CONTRACEPTIVE INTENTIONS AND USE IN RURAL BANGLADESH

Rebecca Callahan, PhD

Stan Becker, PhD

Abstract

While numerous theories of health behavior assume that intentions are the most proximate determinates of behavior, limited evidence exists on the predictive validity of contraceptive use intentions for subsequent contraceptive use. Data from a unique longitudinal study conducted in rural Bangladesh allow for a comparison of women's intention to use contraception in 2006 with their adoption of a method over the following three-year period. Results indicate that while intentions do predict subsequent use (OR=2.7, 95% CI 1.8-4.2), other aspects of women's reproductive experience including current or recent pregnancy and prior use of contraception are also important for predicting future use. Thirty-five percent of women who said they intended to use did not, while two fifths of women with no intention to use at baseline adopted a method, indicating that intentions are not a very sensitive or specific indicator of future use. In addition, only a third of women adopted the method they intended to use in 2006. More nuanced measures of use intentions such as those that gauge intention strength or timing may improve the predictive validity of the measure, thus making if more useful for program planning.

Introduction

Prevailing theories of health behavior consider an individual's intention to perform a behavior as one of the most important precursors to actually carrying out the behavior (Azjen & Fishbein, 1980; Azjen, 1985 & 1991; Fishbein, 2000). The belief that intentions predict behavior is so widespread that many behavior change interventions, including those targeting contraceptive and condom use, consider changes in behavioral intentions as an indicator of program success (Webb & Sheeran, 2006; Agha, 2010). Similarly, reproductive health surveys such as the Demographic and Health Survey (DHS) routinely query women not currently using contraception about their intention to use in the future presumably because researchers and program planners believe responses to these questions predict future behavior. In actuality, very few studies have assessed the relationship between use intentions and later use due to a dearth of appropriate longitudinal data. Therefore, while commonly collected, intentions data are relied upon less for predicting contraceptive demand and targeting family planning resources than is the measure of unmet need for contraception, or the proportion of women who say that they do not want to become pregnant but are not using a method of contraception[1]. A better understanding of the predictive validity of use intentions for subsequent contraceptive behavior is necessary to determine the usefulness of these types of data.

Intentions and use

One of the few prospective studies to compare women's intention to use contraception and consequent behavior comes from Bangladesh. Using data from the Matlab Family Planning

[1] We assess unmet need for contraception in this population in another manuscript.

Health Services Project, Bhatia (1982) found that only 34 percent of women who reported plans to use contraception actually used a method within 15 months. This study did not include a reference period for future use, however, and the follow-up period may have been too short to adequately capture future use, especially since a large proportion of women were either pregnant or lactating at the time of the initial survey. The study also did not assess predictors of successful fulfillment of intentions.

More recently, Curtis and Westoff (1996) made use of a panel Demographic and Health Survey (DHS) in Morocco to compare women's intention to use contraception at the time of the 1992 baseline questionnaire and subsequent use reported in the follow-up questionnaire in 1995. More than three quarters of women who said in 1992 that they intended to use a method subsequently reported in 1995 method use during the inter-survey period. Along with prior contraceptive use, reported intention in 1992 to use contraception proved to be the strongest predictor of future method use. Intentions most strongly predicted use for women who had experienced a prior unintended pregnancy. The 14 percent of women who reported in 1992 intention to use but did not subsequently do so were the most likely to have an unmet need for family planning at follow-up.

Another assessment of contraceptive use intentions and outcomes was conducted using data from the 1992-1993 India National Family Health Survey and a follow-up survey in one state in 1999 (Roy et al., 2003). A substantially smaller proportion of those reporting plans to use a method actually did so in the inter-survey period (49 percent) compared with women intending to use in Morocco (76 percent). Older age was associated with greater consistency between intentions and behavior. Child death during the inter-survey period, however, reduced the likelihood for women to act on the intentions they reported at baseline. This study also found

that women who stated that they did not want any more children and who intended to use family planning were more likely to begin use of a method than other women, indicating that use of both indicators is more effective at gauging contraceptive demand than either alone.

Community effects

Over the last two decades researchers have paid increasing attention to the hierarchical nature of social science data and the importance of considering factors beyond the household for influencing health behaviors and outcomes (Khan, 1997; Stephenson & Tsui, 2003; NIH, 2000). In the field of fertility and family planning, the use of multi-level models has allowed researchers to look beyond individual level determinants of reproductive health behaviors and evaluate the role of community development, norms, attitudes, and health service offerings (Stephenson & Tsui, 2003; Kamal et al., 1999; Kaggwa et al., 2008). Studies in The Philippines, India, South Africa, Pakistan and Bangladesh have shown that the presence and quality of service providers offering family planning and the number of methods available at the village level are associated with women's contraceptive adoption (DeGraff et al., 1997; Stephenson & Tsui, 2002; Hamid & Stephenson, 2006; Hossain, 2005). In a unique study of community-level effects on contraceptive uptake among post-partum women using the longitudinal DHS data from Morocco mentioned above, Steele et al. (1999) found that closer proximity to a health facility offering family planning and increasing number of available methods were both significantly associated with method adoption at the cluster level. Similar to other studies, they did not find an association between contraceptive use and community socioeconomic status.

We are aware of only one study that has assessed the importance of community factors on the relationship between contraceptive use intentions and subsequent use. Using the same

longitudinal DHS data from Morocco, Magnani et al. (1999) found that women's intentions to use contraception were significantly influenced by supply-side factors in the environment, specifically method availability and the number and training of nearby health facility staff. Notably, in contrast to the analysis by Curtis and Westoff (1996), this study found that women's use intentions did not significantly predict subsequent use[2].

The majority of multi-level analyses of contraceptive use have logically focused on the family planning service environment. Several investigators point out, however, that while service-related variables are associated with contraceptive use at the community level, residual community-level variation often remains indicating that unobserved characteristics are influencing contraceptive use at the cluster level. A limited number of studies have attempted to identify these unobserved characteristics by including measures of community norms around family planning use, social networks that may transmit contraceptive knowledge, and measures of female autonomy, for example (Kaggawa et al., 2008; Stephenson et al., 2008). The primary limitation for these types of studies has been the lack of suitable data measuring these often complex phenomena.

The present study takes advantage of a unique panel dataset that includes data on contraceptive use intentions among a sample of rural women in Bangladesh in 2006 and their contraceptive use behavior over the subsequent three years. In this analysis we explore individual and community-level predictors of intention to use a method, predictors of contraceptive use, and the relationship between intentions and use by type of method. We also examine the timing of method uptake and pregnancy among women intending and not intending

[2] The authors argue that their two-equation probit model accounts for common unobserved factors that affect both intentions and use and, therefore, more appropriately model the relationships between predictors and contraceptive use intentions and actual use.

to use a method. We hypothesize that: 1) women who reported in 2006 that they intended to use a method are more likely to begin use during the inter-survey period than women who did not intend to use; 2) women living in villages with higher contraceptive prevalence are more likely to begin use of a method regardless of their intention status in 2006; and 3) that women living in villages with greater access to health and family planning services are more likely to go on to use a method than women living in villages with less access.

Methods

The data used in this analysis come from two surveys carried out in 2006 and 2009 in 128 villages in three of the six Divisions of Bangladesh (Chittagong, Dhaka and Rajshahi) as part of the Bangladesh Microcredit and Health Study (BMHS), an experimental project designed to assess the relative effects of separately and jointly introducing additional micro-credit and essential health services interventions on the use of health services, economic well-being, and women's empowerment. The two surveys served as the baseline and endline surveys for the BMHS and included household, women's, community, and men's questionnaires at both time points. For the present analysis we use data from the baseline and follow-up women's questionnaires and the baseline community questionnaire. The baseline women's questionnaire had a response rate of 98.7 percent with 3,933 currently married women participating. Ninety-four percent of the original sample (3,687 women) completed the follow-up questionnaire three years later. The community questionnaire solicited responses from between two and six key informants in each of the 128 sampled villages. Key informants included elected officials,

religious leaders, educators, doctors, and business people among others. Additional details of the study design and survey sampling are given elsewhere (Amin et al., 2010) [3].

