

Causal Relationship between Women's Fertility Desires and Contraceptive Use: An Investigation through Urban Health Initiative, Uttar Pradesh, India

Ujjaval Srivastava, Anjali Singh, Kaushalendra Kumar Singh

Extended Abstract:

To measure women's fertility intentions, we usually ask *would you like to have a/another child, or would you prefer not to have any more children?* Several studies have shown that women's fertility intentions can be strong predictor of women's contraceptive behaviour and fertility outcomes (Bankole & Westoff, 1998; Bankole & Singh, 1998; Islam & Bairagi, 2003; Roy et al., 2003; Speizer, 2006). Fertility desires are often inconsistent with corresponding contraceptive use and women are often ambivalent in choosing among several family welfare methods. Some researches says that questions about whether or not a woman want to have another child rarely account for the variety of contradictory emotions that women often experience regarding pregnancy and childbirth (Bankole & Westoff, 1998; Santeli et al., 2003), or the role of external influences on such decisions, including husbands's desires, expectations of other family members and community, and religious and social norms (Becker, 1999; Naziri, 2007; Tsui et al., 2011). Many studies access fertility desire and contraceptive use in high fertility settings but most studies are cross sectional. A study in Sub Saharan Africa (OlaOlorun et al., 2016) attempted to study the relationship between fertility motivations and modern contraceptive use over time in high fertility locations (Ghana, Nigeria and Ethiopia) through panel data. The present study is an attempt to explore the relationship between women's fertility desire and their contraceptive behaviour through causal inference in urban settings of Uttar Pradesh, India.

We use panel data to answer the following research questions:

- (1) We hypothesize that women who want no more children should report more contraceptive use at both at baseline and endline compared with women who want more.
- (2) We hypothesize that the change in contraceptive use observed among women who want more and those who want no more children will be same.
- (3) We hypothesize that relationship between fertility desire and modern contraceptive use over time will persist after adjusting for potential confounders (age, education, parity, wealth, caste, religion and residence).

Our study uses the baseline (2010) and follow up (2014) data of Measurement, Learning & Evaluation (MLE) Project led by the Carolina Population Center in partnership with the International Center for Research on Women. These data were collected as part of the evaluation of the Urban Health Initiative (UHI) in Uttar Pradesh, the India arm of the Bill & Melinda Gates Foundation Urban Reproductive Health Initiative. Baseline data were collected in early 2010 from a representative sample of 17643 married women of age 15-49 from the six cities (Agra, Aligarh, Allahabad, Gorakhpur, Moradabad, and Varanasi) of Uttar Pradesh. To include a representative sample at endline, we randomly selected a sample of baseline primary sampling units (PSU) and sought to interview all baseline women in selected PSU. Weights were used to adjust for non-response and oversampling of slums. A total of 14043 women were successfully interviewed at endline.

Our study sample is limited to women who were fertile and non-sterilized and non-pregnant at baseline survey. Women's fecund status is assessed by their response on hysterectomy and menopause and "*can't get pregnant*". Sterilization included women's sterilization or her husband's sterilization. We also excluded women who were pregnant at baseline survey since their future fertility desires depend on the outcome of current pregnancy. So the final analysis sample consists of 8735 women (weighted n=8655). Almost 19 percent women who were found eligible at baseline were become ineligible to provide response to fertility desire i.e. either they were not able to have kids (menopause/hysterectomy) or they were sterilized at endline. Women were asked regarding fertility intentions and modern contraceptive use at both baseline and endline survey. The primary outcome was change in the use of modern contraceptives observed over the two survey point. Other potential confounders are education, parity, wealth, caste, religion, age in 5 years and residence variables. Inverse probability weighing (IPW) was used to address the potential bias from lost to follow up and then using these IPWs as weights, we used generalized estimating equations (GEE) to fit generalized linear model (GLM) with binomial family, log link function and exchangeable correlation structure to produce unbiased estimates of difference in modern contraceptive use over time and 95% confidence intervals (CI) were also obtained using robust standard errors (SE). We want to estimate

$$\text{logit Pr}(Y_{it} = 1) = \beta_0 + \beta_1 X_{it} + \beta_2 \text{Treatment}_{it} + \beta_3 \text{Time}_t + \beta_4 \text{Treatment}_{it} * \text{Time}_{it}$$

for $t = 0, 1; i = 1, 2, \dots N$.

