Measurement, Trends, and Predictors of Unintended Birth: Bangladesh 1983-2000

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Abstract

Bangladesh has experienced a rapid fertility decline in the past several decades, facilitated by proactive population policies, contraceptive provision, and broader societal shifts encouraging smaller families and contraceptive use to achieve these revised norms. We present 18 years of data from the Sample Registration System, a demographic surveillance system operated by the Maternal Child Health Extension Project in 6 study areas in Bangladesh. Using prospective fertility preferences and subsequent birth information, we determined the level of intended versus unintended births, as well as those that were considered to be 'Up to God/Allah'. Over the 18 year period, the level of unintended births varied from 22-38%, with lowest levels in the mid-1990's. Fatalistic responses significantly declined over the study period, from 25% in the mid-1980's to 1% in the mid-1990's. Further analyses explored the determinants of unintended births, finding mother's age and education, parity, birth order to be significantly related to birth intention status across the study period. In a subanalysis of 1987-1995 data, women's status was associated with a decreased risk of reporting an 'up to God' birth; however, there was no significant effect of quality of care measures on birth intention status.

Introduction

Bangladesh is touted as a demographic transition success story. In the 1970's the total fertility rate (TFR) was just under 7 births per woman, with 8% of women using contraception (1). As of the 2004 Demographic and Health Survey, the total fertility rate was 3.0 in 2004 and 58% of currently married women reported using contraception (2). There are several factors that have been integral to this fertility decline – the proactive policies of the national government with respect to the promotion of family planning and the legal provision of menstrual regulation (3, 4)[1]. The fertility decline in Bangladesh hasn't solely resulted due to family planning programs and policies, it has also involved a broader societal and psychological shift in family size norms, as indicated by in-depth work conducted in Bangladesh during this time (5, 6).

Bongaarts has described the changes in the proximate determinants of fertility as nations undergo a demographic transition and the subsequent impact on levels of unintended pregnancy (7). Individuals and couples first perceive a greater benefit of having smaller families. However, as a smaller family size becomes the ideal, there is likely to be an initial gap between fertility preferences and the enactment of these preferences through fertility control. This gap equates to, at least initially, a higher level in unintended pregnancies. However, as couples and societies embrace a smaller family size norm and policies and programs support these revised preferences through the provision of quality services, contraceptive use will, ideally, begin to match fertility preferences and unintended pregnancies will decline.

In order to assess these broader societal changes, it is important to measure fertility preferences and their impact on actual fertility. Most of the work examining fertility preferences is derived from Demographic and Health Survey data, which assess fertility preferences through retrospective assessments. Retrospective assessments are subject to rationalization bias, as women are much less likely to characterize a pregnancy as "unwanted" after the birth of the child (8). Prospective assessments may change over time, but are less likely to be affected by rationalization bias (9).

In an effort to assess fertility preferences and subsequent fertility, we used a unique dataset from the Maternal Child Health-Family Planning Extension project sites in Bangladesh from 1982-2000. Using this powerful dataset, we were able to match prospective fertility preferences with subsequent births and to assess the determinants, levels, and trends of unintended births over nearly two decades across six different areas of Bangladesh.

Methods

Study Sites

In 1982, the International Centre for Health and Population Research established the Maternal Child Health Family Planning (MCH-FP) Extension Project and Sample Registration System (SRS) in Jessore (southwest) and Sirajganj (north-central) areas of Bangladesh (10). The MCH-FP Extension areas were comprised of both intervention sites, as well as comparison sites, to test the effectiveness of various health interventions, including community health workers. Soon after the start of these two

[1] Menstrual regulation is the use of manual vacuum aspiration to restore menstruation, even without the confirmation of pregnancy status.

intervention sites, comparison sites were added to each location - Fultala, Bagherpara, and Keshobpur served as control areas for the Abhoynagar site, and Gopalpur served as a control area for Sirajganj.

Data

The SRS was a quarterly surveillance system that registered demographic and health events in approximately 8,000 households across the study areas (10). In addition to the quarterly collection of demographic data, periodic Knowledge-Attitudes-Practices (KAP) Surveys were administered at 3-5 year intervals. In each of the KAP Surveys in Years 1982, 1985, 1990, 1993, and 1998, currently married female participants were asked about their fertility preferences. If pregnant, female respondents were asked, "With the present pregnancy outcome, how many additional children do you want?" If not pregnant at the time of the survey, female respondents were asked, "How many (additional) children do you want?"