Measures

The women's questionnaires included socio-economic, demographic, and maternal and child health questions similar to those included in the DHS (DHS, 2012). Women were asked about their knowledge of contraceptive methods and if they had ever used a method. Women under age 50 who were married and not pregnant at the time of the survey were asked if they were currently using any method and, if so, what method. Pregnant and non-pregnant married women who said they were not currently using contraception were asked, "Do you think you will use a method to delay or avoid pregnancy at any time in the future?" Women who responded "yes" were then asked what method they planned to use. The surveys also included a calendar in which interviewers recorded monthly data on pregnancy and contraceptive use history, source of contraception, and marital status for the 40 months prior to the baseline interview and the 43 months prior to the follow-up (Appendix 1). The follow-up calendar covered the entire period between the two surveys providing data on women's use of contraception during the three years. Further description of the calendar included in the BMHS are provided elsewhere (Callahan & Becker, 2012).

The community questionnaire gathered information about the relative remoteness and level of development of each village. Key informants reported on the distance of the village

[3] Prior to the baseline survey, a census was conducted in all 128 villages in order to categorize the households intothree strata: 1) those not eligible for micro-credit, 2) those eligible and who had accessed micro-credit, and 3) those eligible but who had not accessed micro-credit. For the survey, a stratified random sample was taken with these three strata among all households that had ever-married women in each village. The sample sizes chosen were: 4, 12 and 15 from strata 1, 2, and 3, respectively. From the sample and census information and the interview response rates, sampling weights were derived for each household and woman. All analyses described here were adjusted for the sample design and employ the sampling weights.

from such things as the nearest paved road, the district headquarters, and health facilities. They were also asked about village infrastructure and services such as the presence or absence of schools, markets, and a post office, as well as the availability of health and family planning services including if methods were sold by an individual or shop and if a health or family planning worker lived in the village.

Several demographic, reproductive history, and community-level variables are included in the analysis based on their anticipated association with contraceptive intentions and use (Table 3.1). Women's reproductive experience including prior use of contraception, prior unintended pregnancy and desire to limit future childbearing are expected to be positively associated with intention to use contraception. A measure of family planning (FP) media exposure is included based on the assumption that exposure to family planning messages will positively influence intentions and use. Exposure is defined as whether or not the respondent has seen, heard, or read about FP via radio, television, newspaper, poster, or community event in the past month. Women's decision-making power is also assumed to be associated with intention to use and actual use of contraception. The measure of woman's decision-making power is based on whether a woman participates in ten decision-making items and if she reports herself as the first or second most important person in making the decision based on a previously defined score[4] (Mahmud et al., 2011). A wealth measure is also included based on a previously constructed

[4]Decisions include buying furniture, buying livestock, spending family savings, taking a loan, treatment for sick children, visiting a doctor for herself, her working outside of the home, her visiting her father's home, having more children, and using family planning.

household asset index[5] (Amin et al., 2010). All variables are based on the status of the respondent at the time of the baseline survey.

The community-level variables of interest include three aggregated variables based on the responses of all women sampled in each village: the proportion of women using a contraceptive method, the proportion of women currently involved in microcredit activities and mean parity across villages. Such cluster-level variables derived from aggregating individual responses have been shown to be effective in capturing community-level influences on individual outcomes (Blakely & Woodward, 2000). The other community variables come from the 2006 community questionnaire and are shown in Table 3.1. An index of relative village "development" or "infrastructure" was devised using principal components' analysis (PCA) with binary indicators of the presence or absence in the village of a post office, pharmacy, primary school, high school, daily or weekly market, and madrassa. The first component generated from the PCA is used for the infrastructure score and contains 39 percent of the variance of the included indicators.

[5] Information on assets was collected in the household questionnaire. Binary indicators included presence or absence of electricity, a wardrobe, table, chair, clock, bed, radio, television, bicycle, at least one of a motorcycle, sewing machine or telephone, brick, cement or tin walls, and modern toilet or pit latrine. In addition, the ratio of the number of people in the household to the number of rooms in the house was included. Principal components' analysis was used to combine the asset indicators and household density figure into an asset index that was assigned to each respondent (Filmer and Pritchett 2001).

Table 3.1: Individual and community-level variables, scales and definitions

Individual-Level Variables	**Scale**	**Definition**
Outcome measures		
Intention to use contraception	Binary	Whether a woman not using a method in 2006 intends to use contraception in the future
Use of any method	Binary	Use of any method of contraception between 2006-09 based on report in the 2009 contraceptive calendar
Demographic variables		
Age	Continuous	Age of the respondent in years
Religion	Binary	Muslim or Hindu religion
Schooling	Categorical	Primary: attended any school through completion of grade 5; Secondary: completion of grade 6 or above
Economic status/Asset score	Continuous	Household wealth measured by an asset index
Decision-making score	Continuous	Women's household decision-making power based on an index of decision-making ranging from 0-20.
Reproductive history variables		
Parity	Continuous	Number of living children including current pregnancy
Child death or stillbirth	Binary	Whether the respondent has ever experienced a stillbirth or death of a child
Fertility preference	Binary	Whether the respondent wants another child (if pregnant, after current pregnancy)
Planning status of last birth or pregnancy	Categorical	Whether the respondent's last birth or current pregnancy was wanted at the time, wanted later, or not wanted at all
Ever used contraception	Binary	Whether the respondent has ever used contraception
FP Media Exposure	Binary	Whether the respondent has been exposed to radio, TV, or newspaper messages about FP in the last month
Talked to anyone about FP	Binary	Talked to anyone in the last three months about using contraception
Community-Level Variables*	**Scale**	**Definition**
Village CPR	Continuous	Mean village contraceptive prevalence rate based on women living in the village in 2006
Village microcredit participation	Continuous	Proportion of women living in the village participating in a microcredit program at baseline
Village parity	Continuous	Mean parity of women living in the village at baseline
Health or FP worker living in village	Binary	Whether either a health worker or FP worker was living in the village in 2006
FP method(s) sold in village	Binary	Whether any method of contraception was sold in the village by an individual or shop based on community informant report
Village infrastructure score	Continuous	Index of village infrastructure or development based on presence of primary school, high school, daily or weekly market, pharmacy, madrassa, and post office
Distance to *thana* HQ	Categorical	Distance greater than or less than 5 miles to the *thana* or sub-district headquarters

* Except for village CPR, microcredit participation, and parity all community-level variables are based on community informant report in the 2006 community questionnaire

Sample

The sample of women used for this analysis includes 1,034 married women under age 50 who were asked about their contraceptive use intentions at baseline and reported on their contraceptive use during the inter-survey period in the follow-up calendar (Figure 3.1). Only sixty-eight women who were asked about their contraceptive use intentions at baseline were lost to follow-up. These women did not differ from those completing both surveys (Table 3.2).