Here, Y_{it} is binary outcome variable for $i = 1, 2, \dots, N$ observations in the sample at time $t = 0$ (2010) and $= 1$ (2014), i.e., $Y_{it} = 1$ if women is currently using modern contraceptives and $Y_{it} = 0$ otherwise. X_{it} represents a vector of confounding covariates (education, parity, wealth, caste, religion, age, residence and having son at home). $Treatment_{it}$ is a dummy variable i.e. $Treatment_{it} = 1$ if women desired no more children at baseline and $Treatment_{it} = 0$ otherwise. $Time_t$ is also a dummy variable which takes value 1 at endline and 0 at baseline.

Preliminary Findings:

Table 1 shows the city wise percentage distribution of women using modern contraceptive methods at baseline and endline. In addition to this, it also shows the proportion of women who became ineligible (due to menopause, hysterectomy or sterilization) to provide answer for their fertility desire at endline. The magnitude of change in use of modern contraceptives between baseline and endline differed across cities but the proportion of women using modern contraceptives increased over all six cities (Agra (0.5%), Aligarh (6.5%), Allahabad (6.3%), Gorakhpur (5%), Moradabad (3.6%) and Varanasi (4.3%)) of Uttar Pradesh. But, this increase is fictitious as 5.7% (Agra), 4.7% (Aligarh), 6.1% (Allahabad), 4.4% (Gorakhpur), 6.8% (Moradabad) and 7.7% (Varanasi) modern contraceptive users at baseline became infecund at endline and new users replaced them at endline among the women who were using modern contraceptive at the base period. Therefore, the real increase would be more than that is seen in the column of the Table 1 represented by the heading ‘endline’.

Table 1: City wise percentage distribution of women using modern contraceptive methods

City	Weighted sample size (N)	Current use of modern contraceptives[%]		Percentage of baseline women who become ineligible to provide answer for fertility desire at endline	Percentage of baseline modern contraceptive users who become ineligible to provide answer for fertility desire at endline
		Baseline	Endline		
Agra	1439	40.1	40.6	17.1	5.7
Aligarh	1758	36.7	43.2	15	4.7
Allahabad	1309	36.8	43.1	21.2	6.1
Gorakhpur	1305	34	39	17.1	4.4
Moradabad	1415	46.7	50.3	18.2	6.8
Varanasi	1429	40.8	45.1	21.2	7.7

Overall	8655	39.2	43.6	18.1	5.9
---------	------	------	------	------	-----

The Table 2 is depicting unadjusted and adjusted OR (95% confidence intervals) showing influence of change in fertility desire on change in modern contraceptive use only for three cities Agra, Aligarh and Allahabad.

Table 2: Unadjusted and adjusted OR (95% confidence intervals) showing influence of change in fertility desire on change in modern contraceptive use

Covariate	OR (unadjusted)	OR (adjusted) ^d
Agra		
Fertility desire (Ref=Want more)	3.11 (2.21-4.39) ^c	3.66 (2.51-5.32) ^c
Time (Ref=Baseline)	1.31 (0.70-2.44)	0.94 (0.49-1.80)
Fertility Desire*Time	0.58 (0.29-1.16)	0.78 (0.40-1.50)
Time + Fertility Desire*Time	1.18 (0.65-1.95)	0.97 (0.61-1.96)
constant	0.29 (0.21-0.40) ^c	0.10 (0.05-0.18) ^c
Aligarh		
Fertility desire (Ref=Want more)	2.84 (1.98-4.08) ^c	3.41 (2.39-4.87) ^c
Time (Ref=Baseline)	1.47 (0.84-2.57)	1.56 (0.87-2.78)
Fertility Desire*Time	0.93 (0.51-1.69)	0.85 (0.46-1.57)
Time + Fertility Desire*Time	1.82 (1.12-2.09) ^b	1.74 (1.04-2.15) ^a
constant	0.26 (0.18-0.36) ^c	0.04 (0.02-0.08) ^c
Allahabad		
Fertility desire (Ref=Want more)	2.45 (1.58-3.78) ^c	2.78 (1.78-4.36) ^c
Time (Ref=Baseline)	0.98 (0.56-1.70)	0.85 (0.50-1.45)
Fertility Desire*Time	1.46 (0.76-2.82)	1.61 (0.85-3.05)
Time + Fertility Desire*Time	1.31(0.69-1.46) ^a	1.24 (0.50-1.46)
constant	0.30 (0.21-0.44) ^c	0.04 (0.01-0.12) ^c