The dataset used in this analysis was constructed by merging the cross-sectional data from the five KAP surveys with all of the births that were registered between 1983-2000 in the SRS longitudinal surveillance database.[2] Each study participant's data were reviewed and hand-coded by a member of the research team; every 10th case was cross-checked by the lead author. In order to decrease the number of excluded cases (births without previous fertility preference measurements), over 25,000 hard copy files were searched by the research team. Table 1 indicates the socio-demographic characteristics of the included versus excluded cases.

Table 1: Comparison of Included and Excluded Cases

Characteristics	Included (n = 19,934)	Excluded (n = 5,113)
Mother's current age (mean)*	32.9	26.6
Number of children ever born*	3.6	1.4
% any maternal education*	35.6	44.8
% any paternal education	47.2	47.0
% Hindu	11.0	12.0

* $p < 0.05$

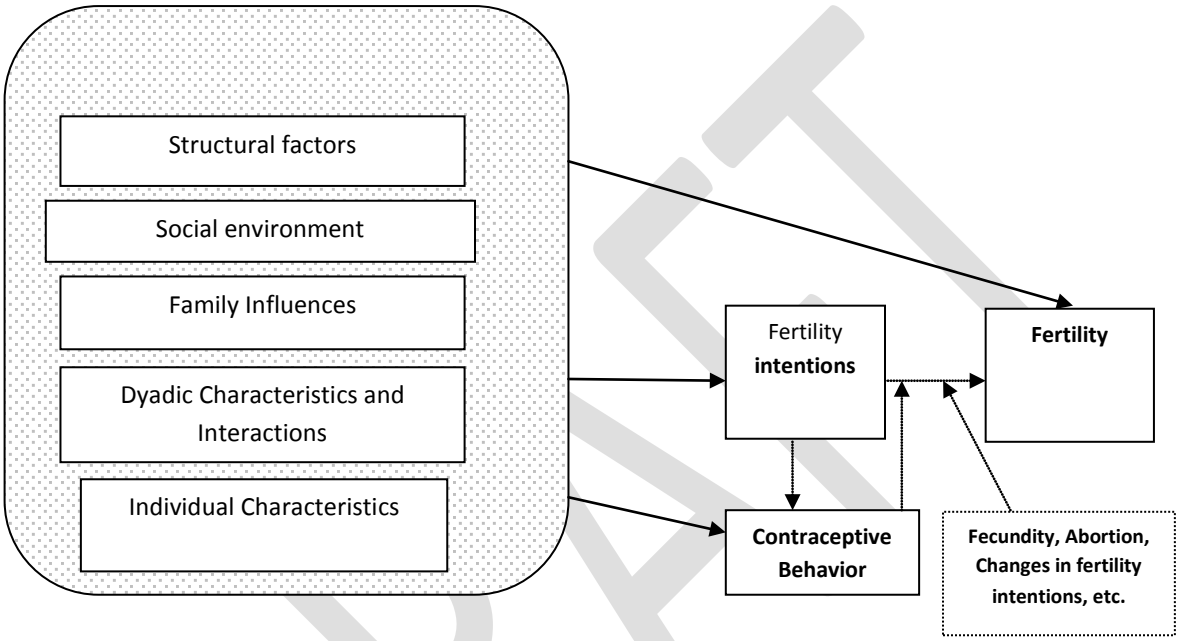
Variables and Conceptual Framework

For all analyses, the independent variable is the intention status of the birth, either 'intended', 'unintended', or 'up to God/Allah'. Given the length of the study period, there is variability in available measures across the study period. Therefore, we conducted 2 separate analyses. The first was to examine the entire dataset of 19,934 births for which there was a previous fertility preference measurement. The second analysis tests the association of women's status and quality of care variables asked in the 1989 and 1993 surveys among a subsample of births occurring between 1987-1995.

[2] A set of algorithms were established to link each birth to a prior fertility preference measurement: 1) births without a prior fertility preference measurement were excluded (see Table 1), 2) births were linked to fertility preference measurements from the closest, previous survey, up to 2 prior surveys, 3) if women were captured at time of pregnancy without a previous fertility preference measure, they were excluded, and 4) if multiple pregnancies occurred between KAP surveys, it was assumed that prior fertility preferences applied to all pregnancies.

