.80)***
Wealth index quintile	
Poorest (ref)	1.00
Poorer	1.49 (1.05–2.12)*
Middle	1.52 (1.07–2.17)*
Richer	2.55 (1.79–3.62)***
Richest	3.71 (2.52–5.45)***
Woman's education	
None (ref)	1.00
Primary	1.53 (1.02–2.28)*
Secondary	1.87 (1.25–2.79)**
>Secondary	3.37 (2.08–5.44)***
Husband's education	
None (ref)	1.00
Primary	1.05 (0.78–1.41)
Secondary	1.55 (1.15–2.10)**
>Secondary	1.94 (1.35–2.79)***
Parity	
1 (ref)	1.00
2–3	0.74 (0.59–0.92)**
4–5	0.49 (0.32–0.76)***
≥6	0.19 (0.06–0.59)**
Exposed to family planning messages	
No (ref)	1.00
Yes	1.51 (1.24–1.85)***
COMMUNITY LEVEL	
% of women with ≥secondary education	2.30 (1.40–3.78)***
Mean ideal no. of children	0.61 (0.42–0.89)**
DEVIANCE	
Woman's employment	
Negative deviance	1.29 (1.04–1.59)*
Positive deviance	1.41 (0.93–2.12)

*p<.05. **p<.01. ***p<.001. *Note:* ref=reference group.

least four visits than did women living in urban areas. Compared with women in the poorest wealth quintile, those in any other quintile had higher odds of having obtained antenatal care (1.5–3.7). Women with a primary, a secondary or a higher level of education were more likely than those with no education to have had the recommended number of antenatal care visits (1.5–3.4); husband's education was also associated with receipt of antenatal care, but only among husbands with a secondary (1.6) or higher (1.9) education. Parity was the only individual-level gender and fertility variable associated with antenatal care; compared with women who had one child, those with two or more children had lower odds of having received care (0.2–0.7). In addition, women who had heard or seen family planning messages were more likely to have received antenatal care than were women who had not heard or seen such messages (1.5).

Two community-level variables were associated with antenatal care. The proportion of women in a community who had at least a secondary education was positively associated with the likelihood that a woman had met WHO's antenatal care recommendation (odds ratio, 2.3). In addition, the mean ideal number of children in a community was negatively associated with women's use of antenatal care (0.6). Finally, one deviance variable was related to antenatal care: Women who were not employed, but lived in a community where the level of female employment was equal to or greater than the national average, were more likely to have used antenatal care than were women who were not deviant for this measure (1.3).

Delivery Care

Delivery care was the outcome associated with the greatest number of independent variables (Table 5). Compared with women aged 15–19, those in the three oldest age groups (25 or older) were more likely to have had delivery care (odds ratios, 1.8–4.1). Rural residence was negatively associated with use of delivery care (0.7). In addition, the odds of having had delivery care increased with wealth; women in the richest quintile had 4.6 times the odds of having had care as did women in the poorest quintile. The odds of having had delivery care were greater among women with a secondary (1.6) or higher (2.7) education than among women with no education. A husband's education level was also associated with a woman's use of delivery care, but the odds of care were elevated only among husbands with more than a secondary education (2.0). Women who were employed had 33% lower odds of having received delivery care than did women who were not employed.

Parity and ideal number of children were the only two individual-level gender and fertility variables associated with delivery care. Compared with women who had one child, those with two or more children had lower odds of having had delivery care; the reduction in odds ranged from 45% among women with 2–3 children to 78% among those with six or more children. In addition, as women's ideal number of children increased, their odds of having obtained delivery care declined; for each additional child that a woman desired to have, her odds of obtaining delivery care decreased by 19%.

Four community-level variables were associated with use of delivery care. The proportion of women in a community who had at least a secondary education was positively associated with the likelihood that women had obtained delivery care (odds ratio, 2.7), as was the proportion who had heard or seen family planning messages (1.8); community means for ideal number of children (0.5) and violence justification score (0.7) were negatively associated with use of delivery care. Finally, three measures of positive deviance were

TABLE 5. Odds ratios (and 95% confidence intervals) from multilevel logistic regression analysis examining associations between selected measures and use of delivery care