Analyses

Logistic regression analyses examining the individual and community-level multivariate

Figure 3.1. Sample of women who were asked about their intention to use contraception in 2006 and subsequent contraceptive use between 2006-2009

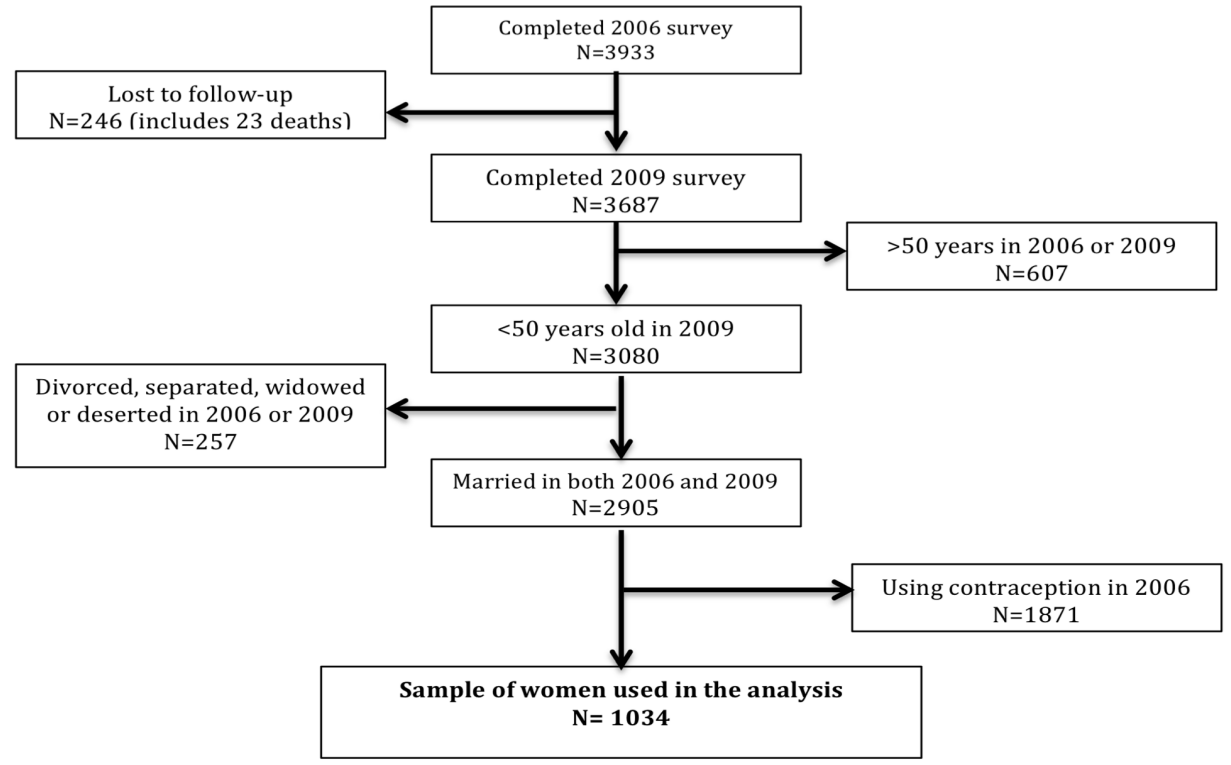


Table 3.2: Demographic and reproductive history characteristics at baseline of women not using a method of contraception by interview status in the 2009 follow-up survey

Characteristic	Completed both surveys N=1034	Lost to follow-up N=68	p-value*
Reproductive history characteristics			
Means			
Parity	2.6	1.9	0.29
Percents			
Currently pregnant	15.7	6.1	0.11
Within one year post-partum	26.6	17.0	0.33
Would like to have another child	43.9	63.3	0.25
Ever had menstrual regulation	3.3	0	0.71
Ever experienced child death or stillbirth	27.8	16.7	0.25
Last birth/pregnancy was unintended	21.6	16.0	0.17
Ever used contraception	71.5	68.4	0.84
Heard media messages about FP in the last month	19.3	21.1	0.86
Talked to anyone about using FP[1]	6.9	1.2	0.56
Demographic characteristics			
Means			
Age	28.6	27.3	0.50
Mean asset score[2]	0.51	-0.15	0.32
Mean decision-making score[3]	16.7	16.6	0.99
Percents			
Ever attended school	67.4	68.3	0.95
Husband ever attended school	67.7	56.3	0.49
Muslim religion	97.5	96.9	0.81

Adjusted for sample design.
*p-values based on Wald tests for continuous variables and chi square tests for categorical variables.
[1]Does not include 351 women who have never used a method.
[2]Asset score ranges from -4.32-3.58, see Table 3.1 for explanation.
[3]See Table 3.1 for explanation.

predictors of intention to use contraception and use of a method during the inter-survey period were conducted with a sub-sample of 904 women from poor households (130 women from wealthy households were excluded)[6]. To account for potential within-village correlation, robust Huber-White or "sandwich" estimates of variance are employed (Rogers, 1993; Williams, 2000).

[6] Because the BMHS was primarily interested in the effects of microcredit activity on health and empowerment outcomes, the majority of women sampled were from poor households who were eligible for microcredit participation based on Grameen Bank criteria. The sample weights applied to non-eligible, wealthier women are therefore much higher than those applied to poorer women and distort the regression results. While the exclusion of the small number of wealthier women from the models means that the results are no longer generalizable to the entire population living in the sampled area, the results still apply to the majority of residents because the majority of women in the study area are poor.

We also employed survival analysis techniques to examine the time to acceptance of a contraceptive method between 2006 and 2009 among women who were not using a method in 2006. Because most of the women included in the sample were at risk of pregnancy, we used a competing risks analysis that modeled the cumulative incidence of beginning use of a contraceptive method treating pregnancy as a competing risk. The cumulative incidence for failure type *k,* in this case beginning contraceptive use, is estimated as

$$\widehat{I}_k(t) = \sum_{j|t_j \leq t} \widehat{S}(t_{j-1}) \frac{d_{kj}}{n_j}$$

where $\widehat{S}(t_j - 1)$ is the Kaplan-Meier (KM) estimate of the overall survival function, i.e., failure of any type, and the second factor is an estimate of the hazard of failure type *k* at time *j* in months. (Marubini & Valsecchi, 1995; Coviello & Boggess, 2004). The cumulative incidence is, therefore, a function of the hazards of all the competing risks and not just the event of interest. Estimating the KM incidence of beginning contraception alone would treat pregnancy as an independent event and simply consider women who become pregnant as censored observations resulting in an overestimation of the cumulative incidence of beginning use.

Because data on timing of method uptake come from the 2009 contraceptive calendar, we can only estimate the cumulative incidence of beginning a method among women who provided a reliable report in the 2009 calendar of their contraceptive or pregnancy status for the baseline interview month, i.e., women were excluded from the analysis if their report in the 2009 retrospective calendar for the month of their 2006 interview did not match what they reported at the time of the 2006 interview. In this way, 333 women were excluded from the analysis. Because the sample is restricted to only women not using a method at the time of the 2006

interview, all women should have reported in 2009 that they were either not using a method or were pregnant in 2006. We allowed a two-month window on either side of the baseline interview month to increase the number of reliable reports. Based on our previous analysis of the reliability of the BMHS calendar data, we expect that women who have experienced more births and episodes of contraceptive use are less likely to report reliably in the calendar (Callahan & Becker, 2012). Excluding these women will, therefore, likely underestimate cumulative incidence of both contraceptive use and pregnancy.

All analyses were performed using Stata version 11 (College Station, TX) and adjusted for sample design unless otherwise noted.