The analyses are guided by the conceptual framework shown below (Figure 1), findings from existing literature on the predictors of fertility intentions and unintended pregnancy, as well as the available data. Previous studies from Asia and Bangladesh point to the influential roles of woman's age, education, religion, parity, and partner characteristics (e.g., age and education) on fertility preferences and the characterization of a pregnancy (11-15). Social influences such as women's status (16, 17), service-level characteristics such as the quality of care (18, 19) have also been shown to influence contraceptive and fertility behavior in Bangladesh.

Figure 1: Influences on Fertility Intentions, Contraceptive Behavior, and Fertility



Sociodemographic characteristics were abstracted from the SRS database. Quality of care and women's status measures were taken from the 1989 and 1993 SRS surveys. These measures were summed and included as independent variables in the subanalysis of 1987-1995 data (Womens' status 0-4 scale; Quality of care 0-6 scale). These measures included:

<u>Women's Status Measures</u>
WS) Are you permitted to go outside your village to a cinema?
WS) Are you permitted to meet and talk to a non-relative casual male visitor to your house?
WS) Can you take your sick child to a hospital/clinic on your own?
WS) Who usually makes the decision with regard to if you yourself are able to seek treatment?

<u>Quality of Care Measures</u>
QoC) Is the Family Welfare Assistant (health worker; FWA) appreciative of your need for privacy?
QoC) Is the FWA responsive to your questions?
QoC) Is the FWA sympathetic to and respectful of your problems and needs?
QoC) Is the FWA someone you can depend on to help you with your problems?
QoC) When the FWA explains something to you, does she use words/ideas that you can easily understand?
QoC) When the FWA explains something to you, does she give you enough information?

Findings

Figure 2 indicates the levels of intended, unintended, and up to God/Allah births that occurred from 1984-1999. Over the 18 year period, unintended pregnancy levels varied from 22-38%, with lowest levels in the mid-1990's. Fatalistic responses declined significantly ($p<0.001$) over the study period, from 25% in the mid-1980's to 1% in the mid-1990's.

Figure 2: Reported fertility preferences across 6 study areas: 1984-1999 (n = 19,934)

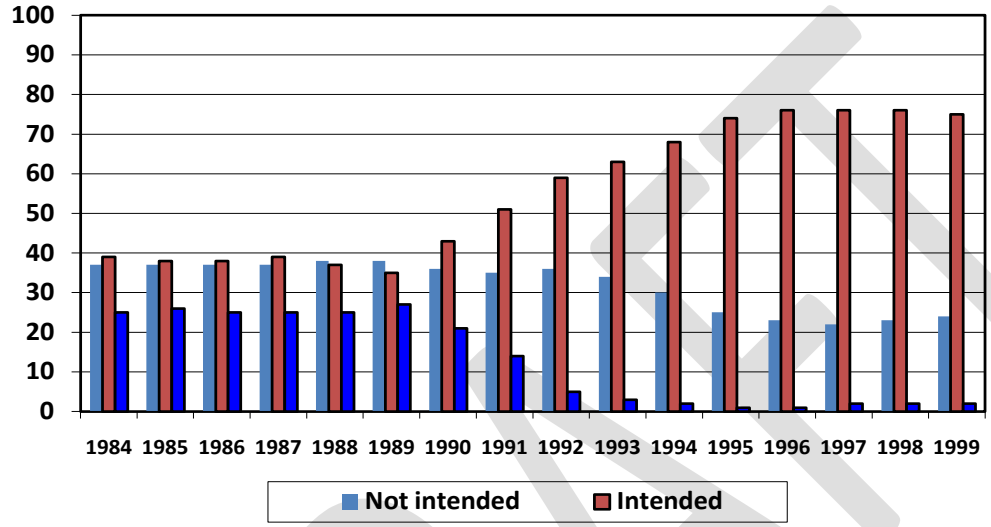
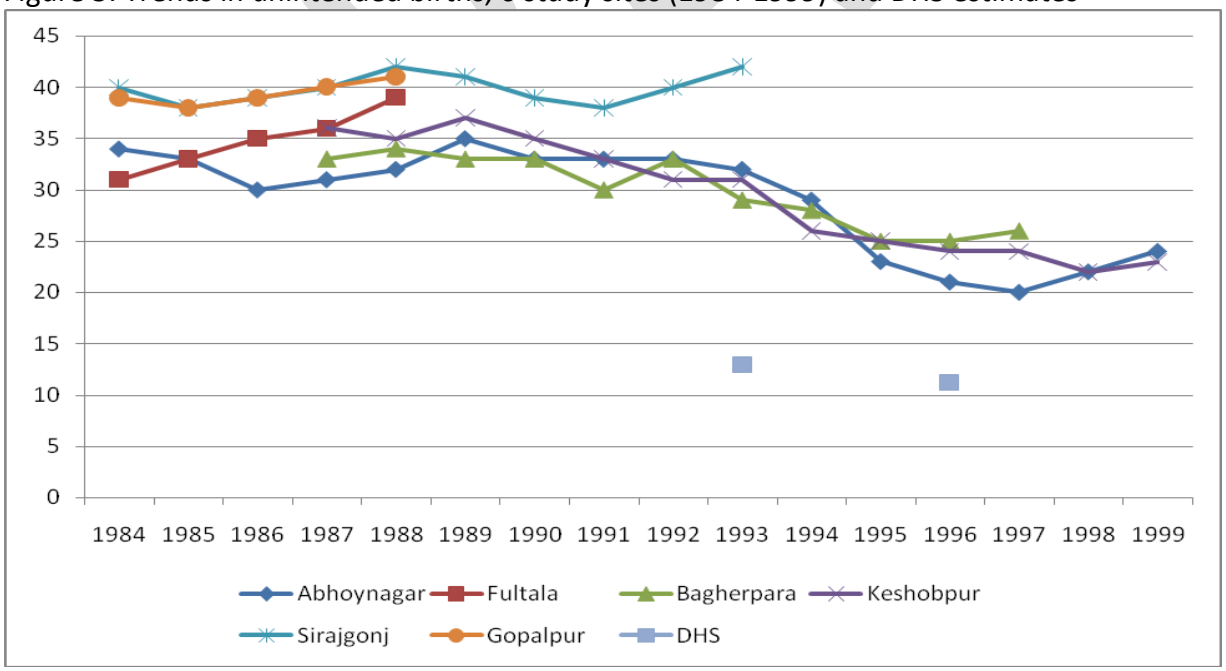