Measure	Odds ratio
INDIVIDUAL LEVEL	
Age	
15–19 (ref)	1.00
20–24	1.19 (0.94–1.50)
25–29	1.79 (1.34–2.39)***
30–34	1.99 (1.39–2.86)***
≥35	4.14 (2.53–6.79)***
Residence	
Urban (ref)	1.00
Rural	0.72 (0.57–0.91)**
Wealth index quintile	
Poorest (ref)	1.00
Poorer	1.36 (1.01–1.81)*
Middle	1.75 (1.30–2.34)***
Richer	2.37 (1.75–3.21)***
Richest	4.63 (3.26–6.56)***
Woman's education	
None (ref)	1.00
Primary	1.33 (0.97–1.83)
Secondary	1.59 (1.14–2.22)**
>Secondary	2.68 (1.73–4.14)***
Husband's education	
None (ref)	1.00
Primary	1.12 (0.87–1.43)
Secondary	1.26 (0.97–1.64)
>Secondary	2.03 (1.44–2.86)***
Woman employed	
No (ref)	1.00
Yes	0.67 (0.55–0.82)***
Parity	
1 (ref)	1.00
2–3	0.55 (0.44–0.69)***
4–5	0.35 (0.23–0.51)***
≥6	0.22 (0.11–0.46)***
Ideal no. of children	0.81 (0.69–0.94)**
COMMUNITY LEVEL	
% of women with ≥secondary education	2.65 (1.64–4.27)***
Mean ideal no. of children	0.52 (0.36–0.76)***
Mean violence justification score	0.65 (0.53–0.79)***
% of women exposed to family planning messages	1.75 (1.00–3.06)*
DEVIANCE	
Husband's employment	
Negative deviance	0.92 (0.60–1.41)
Positive deviance	1.33 (1.06–1.66)*
Violence justification score	
Negative deviance	1.29 (0.91–1.82)
Positive deviance	4.83 (1.73–13.50)**
Exposed to family planning messages	
Negative deviance	1.07 (0.87–1.32)
Positive deviance	1.59 (1.07–2.36)*

*p<.05. **p<.01. ***p<.001. *Note*: ref=reference group.

TABLE 6. Odds ratios (and 95% confidence intervals) from multilevel logistic regression analysis examining associations between selected measures and use of postpartum care

Measure	Odds ratio
INDIVIDUAL LEVEL	
Wealth index quintile	
Poorest (ref)	1.00
Poorer	1.12 (0.85–1.48)
Middle	1.32 (0.98–1.78)
Richer	1.58 (1.14–2.17)**
Richest	3.54 (2.40–5.22)***
Woman's education	
None (ref)	1.00
Primary	1.24 (0.94–1.65)
Secondary	1.55 (1.17–2.05)**
>Secondary	2.67 (1.78–4.00)***
Husband employed	
No (ref)	1.00
Yes	1.58 (1.11–2.25)*
Exposed to family planning messages	
No (ref)	1.00
Yes	1.30 (1.03–1.65)*
COMMUNITY LEVEL	
% of women in poorest wealth quintile	0.26 (0.13–0.53)***
% of women employed	5.22 (2.59–10.50)***
Mean violence justification score	0.56 (0.44–0.72)***
DEVIANCE	
Husband's employment	
Negative deviance	1.15 (0.67–1.95)
Positive deviance	0.68 (0.48–0.96)*

*p<.05. **p<.01. ***p<.001. *Note:* ref=reference group.

Postpartum Care

Relatively few independent variables were associated with receipt of postpartum care (Table 6). As in the other models, wealth was associated with an elevated likelihood of receiving care, though in this case only for women in the two highest wealth quintiles (1.6–3.5). Similarly, education was positively associated with use of postpartum care, but only for women with a secondary (1.6) or higher (2.7) education. The odds of having had postpartum care were also elevated among women whose husband was employed (1.6) and among those who had heard or seen family planning messages (1.3).

Three community-level measures were associated with use of postpartum care. Women's likelihood of having received such care was negatively associated with the proportion of women in the community who were in the poorest wealth quintile (odds ratio, 0.3) and with a community's mean violence justification score (0.6). The proportion of women in a community who were employed was positively associated with the odds of having received postpartum care (5.2). Only one deviance variable was associated with postpartum care: Positive deviance on husband's employment was associated with a 32% reduction in the odds of women's having had postpartum care.

associated with delivery care: Women had elevated odds of having received delivery care if they were positively deviant on measures of husband's employment (1.3), violence justification (4.8) and exposure to family planning messages (1.6).