Results

Predictors of intentions and use

Of the 1,034 married women not using contraception at the time of the 2006 survey, 71 percent reported that they intended to use a method in the future and 58 percent actually began using a method during the inter-survey period between 2006 and 2009. Table 3.3 describes the characteristics of women who intended to use a method and those who began use of any method. Nearly all of the 215 women who were pregnant and over 80 percent of those who were within one year postpartum at the time of the baseline interview said they intended to use and the vast majority of both of these groups began using a method during the following three-year period. In contrast, just over half of women who were not pregnant or post-partum said they intended to use and not quite two-fifths actually began using. While more women expressing a desire for

Table 3.3: Weighted* percent of married women aged 13-49 who said in 2006 that they intended to use a method in the future and the percent who began use of any method between 2006-09

Characteristic	Intended to use in 2006	Began use 2006-09	No. of women
Socio-demographic			
Age			
<30 years	87.4	64.0	595
≥30 years	47.2	49.2	439
Parity			
0	72.1	47.5	104
1-2	82.2	60.5	422
3-4	69.3	65.4	291
5+	46.5	49.6	217
Schooling			
None	54.7	54.4	506
Primary	71.2	53.4	306
Secondary	83.1	63.4	222
Religion[1]			
Muslim	70.2	57.3	989
Hindu	87.0	82.7	41
Relative household economic status			
Poorest	62.9	57.7	345
Middle	77.1	57.6	345
Richest	71.4	57.9	344
Household decision-making power[2]			
High (18-20)	75.2	64.0	529
Low (0-17)	67.6	53.7	505
Reproductive history			
Exposure status			
Fecund	55.0	38.9	559
Pregnant	97.4	80.0	215
Within one year post partum	82.9	89.7	260
Planning status of last birth/pregnancy			
Intended	70.8	62.4	667
Unintended	65.7	56.3	304
No prior pregnancies	81.3	25.3	63
Future childbearing preference			
Would like a/another child	83.5	49.3	387
Do not want any more children/Don't know	60.6	64.5	647
Used contraception in the past			
Yes	70.3	61.4	683
No	71.5	48.7	351
Talked to anyone about FP in the last 3 months[3]			
Yes	89.5	84.2	69
No	68.3	59.0	614
Heard FP media message in the last month			
Yes	78.0	46.0	146
No	68.9	60.6	888
Ever experienced child death or stillbirth			
Yes	44.2	58.3	339
No	80.8	57.6	695
All women	70.7	57.8	1034

*Adjusted for sample design.
[1]Does not include four women who reported religion other than Muslim or Hindu.
[2]See Table 3.1 for explanation.
[3]Does not include 351 who never used a method.

additional children said they intended to use a method in the future than women who wanted no more children, a smaller proportion of the former group actually began using a method. Since women were not asked when they planned to use a method, presumably many women wanting another child intended to use after their next birth. Similar proportions of women with and without prior contraceptive experience intended to use in 2006, however those who had used in the past were more likely to adopt a method. Differences in intention status and method used are also observed by whether or not a woman had talked to anyone about family planning in the past three months and her exposure to family planning-related media messages. Interestingly, a smaller proportion of women with FP-related media exposure began use compared with those who had not heard such messages. Women who had ever experienced the death of a child or stillbirth were less likely to report an intention to use contraception compared with women without such experience, however similar proportions actually adopted a method. Differences in intention to use and actual use are also observed by household decision-making power, schooling, religion, age and parity. The proportion of women intending to use a method varies by relative household economic status; however, little difference is seen in subsequent use.

Of the 128 villages included in the study, all but one included women aged 13-49 not using a method of contraception in 2006. Table 3.4 shows the average village values of the community variables of interest and the percentage of women intending to use a method and beginning use of a method during the inter-survey period. On average, 77 percent of women were using a method of contraception at the time of the 2006 survey (village range 47-100 percent), mean microcredit participation across villages was 53 percent, and mean parity across villages was 3.1 children. A health or family planning worker was reported to live in 91

percent of villages and 75 percent had methods for sale. The percent of women intending to use a method of contraception and the percent actually beginning use of a method do not vary greatly by community-level indicator; however as expected, relatively lower proportions of women living in villages with low contraceptive prevalence, high parity, and no methods for sale began use of a method between 2006 and 2009.

The multivariable logistic regression results shown in Tables 3.5a and 3.5b show that, after adjusting for other background variables, women who were pregnant or within one-year

Table 3.4: Village characteristics (N=127*) and percent of married women aged 13-49 who said in 2006 that they intended to use a method in the future and the percent who began use of any method between 2006 and 2009

Village Characteristic**	No. of villages	Mean (SD)	Range	Percent of all women	
				Intending to use in 2006	Beginning use between 2006-09
Village CPR		0.77 (0.11)	0.47-1.00		
Highest mean CPR	64			63.6	66.9
Lowest mean CPR	63			72.6	57.2
Village microcredit participation		0.53 (0.13)	0-0.87		
Highest mean MC participation	64			68.5	61.2
Lowest mean MC participation	63			67.9	62.6
Village parity		3.11 (0.63)	1.41-4.42		
Highest mean parity	64			65.2	57.5
Lowest mean parity	63			71.2	66.2
Health or FP worker living in village		0.91 (0.29)	0-1		
Yes	116			68.3	61.8
No	11			67.6	63.0
Any method sold in village by individual or shop		0.75 (0.43)	0-1		
Yes	118			70.1	63.7
No	9			62.7	56.5
Village infrastructure score		~0 (1.47)	-1.46-6.30		
High	64			68.5	61.8
Low	63			68.0	62.0
Distance to *thana* HQ		5.49 (3.70)	0-20		
≤ 5 miles	71			65.6	62.2
> 5 miles	56			75.4	61.0
ALL WOMEN				68.2	61.9

Adjusted for sample design.
*One of the 128 village samples did not have any women not using a method at the time of the 2006 survey.
**Based on 2006 data.

Table 3.5a: Estimated unadjusted and adjusted odds ratios from logistic regression analysis of intention to use contraception among poor married women not using a method in 2006[1] (N=904)

Covariate	Unadjusted odds ratios	Model 1: Adjusted odds ratio	Model 2: Adjusted odds ratios with interactions
Individual-level reproductive history variables			
Pregnant or within one year post-partum	10.68 (6.5-17.5)***	6.62 (3.7-11.7)***	--
Planning status of last birth/pregnancy (Ref = Intended)			
Unintended	1.69 (1.1-2.5)**	2.41 (1.4-4.1)**	--
No prior pregnancies	0.61 (0.3-1.2)	0.92 (0.4-1.9)	--
Would like a/another child in the future	1.62 (1.0-2.5)**	2.03 (1.0-4.2)*	--
Used contraception in the past	2.06 (1.5-2.8)***	2.48 (1.5-4.0)***	2.41 (1.5-3.9)**
Heard FP media message in the last month	1.99 (1.1-3.4)**	1.85 (0.8-4.3)	1.95 (0.9-4.4)
Ever experienced child death or stillbirth	0.37 (0.3-0.5)***	0.60 (0.4-1.0)**	0.62 (0.4-1.0)**
Parity >2	0.47 (0.3-0.7)***	1.24 (0.5-2.9)	1.49 (0.7-3.3)
Other individual-level variables			
High household decision-making power[2]	2.09 (1.4-3.1)***	1.57 (1.0-2.5)*	1.66 (1.0-2.7)**
Schooling (Ref = None)			
Primary	2.20 (1.4-3.5)**	1.53 (0.9-2.5)	1.60 (0.9-2.7)*
Secondary	3.29 (1.9-5.8)***	1.55 (0.7-3.3)	1.58 (0.7-3.3)
Religion (Ref = Muslim)			
Hindu	2.29 (1.1-4.8)**	2.01 (0.9-4.6)*	2.31 (0.9-5.8)*
Relative economic status (Ref = Poorest)			
Middle	1.18 (0.7-2.1)	1.14 (0.6-2.0)	1.23 (0.7-2.3)
Richest	0.95 (0.5-1.7)	0.72 (0.4-1.3)	0.81 (0.4-1.5)
Age ≥30 years	0.15 (0.1-0.2)***	0.20 (0.1-0.3)***	0.19 (0.1-0.3)***
Community-level variables			
High village CPR[3]	1.00 (0.6-1.6)	0.66 (0.4-1.2)	0.62 (0.3-1.1)
High village microcredit participation[3]	1.36 (0.8-2.3)	1.13 (0.6-2.0)	1.11 (0.7-1.9)
High village parity[3]	0.88 (0.5-1.4)	1.04 (0.6-1.7)	1.18 (0.7-1.9)
Health or FP worker living in village	1.60 (0.8-3.2)	1.84 (0.9-4.0)	1.75 (0.8-3.9)
Any method sold in village by individual or shop	1.56 (0.9-2.7)*	1.58 (0.8-3.2)	1.58 (0.8-3.1)
Village infrastructure score[4]	1.06 (0.9-1.3)	1.07 (0.9-1.3)	1.07 (0.9-1.3)
Distance from *thana* HQ >5 miles	1.04 (0.9-1.7)	0.87 (0.5-1.)	0.83 (0.5-1.4)