Figure 3: Trends in unintended births, 6 study sites (1984-1999) and DHS estimates



(Smoothed estimates)

Figure 3 compares the level of unintended births that occurred across the 6 study sites throughout the study period. Of note is the difference in levels of unintended pregnancies as determined by our

prospective fertility preferences, as compared to the retrospective DHS estimates. For example, whereas prospective unintended pregnancies ranged from 29-42% across the study areas in 1993, the 1993 DHS estimate was 13%.

The first analysis focuses on the entire dataset of 19,934 births for which there was a previous fertility preference measurement. A total of 2,625 observations were dropped from the analysis since the dataset did not include basic sociodemographic for these women and their births (i.e., religion, education, birth order). These women had births which were registered in the SRS database, but resided in households which were added to the MCH-FP study area between survey periods and for whom these demographic characteristics were not ascertained. In the full dataset, 9,607 mothers registered 17,309 births. Standard errors are adjusted to account for the occurrence of >1 event per woman.

Table 2: Description of Distribution of Births and Sociodemographic Characteristics

Variable	**Intended**	**Unintended**	**Up to Allah/God**	**Sample size Mean**
Intention status	52% (9,040)	32% (5,494)	16% (2,775)	(17,309)
Thana				
Sirajgonj (1982-1993)	23%	41%	50%	(6,487)
Abhoynagar (1982-2000)	35%	24%	21%	(6,010)
Gopalpur (1983-1989)	5%	8%	9%	(1,361)
Fultala (1983-1989)	3%	4%	5%	(716)
Bagherpara (1986-1999)	12%	9%	7%	(1,964)
Keshobpur (1986-2000)	21%	15%	8%	(3,396)
Years				
1983-86	21%	31%	44%	(4,764)
1987-90	21%	33%	48%	(5,083)
1991-95	32%	25%	7%	(4,480)
1996-2000	26%	11%	2%	(2,982)
Mother's age (mean)	29.9 years	37.9 years***	32.5 years***	32.9 years
Birth order (mean)	2.48	5.64***	3.51***	3.65
Religion:				
Hindu/Other	14%	8%***	7%***	(1,904)
Muslim	86%	92%	93%	(15,405)
Woman's education	2.3 years	1.2 years***	0.96 years***	1.72 years
Man's education	3.0 years	2.7 years***	2.2 years***	2.8
Women's status (sum) (1987-95)	2.64	2.66	2.62	2.64 (3,810)
Quality of care (sum) (1987-95)	3.97	3.89	4.00	3.95 (3,626)

Reference group: Intended, ***p≤0.001

Table 2 describes the reduced dataset, showing the distribution of birth events according to birth intention status across thana (administrative unit) and year of birth. In addition, assessment of sociodemographic characteristics according to birth intention status indicates that, as compared to intended births, unintended births were more likely to occur to older mothers, less-educated mothers and fathers, and were more likely to be of higher birth order. For the subsample of births occurring in 1987-1995, there were no significant differences in women's status or quality of care scores according to birth intention status.