Composite Measure

Eleven variables were associated with the composite measure encompassing all three types of maternal health care (Table 7). Women aged 35 or older had more than twice the odds of having received all three types of care as did 15–19-year-olds (odds ratio, 2.3); however, women in the other age-groups did not have an elevated likelihood of reporting this outcome. Rural residents were less likely than their urban counterparts to have had all three types of maternal health care (0.6). Compared with women in the poorest wealth quintile, those in the middle, richer and

TABLE 7. Odds ratios (and 95% confidence intervals) from multilevel logistic regression analysis examining associations between selected measures and use of all three types of maternal care

Measure	Odds ratio
INDIVIDUAL LEVEL	
Age	
15–19 (ref)	1.00
20–24	1.22 (0.89–1.66)
25–29	1.31 (0.89–1.93)
30–34	1.33 (0.82–2.17)
≥35	2.29 (1.21–4.32)*
Residence	
Urban (ref)	1.00
Rural	0.59 (0.44–0.78)***
Wealth index quintile	
Poorest (ref)	1.00
Poorer	1.37 (0.79–2.37)
Middle	1.69 (1.00–2.85)*
Richer	2.88 (1.73–4.78)***
Richest	4.93 (2.89–8.42)***
Woman's education	
None (ref)	1.00
Primary	1.22 (0.70–2.14)
Secondary	1.67 (0.97–2.87)
>Secondary	3.01 (1.63–5.57)***
Husband's education	
None (ref)	1.00
Primary	1.05 (0.68–1.60)
Secondary	1.71 (1.13–2.59)*
>Secondary	2.41 (1.51–3.87)***
Parity	
1 (ref)	1.00
2–3	0.74 (0.56–0.97)*
4–5	0.58 (0.33–1.01)
≥6	0.12 (0.02–0.97)*
Exposed to family planning messages	
No (ref)	1.00
Yes	1.53 (1.21–1.92)***
COMMUNITY LEVEL	
% of women with ≥secondary education	4.02 (2.16–7.50)***
Mean violence justification score	0.76 (0.59–0.99)*
DEVIANCE	
Woman's employment	
Negative deviance	1.59 (1.23–2.06)***
Positive deviance	0.89 (0.51–1.55)
Age at marriage	
Negative deviance	1.39 (0.61–3.14)
Positive deviance	1.65 (1.02–2.66)*

*p<.05. ***p<.001. *Note:* ref=reference group.

richest quintiles were more likely to have used the three types of care (1.7–4.9). The odds of having had care were higher among women with more than a secondary education than among those with no education (3.0); higher among women whose husband had a secondary (1.7) or higher (2.4) education than among those whose husbands had no education; and higher among women who reported exposure to family planning messages than among those who did not (1.5). Parity was negatively associated with having received all three types of care, but the association was significant only for women with two or three children (0.7) or six or more children (0.1).

Associations were also evident for two community-level variables. The proportion of women who had at least a secondary education was positively associated with receiving all three types of care (odds ratio, 4.0), while a greater mean violence justification score in a community was negatively associated with women's having obtained all three types of care (0.8). Finally, women had elevated odds of having had all three kinds of care if they were negatively deviant on employment (1.6) or positively deviant on age at marriage (1.7); the latter finding was evident even though none of the individual maternal health care outcomes were associated with an individual's age at marriage, a community's mean age at marriage or deviance in age at marriage.

After adjustment for all of the variables in the models, the community-level random effects term was significantly associated with the relevant maternal health care outcome in all four models (not shown). Thus, the odds of a woman having experienced each of the outcomes varied across communities and was not explained by the individual, community and deviance variables that were present in the model, suggesting that there was unobserved heterogeneity at the PSU level in the use of maternal health care services.

DISCUSSION

We found that individual-level, community-level and deviance measures of socioeconomic characteristics, gender- and fertility-related characteristics, and exposure to family planning messages were all associated with women's use of maternal health care in Bangladesh. These relationships differed by type of maternal health care use.