[1]Poor women include those living in households eligible for microcredit participation based on household income.
[2]High household decision-making power is defined as 18 or above; see Table 3.1 for explanation.
[3]Village CPR, village microcredit participation and village parity are mean values based on all women living in the village. A village is assigned a "1" for "high" value for each if its mean value falls in the top 50% of all villages. The reference group includes those villages with a mean value in the lower 50% of all villages.
[4]The village infrastructure score ranges from -1.5-6.3; see Table 3.1 for explanation
Significant at *p<0.10, **p<0.05, ***p<0.001

Table 3.5a Continued: Estimated unadjusted and adjusted odds ratios from logistic regression analysis of intention to use contraception among poor married women not using a method in 2006[1] (N=904)

Covariate	Unadjusted odds ratios	Model 1: Adjusted odds ratio	Model 2: Adjusted odds ratios with interactions
Interactions			
Planning status of last birth by preg/PP status			
Last birth was not planned among those not pregnant or PP (Ref = Last birth planned among those not pregnant or PP, adjusting for wanting a/another child)	--	--	1.69 (0.9-3.2)
	--	--	7.78 (2.3-26.8)**
Last birth was not planned among those pregnant or PP (Ref = Last birth planned among those pregnant or PP, adjusting for wanting a/another child)			
Desire for another child by preg/PP status			
Would like a/another child among those not pregnant or PP (Ref = Would not like a/another child among those not pregnant or PP, adjusting for planning status of last birth)	--	--	2.83 (1.4-5.9)**
Would like a/another child among those pregnant or PP (Ref = Would not like a/another child among those pregnant or PP, adjusting for planning status of last birth)	--	--	0.61 (0.2-1.7)
F-adjusted test statistic (prob>F)	--	1.24 (0.28)	0.94 (0.50)

Significant at *p<0.10, **p<0.05, ***p<0.001

post-partum have higher odds of both intending to use a method and going on to use than women who were neither pregnant nor post-partum at baseline, consistent with the results just described. Other predictors of both intention to use and actual use include prior contraceptive use, high levels of household decision-making power, and age less than 30 years. Compared with women who said that their last pregnancy was intended, women whose last pregnancy was unintended have higher odds of intending to use a method (OR=2.4, 95% CI 1.4-4.1) but not of beginning use (OR=1.1, 95% CI 0.7-1.8). Among pregnant and post-partum women, however, the odds of intending to use and beginning use are higher among women whose last birth was unintended

Table 3.5b: Estimated unadjusted and adjusted odds ratios from logistic regression analysis of adoption of any method between 2006-09 among poor married women not using a method in 2006[1] (N=904)

Covariate	Unadjusted odds ratios	Model 1: Adjusted odds ratio	Model 2: Adjusted odds ratios with interactions
Individual-level reproductive history variables			
Intend to use a method at baseline	4.67 (3.2-6.9)***	2.74 (1.8-4.2)***	--
Pregnant or within one year post-partum	4.92 (3.3-7.4)***	2.07 (1.3-3.2)**	--
Planning status of last birth/ pregnancy (Ref = Intended)			
Unintended	1.86 (1.2-2.9)**	1.14 (0.7-1.8)	--
No prior pregnancies	0.21 (0.1-0.4)***	0.65 (0.3-1.5)	--
Would like a/another child in the future	0.43 (0.3-0.6)***	0.33 (0.2-1.5)***	0.30 (0.2-0.5)***
Used contraception in the past	3.47 (2.5-4.9)***	2.69 (1.7-4.1)***	2.85 (1.9-4.3)***
Heard FP media message in the last month	1.45 (0.9-2.3)	1.32 (0.7-2.5)	1.27 (0.7-2.4)
Ever experienced child death or stillbirth	0.72 (0.5-1.0)*	1.05 (0.6-1.7)	1.13 (0.7-1.9)
Parity >2	1.15 (0.8-1.7)	1.40 (0.8-2.5)	1.45 (0.8-2.6)
Other individual-level variables			
High household decision-making power[2]	2.42 (1.6-3.7)***	1.86 (1.2-2.8)**	1.93 (1.3-3.0)**
Schooling (Ref = None)			
Primary	1.22 (0.8-1.8)	0.77 (0.5-1.3)	0.80 (0.5-1.3)
Secondary	1.76 (1.1-2.8)**	1.04 (0.5-2.0)	1.06 (0.6-2.0)
Religion (Ref = Muslim)			
Hindu	0.96 (0.5-1.9)	0.74 (0.3-1.8)	0.70 (0.3-1.8)
Relative economic status (Ref = Poorest)			
Middle	1.08 (0.7-1.6)	0.87 (0.5-1.4)	0.89 (0.5-1.4)
Richest	1.19 (0.8-1.9)	1.00 (0.6-1.7)	1.08 (0.6-1.8)
Age ≥30 years	0.43 (0.3-0.6)***	0.33 (0.2-0.6)***	--
Community-level variables			
High village CPR[3]	1.37 (0.9-2.0)	1.24 (0.8-1.9)	1.25 (0.8-2.0)
High village microcredit participation[3]	1.23 (0.8-1.8)	1.18 (0.8-1.8)	1.19 (0.8-1.8)
High village parity[3]	0.63 (0.4-1.0)**	0.54 (0.3-0.8)**	0.56 (0.3-0.9)**
Health or FP worker living in village	1.28 (0.5-3.0)	1.57 (0.6-4.2)	1.45 (0.5-4.1)
Any method sold in village by individual or shop	0.94 (0.6-1.4)	0.72 (0.5-1.1)	0.74 (0.5-1.1)
Village infrastructure score[4]	1.07 (1.0-1.2)	1.13 (1.0-1.3)**	1.12 (1.0-1.3)*
Distance from *thana* HQ >5 miles	1.17 (0.8-1.8)	0.87 (0.5-1.4)	0.86 (0.5-1.3)

[1]Poor women include those living in households eligible for microcredit participation based on household income.
[2]High household decision-making power is defined as 18 or above; see Table 3.1 for explanation.
[3]Village CPR, village microcredit participation and village parity are mean values based on all women living in the village. A village is assigned a "1" for "high" value for each if its mean value falls in the top 50% of all villages. The reference group includes those villages with a mean value in the lower 50% of all villages.
[4]The village infrastructure score ranges from -1.5-6.3; see Table 3.1 for explanation
Significant at *p<0.10, **p<0.05, ***p<0.001

Table 3.5b Continued: Estimated unadjusted and adjusted odds ratios from logistic regression analysis of adoption of any method between 2006-09 among poor married women not using a method in 2006[1] (N=904)

Covariate	Unadjusted odds ratios	Model 1: Adjusted odds ratio	Model 2: Adjusted odds ratios with interactions
Interactions			
Planning status of last birth by preg/PP status			
Last birth was not planned among those not pregnant/PP (Ref = Last birth planned among those not pregnant/PP)	--	--	0.67 (0.4-1.2)
Last birth was not planned among those pregnant/PP (Ref = Last birth planned among those pregnant/ PP)	--	--	2.37 (1.1-5.2)**
Intended to use a method at baseline/Age≥30			
Intended to use a method among those under age 30 (Ref = Did not intended to use among those under age 30)	--	--	1.91 (1.0-3.8)*
Intended to use a method among those age ≥30 (Ref = Did not intend to use among those age ≥30)	--	--	3.34 (1.8-6.2)***

Significant at *p<0.10, **p<0.05, ***p<0.001

compared with those whose last birth was planned (OR=7.8, 95% CI 2.3-26.8 and OR= 2.4, 95% CI 1.1-5.2, respectively). Women who would like to have a child in the future had significantly higher odds of intending to use a method but were significantly less likely to begin use compared with women who said they wanted no more children. Women who had experienced a child death or stillbirth had 38 percent lower odds of intending to use a method, but were no less likely to begin using. After adjusting for other characteristics, having attended primary school and being of Hindu religion were marginally associated with intention to use a method. Relative household economic status and parity were not associated with either intention to use a method or actual use.