Table 3 shows the multivariate multinomial regression results. Given the broader changes with respect to family size norms and contraceptive use and differences in service provision between MCH-FP intervention sites versus control sites that were occurring throughout the study period (5, 10, 17, 20), these analyses are stratified by time period. Consistently, we see that older maternal age and higher birth order are associated with unintended births. In the first, two time periods (1983-86 and 1987-90) Hindu respondents had a lower relative risk of unintended pregnancy as compared to Muslim respondents, after controlling for other covariates. There are some differences across the study areas, with lower risk of 'up to God' births for some study areas (Gopalpur and the SW control sites) as compared to Abhoynagar in the earlier time periods; however, the effects of study areas across time are not consistent. In the later time periods, however, Gopalpur and Sirajgonj have higher risks of unintended pregnancy as compared to Abhoynagar. In the 1996-2000 time period, the southwest control areas had a higher relative risk of unintended births as compared to Abhoynagar.

Table 3: Multivariate Multinomial Logistic Regression of Birth Intention Status, by Time Period

	Unintended	Up to Allah/God
1983 – 1986 (n = 4,764)		
Mother's age: <25 years (ref)	1.00	1.00
25-34 years	2.56***	0.70**
35+ years	4.06***	0.58***
Mother's education: None (ref)	1.00	1.00
Primary	0.95	0.57***
Secondary	1.02	0.63*
Hindu religion	0.63**	0.44***
Birth order	1.87***	1.19***
Region/intervention: Abhoynagar: SW/interven (ref)	1.00	1.00
Fultala/Keshobpur/Bagherpara: SW/control	1.30	1.04
Sirajgonj: North/intervention	1.15	1.19
Gopalpur: North/control	1.28	0.81
1987-1990 (n = 5,083)		
Mother's age: <25 years (ref)	1.00	1.00
25-34 years	2.02***	0.84
35+ years	3.00***	0.73†
Mother's education: None (ref)	1.00	1.00
Primary	0.89	0.74**
Secondary	0.86	0.48***
Hindu religion	0.62***	0.58***
Birth order	1.81***	1.16***
Region/intervention: Abhoynagar: SW/interven (ref)	1.00	1.00
Fultala/Keshobpur/Bagherpara: SW/control	1.04	0.65***
Sirajgonj: North/intervention	1.26	1.14
Gopalpur: North/control	1.53*	0.44***
1991-1995 (n = 4,480)		
Mother's age: <25 years (ref)	1.00	1.00
25-34 years	1.86***	1.07
35+ years	3.80***	1.31
Mother's education: None (ref)	1.00	1.00
Primary	0.97	0.96
Secondary	0.67*	0.42*
Hindu religion	1.15	0.82
Birth order	2.15***	1.56***
Region/intervention: Abhoynagar: SW/interven (ref)	1.00	1.00
Fultala/Keshobpur/Bagherpara: SW/control	0.90	0.81
Sirajgonj: North/intervention	1.54***	3.47***
1996-2000 (n = 2,982)		
Mother's age: <25 years (ref)	1.00	1.00
25-34 years	1.44†	0.68
35+ years	1.76***	0.93
Mother's education: None (ref)	1.00	1.00
Primary	0.59***	0.77
Secondary	0.75†	0.53
Hindu religion	0.93	0.56
Birth order	3.10***	2.15***
Region/intervention: Abhoynagar: SW/interven (ref)	1.00	1.00
Fultala/Keshobpur/Bagherpara: SW/control	1.39*	1.43

*** p ≤ 0.001 ** p ≤ 0.01 * p ≤ 0.05 †p≤0.10

To test the association of women's status and quality of care variables asked in the 1989 and 1993 surveys, we selected a subsample of births occurring between 1987-1995 to assess the relationship between these variables and intention status of births (n=3,600). In addition, this model includes a region/intervention variable to assess the differences in reported intention status according to *thana* (administrative district) and whether the site was an intervention or control area for improved family planning and quality of care interventions (10).