Types of Care

•*Antenatal care.* Although previous work has found that, at an individual level, women's and husbands' educational attainment and women's employment are positively associated with use of maternal health care services, those studies focused on delivery care.[5,34] The current findings suggest that socioeconomic characteristics may also be related to use of antenatal care. At the individual level, women may have less access to care if they are relatively poor or if they and their husbands have low levels of education; decisions about obtaining antenatal care, which may be made by a woman, her husband or both, may also differ by these characteristics. At the community level, the proportion of women with a secondary education was

positively associated with use of antenatal care, while the mean ideal number of children was negatively associated with use of antenatal care. These findings may reflect the socioeconomic characteristics of the community and are consistent with the possibility that women living in communities with high levels of autonomy are more likely than women in other communities to obtain services. Finally, women who were negatively deviant for employment had an elevated likelihood of having obtained antenatal care. Perhaps women who lived in areas of high female employment but were not employed were socioeconomically privileged and had less need to work than other women did. However, because this association existed even after we adjusted for household wealth, this finding is not simply a reflection of income and assets. Instead, negative deviance on employment may reflect a woman's position in her household as well as the amount of time she has available to obtain antenatal care.

•*Delivery care.* Use of delivery care was associated with more variables than any of the other maternal health care outcomes. The findings support previous research indicating that age, place of residence, wealth, education and parity are associated with delivering in a facility.[5] Unique to the current study is the finding that the number of children women desire is negatively associated with their use of delivery care. Wanting fewer children may be an indicator of high levels of autonomy, which in turn may be associated with greater use of delivery care.

Several community-level measures were also related to use of delivery care. Having a greater proportion of women in the community who had a secondary education was positively associated with receipt of delivery care, while mean violence justification score and mean desired number of children were both negatively associated with use of delivery care. One possible explanation for these findings is that higher levels of socioeconomic prosperity and women's autonomy may be related to both access to delivery care and the decision to obtain such care. In addition, women had elevated odds of having had delivery care if they lived in a community where a higher proportion of women were exposed to family planning messages. This may reflect a relationship between the availability of health media in a community and use of delivery care. The analysis did not control for availability of health care services, so it is unclear if the association between exposure to family planning messages and use of delivery care services is related to the availability of services or to health education (which may influence the decision to give birth in a facility); more research on this relationship is warranted.

The positive relationship between positive deviance on husband's employment and use of delivery care suggests that receipt of care is not related to simply having an employed husband (a characteristic that was not associated with delivery care at the individual level), but rather to having a husband who is employed when others are not. This may demonstrate exceptional abilities or connections to resources that could be used to obtain care. Positive

deviance on the measure of violence justification was also associated with elevated odds of having had delivery care. Women who are positively deviant for this characteristic may have more autonomy and empowerment than the average woman in their community, and may be more motivated or more able to obtain care.[35] Finally, positive deviance on having heard or seen family planning messages was positively associated with receipt of delivery care. Such messages generally are disseminated at the community level, so that either most women in a particular area are exposed to the same messages or most are not. When a woman is exposed to family planning messages that are not widely viewed or heard in her community, it may indicate that she has employed additional effort or used additional resources to gain access to that information; she also may have utilized such effort or resources to obtain delivery care.

•*Postpartum care.* Household wealth, woman's and husband's education, and exposure to family planning messages were also all positively associated with use of postpartum care. Women with these characteristics may have better access to care, or may be more likely to seek care, than other women. Similarly, the associations between community-level measures of wealth and employment and women's receipt of postpartum care may reflect the socioeconomic resources and access to care available in communities. In addition, the associations of violence justification and women's employment with postpartum care may be related to the degree of women's autonomy within a community.

The only deviance variable associated with receiving postpartum care was husband's employment. Although husband's employment was positively associated with postpartum care at the individual level, positive deviance on husband's employment was associated with reduced odds of women's having obtained postpartum care. This result is surprising, because a woman whose husband has more resources than the average man in the community might be expected to have better health outcomes and access to maternal health care than other women. One possible explanation for this is that husbands who are positively deviant for employment may spend more time away from the family home than other husbands do, which could influence decisions about postpartum care. The relationship between such deviance and receipt of postpartum care warrants further investigation.

•*Composite measure.* With one exception, the variables that were associated with our composite measure of maternal care were also associated with at least one individual maternal health care service. Obtaining all three types of services may require a woman to have exceptional access to care, as well as the ability to make decisions about her maternal health care use. The associations between community variables and receipt of all three types of care may reflect norms consistent with prosperity and women's autonomy, both of which may facilitate use of maternal health care in general. Finally, the positive association between negative

deviance for women's employment and obtaining all three types of care may be related to these women not needing to work (as opposed to not being able to work).