Women living in villages with high parity (defined as the half of villages above the median average across villages) were significantly less likely to intend to use a method or to begin use of a method compared with women living in low parity villages. A higher village infrastructure or development score is also significantly associated with use but not with

intention to use. No other community-level variables reached statistical significance in the multivariable models.

Intention to use a method predicts future use among this sample of rural Bangladeshi women. Results from Model 1 (Table 3.5b) show that those who intended to use a method in 2006 had a much higher odds of beginning use than women who did not intend to use after adjusting for potential confounders at the individual and community level (OR=2.74, 95% CI 1.8-4.2). Among women older than 30, this association is even stronger (OR=3.34, 95% CI 1.8-6.2).

Consistency of intentions and use

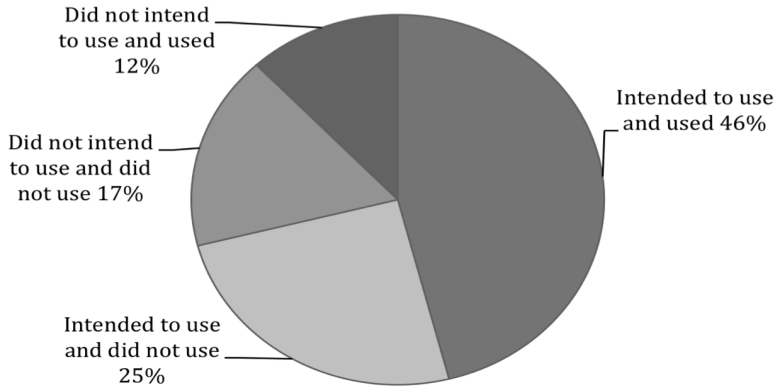
While intention to use appears to predict subsequent use of contraception in this population, a sizeable proportion of women exhibited contraceptive behavior between 2006 and 2009 inconsistent with their intentions in 2006. Table 3.6 shows that 35 percent of women who reported an intention to use a method did not adopt a method, while two-fifths of women who said that they did not plan on using went on to use. Figure 3.2 shows the percentage of women by intention/use status for the entire sample of 1,034 women not using at baseline.

Table 3.6: Percent of married women aged 13-49 using a method between 2006-09 by intention status in 2006

	Use between 2006-09		
Intention in 2006	All Women	Used	Did not use
Intended to use	100.0 (714)	65.0	35.0
Did not intend to use	100.0 (196)	40.5	59.5
All women	100.0 (1034)	57.8	42.2

X^2 test = 52.63 , p=0.013

Figure 3.2: Contraceptive use intention status in 2006 and use of any method



Characteristics of women by consistency of intentions and subsequent use are shown in Table 3.7. A particularly high proportion of women who reported that they did not intend to use but went on to use had said in 2006 that they wanted another child, possibly indicating a change in childbearing intentions over time. Changes in future childbearing intentions may also explain the relatively high proportion of women who had ever experienced a stillbirth or death of a child who did not follow through with their intention to use a method. Even though schooling wasn't significantly associated with intention to use or actual use in the multivariable logistic regression analysis, a large proportion of the women who began use, subsequent to reporting that they did not intend to, had ever

Table 3.7: Characteristics of women (means and percents) who were not using a method of contraception in 2006 by intention to use in 2006 and subsequent use between 2006-09 (N=1034)

			Characteristic								
			Mean		Percent						
Intention in 2006	Use between 2006-09	% distri-bution	Age	Parity	Preg. or PP	Wanted another child	Ever used FP	Last birth not wanted	Ever attend school	Exp. child death	Exposed to FP media
Intended to use	Used	45.9	26.2	2.6	70.9	40.0	76.3	23.6	70.6	20.4	16.9
	Did not use	24.7	32.3	2.6	23.2	27.3	74.8	11.1	64.4	57.4	9.1
Did not intend to use	Used	11.9	24.6	1.6	25.5	73.8	61.6	13.5	82.5	11.8	29.3
	Did not use	17.5	38.3	4.3	3.4	22.9	70.6	34.8	39.8	49.7	18.0
All Women		100.0	28.6	2.6	42.3	43.9	71.5	21.6	67.4	27.8	19.3

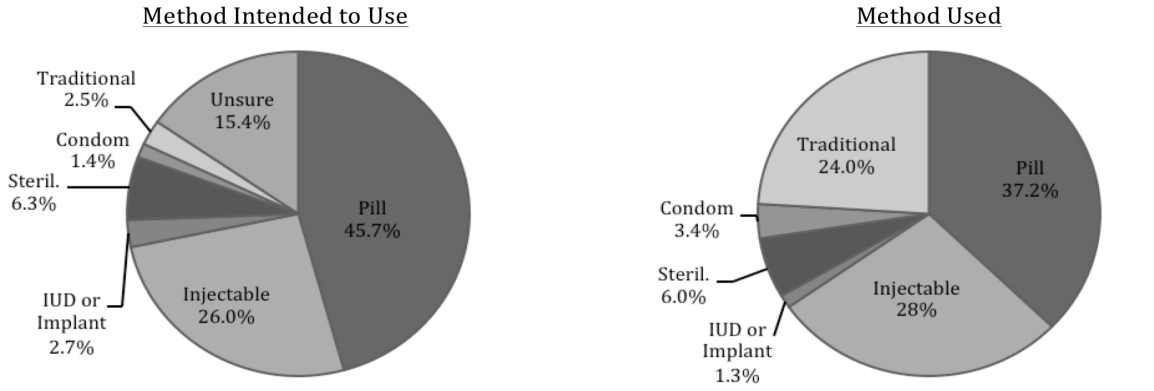
Adjusted for sample design

attended school.

Contraceptive Methods

Nearly half of women intending to use a method in 2006 said that they planned to use oral contraceptives. Just over a quarter planned to use injectable contraceptives while less than 15 percent planned to use condoms, an IUD or implant, sterilization or a traditional method. The remaining 15 percent said they were unsure as to what method they planned to use (Figure 3.3). Figure 3.4 shows that among those actually beginning use of a method between 2006 and 2009, 65 percent began using either OCs or injectables, a quarter of women began a traditional method, and the remaining 10 percent adopted an IUD or implant, condoms, or sterilization. Women intending to use a method were slightly more likely to adopt a modern method, however this difference is not statistically significant (results not shown). Apart from traditional methods, the

Figures 3.3 & 3.4: Methods women intended to use in 2006 (N=714*) and method used among those beginning use of any method between 2006-09 (N=678*)



*Sample sizes are different because not all women who said they intended to use began use of a method between 2006-09.

proportional breakdown of methods women intended to use and actually used were roughly the same, though it should be noted that the sample of women intending to use a method and the sample actually using are not the same. In fact, among women who intended to use and actually began use, only about a third adopted their intended method.