Table 4: Multivariate Multinomial Logistic Regression of Birth Intention Status, 1987-1995 (n = 8,712), Relative Risk Ratios

	Unintended	Up to Allah/God
Mother's age		
<25 years (ref)	1.00	1.00
25-34 years	1.89***	1.55***
35+ years	3.28***	2.36***
Mother's education		
None (ref)	1.00	1.00
Primary	0.93	0.91
Secondary	0.75*	0.51***
Hindu religion	0.79*	0.76†
Spousal educational differences		
Equal	1.00	1.00
Wife>Husband	0.95	0.67*
Husband>Wife	1.06	0.87
Birth order	1.91***	1.22***
Intervention site		
Abhoynagar –intervention (ref)	1.00	1.00
Fultala/Keshobpur/Bagherpara: SW/control	0.99	0.88
Sirajgonj: North/intervention	1.42***	2.21***
Gopalpur: North/control	1.71**	2.21***
Women's status (sum score)	1.05	0.91*
Quality of care (sum score)	1.02	1.00

*** p ≤ 0.001 ** p ≤ 0.01 * p ≤ 0.05 † p≤0.10

Reference group: Intended births

The results of this analysis mirror the findings of the previous analysis with respect to maternal age, education, birth order, and religion. During this time period, respondents in the northern intervention and control areas were more likely to report unintended or 'up to God' births as compared to the Abhoynagar study site. The women's status variables (spousal educational differences and the summative score of women's status variables) indicate that for women with greater mobility and decision-making power, and higher relative education to their husbands, there was a decreased risk of an 'up to God' birth as compared to an intended birth. The quality of care variables were not significantly related to birth intention status in this analysis.

Discussion

Overall, these analyses provide insight in to the levels, trends, and factors associated with birth intention in several areas of Bangladesh over an 18-year time period.

The significant decline in "up to God" responses mirrors other settings as they progress through the fertility transition. As reflected in the drastic decline in fertility in Bangladesh over this time period, broader social and personal transitions were occurring. As discussed by van de Walle, the shift away from fatalistic responses over this study period is likely reflecting the notion of 'calculus of conscious choice' in which individuals and couples begin to identify contraception as a means of regulating fertility and achieving preferred family size norms (21).

Also unique to this analysis is the prospective assessment of fertility preferences and birth outcomes. Prospective measurements can also be problematic, in that they do not account for intervening situational changes (e.g., death of a child, economic status) that may shift fertility preferences. However, retrospective measurements of fertility preferences, such as those used in the Demographic and Health Surveys are problematic in that determine intention status for births that occurred 3-5 years previously. Assessments of prospective versus retrospective assessments have indicated that retrospective assessments likely underestimate the true level of unintended pregnancies/births (9, 22, 23). In this analysis, levels of unintended births as reported in our database across several study areas are more than double of what was recorded in the national DHS estimates.

Previous studies have indicated that the improvement of quality of care and women's status have positive impacts on contraceptive uptake and continuation (cite). We did not find indications of an effect of quality of care; however, higher status among women was associated with lower risk of fatalistic responses ('up to God'). Given the multidimensionality of women's status, further analyses will be conducted to assess the potential associations of specific domains of women's status, rather than a summative score of variables. Moreover, since these measures were ascertained at two, different timepoints (1989, 1993), further work is needed to sort out the temporality of these measures with the ascertainment of intention status and the birth outcome. Further analyses will also explore the occurrence of repeat, unintended pregnancies among women in the study.

A few limitations of this study should be mentioned. The fertility preference measures that were used across the MCH-FP surveys were usually trichotomous measures (want more; don't want more; up to God). More recent studies have pointed to the utility of a scaled measure to better represent the nuances of fertility preferences (22, 24). In addition, across the time period, these preferences were consistently measured for women only. A separate analysis of data from the 1998-2003 MCH-FP data indicated the importance of considering husbands' fertility preferences for subsequent reproductive outcomes; however, these measurements were not available for the duration of the study (12, 15). Lastly, this dataset includes only live birth outcomes, underestimating the true level of unintended pregnancies in the population. In the analysis of 1998-2003 data, 11% of all pregnancies were terminated via menstrual

regulation over the 5-year study period (12). Further attempts to include non-live births and pregnancies will be attempted using this dataset.

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