The only relationship that was unique to the composite outcome was that with positive deviance on age at marriage. Women who marry at an older age than others in their community may be more comfortable than other women defying community gender norms that dictate that women marry at a certain age; like other deviance variables, this may demonstrate that a woman has a high degree of autonomy. One potential reason for the association between deviance on age at marriage and all three types of care (when this variable was not associated with any of the individual maternal health care outcomes) is that age at marriage is a deep-seated cultural norm.[36,37] Deviating from this norm may be more difficult than deviating from other characteristics in our analysis. For this reason, it is possible that we do not see the added value of deviating from age at marriage unless there are higher levels of health care.

Limitations and Conclusion

This study has some limitations. These findings were based on cross-sectional data, so we cannot assume the existence of causal pathways. Furthermore, our analysis focused on three types of maternal health care that are important because of their strong association with birth outcomes; however, we did not examine other types of maternal health care that are necessary for reducing maternal mortality (e.g., abortion care). The analysis was limited to data collected in the 2014 Bangladesh DHS. Although WHO recommends that women have their initial antenatal visit during the first trimester,[4] the Bangladesh DHS did not collect information on the timing of visits, so we were unable to examine that outcome. In addition, we wanted our variable for husband's employment to focus on wage-based employment. To achieve this, we categorized men working in agriculture as unemployed; however, some agricultural work may be paid employment.

Furthermore, because the DHS did not collect community-level data about the characteristics that we wished to include in our analysis, we were limited to using aggregate variables for our community-level and deviance measures. It is possible that aggregate variables do not fully capture the effects of living in a community. In the Bangladesh DHS, a PSU consisted of 20–30 households; because our sample was restricted to women who had had a child in the past five years and had provided data on all of our variables, some PSUs in our analysis contained fewer than 10 respondents. Moreover, PSUs are artificial sampling units and may not reflect what a woman thinks of as her community. However, analysis showed that the outcomes varied significantly by PSU, suggesting that these areas may have an influence on outcomes; model checking found no instability due to the small number of respondents in some PSUs. This indicates that, despite the aforementioned limitations, the PSU was an appropriate measure to use as a proxy for the community. Furthermore, use of aggregated variables by PSU is common in analyses that use DHS data to examine community effects[8,9,24–27] and is the best option given that the DHS does not collect the relevant community-level data.

Finally, although our models adjusted for individual-level, community-level and deviance variables, unobserved heterogeneity was evident in all four models. There may be important factors on which the DHS does not collect data but that can explain the community-level random effects. For example, the Bangladesh DHS does not collect data on the quality or presence of maternal health services or on the presence of interventions or social programs that could influence women's use of maternal health care services and partly explain the unobserved heterogeneity.

Despite these limitations, this study also had strengths. This is the first analysis of DHS data that has examined deviance from community norms and the relationship between deviance and use of maternal health care services. Such analysis reveals variation in women's experiences within communities and highlights experiences of both positive and negative deviance.

Previous research has identified associations between community characteristics and use of maternal healthcare.[8,9] Our study builds on those findings by demonstrating that variation in women's experiences within communities—that is, deviance—is also associated with maternal health care use, even after adjustment for individual- and community-level measures. Both positive and negative deviance were associated with use of maternal health care, highlighting that deviance from community norms in both directions may matter for maternal health care use. Positive deviance has been examined largely within the context of child health and child nutrition;[14,16] however, the current findings demonstrate that an examination of both positive and negative deviance is warranted and can be applied to maternal health care use and other reproductive health outcomes.

Moreover, our findings highlight that the relationship between deviance and use of maternal health care varies by type of service, perhaps in part because of differences in the process of obtaining, and the effort required to obtain, each type.[38–40] Moreover, although obtaining antenatal care often links women with delivery and postpartum care, it does not always do so.[41,42] Therefore, although the independent variables associated with our outcomes overlap, each outcome also has unique relationships with individual-level, community-level and deviance variables.

Maternal morbidity and mortality are declining worldwide, but much work needs to be done to reach the 2030 Sustainable Development Goal of reducing the global maternal mortality ratio to 70 per 100,000 live births.[3] Increasing the utilization of maternal health care services is necessary to improve maternal health. The current findings highlight the need to move beyond simply understanding individual- and community-level

factors related to use of maternal health care services. Women within a community are not all the same, and the differences between them and their peers may play a role in whether they obtain care. Therefore, to fully understand who is using maternal health care services, researchers must examine the nuances of women's experiences within communities, including the experience of deviance. Such analyses can highlight additional programmatic needs and may inform interventions for increasing use of maternal health care services.