Figure 3.5 shows the method used (same method as intended, different method than intended, or no use) by method intended to use at baseline among women who said they intended to use. About 40 percent of women who said that they planned to use the pill or injectable ended up using those methods compared with less than 20 percent of women who said they intended to use sterilization, an IUD or implant, condoms or a traditional method. As would be expected, women with vague intentions were less likely to adopt a method than those who intended to use a specific method. More than 30

Figure 3.5: Method used between 2006-09 among women who reported in 2006 that they intended to use a method (N=714)

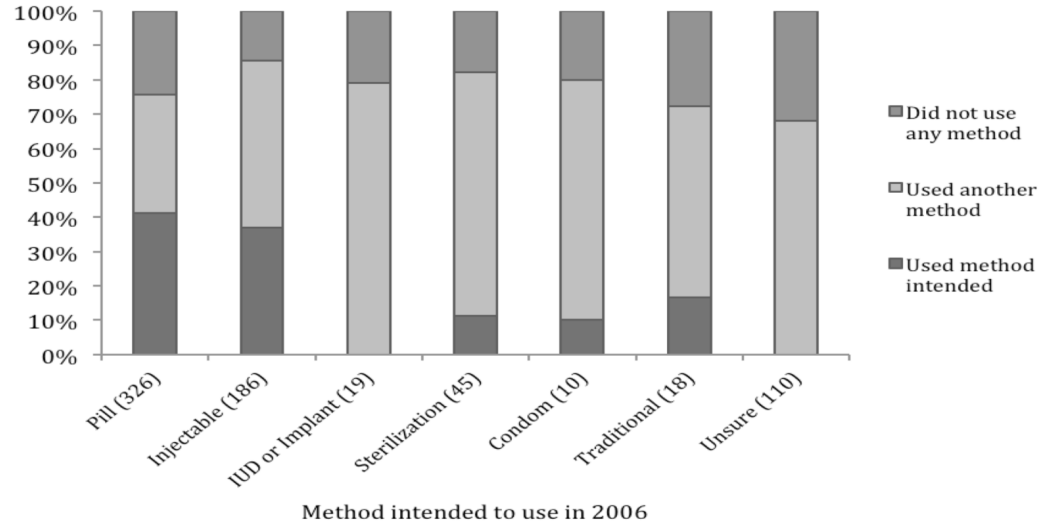


Table 3.8 Characteristics of married women aged 13-49 who were not using a method of contraception in 2006 comparing those with and without reliable 2009 calendar reports of that use for the baseline interview month

	With reliable reports		
Characteristic	Yes N=701	No N=333	p-value*
Mean			
Age	28.1	30.3	0.15
Parity	2.45	3.29	**0.005**
Asset score[1]	0.68	-0.07	0.08
Percent			
Ever attended school	69.2	61.2	0.27
Husband ever attended school	69.5	61.7	0.21
Muslim	97.7	96.9	0.33
Ever used FP	69.9	77.0	0.25
Currently pregnant	15.0	17.7	0.61
Within one year post-partum	27.1	24.9	0.77
Would like to have another child	45.3	38.8	0.43
Last birth was unintended[2]	23.7	23.7	0.99
Ever experienced child death or stillbirth	23.0	44.5	**0.006**
Heard media messages about FP in the last month	20.9	13.5	0.27
Average decision-making score[3]	16.4	17.6	**0.05**
Talked to anyone about using FP[4]	7.5	4.8	0.23
Intends to use a method	70.8	70.1	0.93
Began use of a method	46.7	96.3	**<0.001**

*p-values based on Wald tests for continuous variables and chi square tests for categorical variables.
[1]Asset score ranges from -4.32-3.58; see Table 3.1 for explanation
[2]Does not include 63 women who have not had a prior birth
[3]Decision-making score ranges from 0-20; see Table 3.1 for explanation
[4]Does not include 351 women who have never used a method

percent of women who said that they were unsure what method they would use did not end up using any method at all.

Time to use

Using data from the contraceptive calendar collected at the time of the follow-up in 2009, we were able to look at time to adoption of a method over the three-year inter-survey period. Just under 70 percent of all women who said they were not using a method in 2006 had a calendar report in 2009 that matched their 2006 report, i.e., in 2009 of a method during the three-year period began within the first six months after their report of contraceptive use or pregnancy status for the interview month in 2006 was the same as what they had reported contemporaneously in 2006. Table 3.8 shows that women who did not report reliably between 2006 and 2009 and, thus, were not included in the time to use analysis were of higher parity, more likely to have experienced a stillbirth or death of a child, and more likely to begin use of a method during the inter-survey period than women who did not report reliably. The majority of women who did not report reliably the end of said in 2009 that

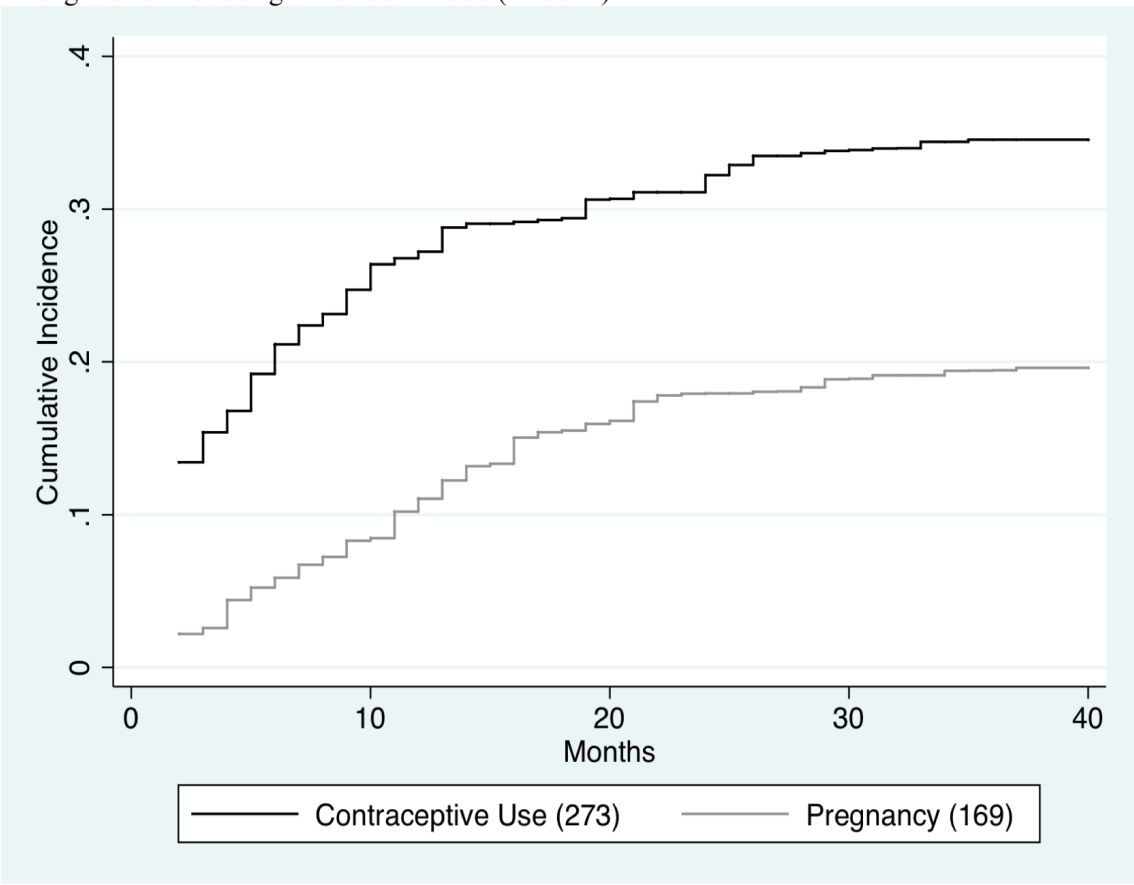
they were using a method of contraception at the time of the 2006 interview, which accounts for the much higher proportion using during the inter-survey period, i.e., women who reported in 2009 that they were using a method in 2006 are considered to have adopted a method.