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RESUMEN

Contexto: *El uso de los servicios de atención a la salud materna puede reducir la morbilidad y mortalidad materna en países como Bangladesh, donde las tasas relativas a estos resultados son altas. Las características de la comunidad están asociadas con el uso de los servicios de atención materna, pero no está claro si la desviación respecto de las normas de la comunidad está asociada con el uso de los servicios.*

Métodos: *Se usaron datos de la Encuesta Demográfica y de Salud de Bangladesh de 2014 de 4,106 mujeres de 15–49 años de edad y que alguna vez estuvieron casadas, para examinar las asociaciones entre su desviación respecto a sus comunidades en lo que se refiere a características socioeconómicas, de fecundidad y otras y en el uso de servicios de salud materna (atención prenatal, atención en el parto, atención posparto y una medida compuesta). Se examinaron las características a nivel individual y comunitario, y también como variables de desviación que indicaron si las mujeres encuestadas diferían o no de las normas locales de una manera positiva (por ejemplo, estar empleadas cuando otras no lo estaban), o de una manera negativa (estar desempleada cuando otras tenían trabajo). Las asociaciones se identificaron mediante regresión logística.*

Resultados: *Sesenta y tres por ciento de las mujeres habían recibido atención posparto; proporciones más pequeñas habían recibido atención en el parto (40%), atención prenatal (27%) o los tres tipos (17%). Diferentes variables de desviación se asociaron con el uso de los servicios. La desviación negativa en el empleo de las mujeres se asoció con la atención prenatal (razón de probabilidades, 1,3); la desviación positiva relativa a la justificación de la violencia, la exposición a los mensajes de planificación familiar y al empleo del marido se asociaron* con la atención del parto (1.3-4.8); la desviación positiva en el empleo del marido se asoció con no recibir atención posparto (0,7); y la desviación negativa en el empleo de las mujeres y la desviación positiva en la edad al contraer matrimonio se asociaron con la recepción de los tres servicios (1.4-1.7).*

Conclusión: *Comprender las asociaciones entre la desviación de las normas de la comunidad y la recepción de servicios de salud materna puede proporcionar una comprensión más profunda de la variación en las experiencias de las mujeres que utilizan los servicios dentro de las comunidades.*

RÉSUMÉ

Contexte: *Le recours aux soins de santé maternelle peut réduire la morbidité et la mortalité maternelles dans les pays tels que le Bangladesh, où ces taux sont élevés. Les caractéristiques des communautés sont associées au recours à ces services, mais l'association n'est pas claire en cas d'écart par rapport aux normes de la communauté.*

Méthodes: *Les données de l'Enquête démographique et de santé bangladaise 2014 relatives à 4 106 femmes âgées de 15 à 49 ans, mariées ou l'ayant été, ont servi à examiner les liens entre l'écart des femmes par rapport aux caractéristiques socioéconomiques, de fécondité et autres de leur communauté et le recours aux soins de santé maternelle (soins prénatals, d'accouchement, post-partum et mesure composite). Les caractéristiques ont été examinées aux niveaux individuel et communautaire et comme variables d'écart indiquant si les répondantes différaient des normes locales de manière positive (employées quand les autres ne l'étaient pas, par exemple) ou négative (sans emploi quand les autres en avaient un). Les associations ont été identifiées par régression logistique.*

Résultats: *Soixante-trois pour cent des femmes avaient obtenu des soins post-partum; de moindres proportions avaient bénéficié de soins d'accouchement (40%), prénatals (27%) ou des trois types (17%). Plusieurs variables d'écart sont associées au recours aux services. L'écart négatif en termes d'emploi des femmes est associé aux soins prénatals (RP, 1,3); l'écart positif relatif à la justification de la violence, l'exposition aux messages de la planification familiale et l'emploi du mari, aux soins d'accouchement (1,3–4,8); l'écart positif concernant l'emploi du mari, à l'absence de soins post-partum (0,7); et l'écart négatif en termes d'emploi des femmes et positif à propos de l'âge au mariage, à l'obtention des trois services (1,4–1,7).*

Conclusion: *Comprendre les associations entre l'écart par rapport aux normes de la communauté et l'obtention de soins de santé maternelle pourrait permettre de mieux cerner la variabilité, au sein des communautés, du recours de ces services par les femmes.*

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