Figure 3.6 shows the cumulative incidence of beginning use of a contraceptive method among all women with reliable calendar reports treating pregnancy as a competing risk. The incidence of both contraceptive use and pregnancy increases most rapidly within the first year and then levels off. Half of all women who began use of a method during the three-year period began within the first six months after the interview, while half of all those who eventually became pregnant were pregnant by the first year. Excluding women who were pregnant or immediately post-partum results in a slightly steeper increase in the cumulative incidence of contraceptive use during the first 12 months after the survey, which is expected since most of these women did not begin use of a method soon after the survey (results not shown). Figures 3.7 and 3.8 show the cumulative incidence of contraceptive use and pregnancy, respectively, by intention to use a method at baseline. For both outcomes, the cumulative incidence is higher over the three-year period for women who intended to use compared with women who did not intend to use.

Discussion

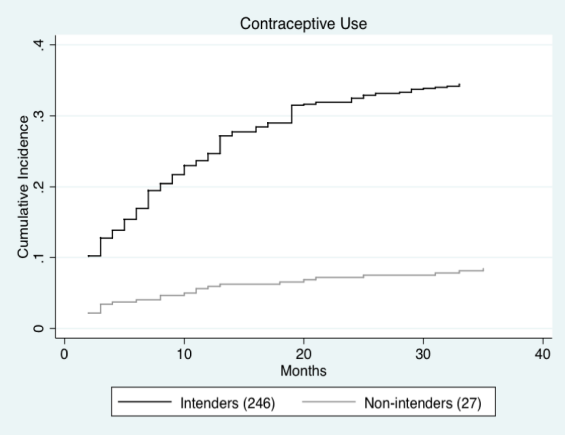
The results of this study add to the limited body of evidence on the predictive validity of contraceptive use intentions. Rural Bangladeshi women not using a method of contraception who said they intended to use a method in the future were more likely to go on to

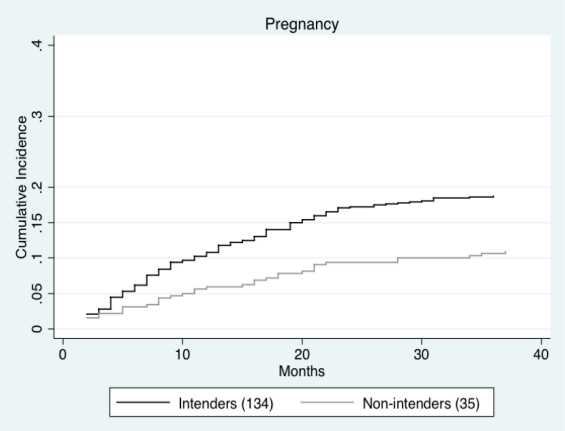
Figure 3.6 Cumulative incidence of beginning use of a method and of becoming pregnant among women not using a method in 2006 (N=701*)



*Excludes 333 women with unreliable calendar reports for the 2006 baseline interview month in the 2009 follow-up calendar

Figures 3.7 & 3.8: Cumulative incidence of beginning contraceptive use and of becoming pregnant by intention to use status among women not using a method in 2006 (N=701*)





*Excludes 333 women with unreliable calendar reports for the 2006 baseline interview month in the 2009 follow-up calendar

use than women with no intention to use. Furthermore, women who intended to use a specific method were even more likely to begin use than women who were unsure of what method they wanted to use. These findings are important because they support the use of intentions data for predicting contraceptive demand. Programs can also use these data to more efficiently target resources to women most likely to use.

We also found, however, that other aspects of women's reproductive history are also important for predicting future contraceptive use including current or recent pregnancy and prior experience using contraception. In addition, many women behave inconsistently with their intentions with around two fifths of women not intending to use going on to use and the same proportion of those intending to use not using. Studies in Morocco and India, both with at least three years of follow-up time, found similar levels of inconsistency where, in both contexts, around 30 percent of women who said that they did not intend to use ended up using, and a quarter to just over half of women intending to use in Morocco and India, respectively, did not use (Curtis & Westoff, 1996; Roy et al, 2003). Discrepancies between stated intentions and behavior can be attributed to a number of causes including the fact that contraceptive use intentions are dynamic and women often change their minds over time. Also, limited access to methods, husband's or family opposition to use, and other environmental constraints may prevent women who intend to use from realizing their intentions. In addition, because the BMHS did not ask women when they intended to use a method, it may be that women who said they intended to use may have meant that they intended to use sometime after the three year time period covered by the survey. However, our analysis of the time to use of a method shows a leveling off of use after less than two years indicating that most women who intend to use intend to use soon. This assumption is supported by data from Morocco, where more than 80 percent of

women who said they intended to use planned to do so within in the next 12 months. Finally, inconsistencies between stated use intentions and behavior also reflect the bluntness of standard measures of contraceptive use intentions including that used in the BMHS. Measuring the strength of women's intention to use, for example by asking them to rate their likelihood of adopting a method or the strength of their intention to use on a quantitative scale, it might be possible to more clearly link intentions to use and understand behavioral inconsistencies. Theoretically, strongly held intentions are more likely to result in action than those more weakly held.

We had hypothesized that women living in communities with higher contraceptive prevalence and greater access to family planning methods and services would be more likely to adopt a method regardless of their intention status in 2006. The results of our analysis, however, show that only the relative level of village development is associated with women's adoption of a method and that higher village parity is associated with less method adoption. Since most women lived in villages where more than three quarters of women were using a method, the influence of social pressure and social norms on method adoption is harder to detect through a measure of aggregate CPR. Similarly, the vast majority of women in the study villages had methods available for sale and a resident health or family planning worker, making it more difficult to discern the effect, if any, that this type of access had on use.

Our findings related to the type of method women intended to use and actually used are largely in line with national level patterns of use. Oral contraceptives made up just over half of the country's total method mix in 2007 (NIPORT et al., 2009) and OCs were the most frequently named method women intended to use in the BMHS study area and, among users, the most frequently used. Consistency between intended method and actual method adopted, however,

was quite low in this population with the majority of intenders of all method types either using a different method than they intended or not using at all. Therefore, while asking women whether or not they intend to use can provide a fairly reliable estimate of future contraceptive demand, exactly what the future method mix will look like is harder to determine from these responses. Women intending to use less common long-acting and permanent methods such as sterilization, IUDs and implants were the least likely to use their intended method, possibly because they were not as easy to obtain. Additional research on why women did not use the method they intended is necessary to better understand how women decide what method to use and to identify and overcome barriers to obtaining preferred methods.

Study limitations

The present study involves secondary analysis of data collected for another purpose; therefore several factors that may be important for understanding the association between contraceptive use intentions and subsequent behavior cannot be explored simply because the data were not collected. For example, because men were not asked about their intentions to use contraception, we can only measure the association between women's intention to use and method adoption. Prior research has shown that the predictive value of fertility intentions questions depends on whether couples' fertility preferences are considered or only the woman's (Tan & Tey, 1994; Bankole, 1995; Miller et al., 2004; Gipson & Hindin, 2009). While prior studies have not considered partner's influence on the relationship between women's contraceptive intentions and use, a significant effect of partner's approval (or disapproval) on women's contraceptive use has been demonstrated in cross-sectional studies in various contexts (Bankole & Singh, 1998; Dodoo, 1998; Joesoef et al., 1988). It is reasonable to expect that

partner attitudes and intentions also influence women's intentions to use a method and the translation of intention into use.

Another possible limitation of this study relates to the fact that the data were collected before and after an experimental intervention (though it was not a family planning intervention). While the sample was drawn randomly and no obvious biases have been identified due to the study design or the microcredit intervention activities, unidentified biases associated with the intervention cannot be completely ruled out. We did, however, adjust for study arm in the logistic regression analyses.

Even with these limitations, the results presented here show that data on contraceptive use intentions do have value for program planning and resource allocation. We recommend that these types of data be considered alongside the more widely used measure of unmet need for family planning for identifying intervention priorities and opportunities. At the same time, additional research should be conducted to evaluate alternative methods of soliciting more valid and reliable intentions information, e.g., by asking women about the strength of their intention to use a method, what method they intend to use, when and how they intend to use, and if they do not intend, why not.

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