a-p<0.05, b-p<0.01, c-p<0.001, d-models were adjusted for education, parity, wealth, caste, religion, age in 5 years and residence

The first model is unadjusted for potential confounders and includes the main independent variable, fertility desire, the time variable and an interaction between the two. The second model is adjusted for education, parity, wealth, caste, religion, age in 5 years and residence (slum/non slum). The magnitude of change in modern contraceptive use between baseline and follow up differed across cities but the direction of change is increasing at all the cities. For all six cities at baseline, women who wanted more children had higher odds of contraceptive use compared with those who wanted more children. All the odds ratios are in hypothesized direction and significant. The adjusted OR for modern contraceptive use at endline with respect to baseline among women who desired more children were in hypothesized direction all the city (0.43, 0.87, 0.54, 0.43 and 0.68 for Agra, Allahabad, Gorakhpur, Moradabad and Varanasi respectively) except Aligarh (1.60), but did not reach statistical significance in Agra and Varanasi (**Data is not fully shown in**

the table). The OR for the interaction term (Fertility desire*Time) shows the average causal effect of change in fertility desire between baseline and endline on change in modern contraceptive use over the time. Also OR of (Time + Fertility desire*Time) indicates the OR for modern contraceptive use at endline with respect to baseline among women who desired no more children. All these adjusted OR were in hypothesized direction at all cities (1.74, 1.24, 1.55, 1.43, and 1.19 for Aligarh, Allahabad, Gorakhpur, Moradabad and Varanasi respectively) except Agra (0.97), but did not attain statistical significance in Agra and Varanasi (**Data is not fully shown in the table**).

Strength of the study:

Our results may help policy framers to set their goals. If the women who do not desire to resume childbearing and unaware of being at risk of unwanted pregnancy, delivering FP services and information could be a fruitful strategy to lessen the burden of unmet need along with maternal mortality and unintended pregnancies. The other significance of this study is that we have used longitudinal data to study the relationship between fertility desires and contraceptive use. Since fertility desires and contraceptive behaviour changes over time, it is better to use longitudinal data instead of cross-sectional data to explain the relationship between the two.

References:

Some important references are given here.

1. Bankole, A., & Singh, S. (1998). Couples' fertility and contraceptive decision-making in developing countries: hearing the man's voice. *International family planning perspectives*, 15-24.
2. Bankole, A., & Westoff, C. F. (1998). The consistency and validity of reproductive attitudes: evidence from Morocco. *Journal of biosocial science*, 30(4), 439-455.
3. Becker, S. (1999). Measuring unmet need: Wives, husbands or couples?. *International Family Planning Perspectives*, 172-180.
4. Islam, M. M., & Bairagi, R. (2003). Fertility intentions and subsequent fertility behaviour in Matlab: do fertility intentions matter?. *Journal of biosocial science*, 35(4), 615-619.

5. Naziri, D. (2007). Man's involvement in the experience of abortion and the dynamics of the couple's relationship: a clinical study. *The European Journal of Contraception & Reproductive Health Care*, 12(2), 168-174.
6. Roy, T. K., Ram, F., Nangia, P., Saha, U., & Khan, N. (2003). Can women's childbearing and contraceptive intentions predict contraceptive demand? Findings from a longitudinal study in central India. *International family planning perspectives*, 25-31.
7. Santelli, J., Rochat, R., Hatfield-Timajchy, K., Gilbert, B. C., Curtis, K., Cabral, R., ... & Schieve, L. (2003). The measurement and meaning of unintended pregnancy. *Perspectives on sexual and reproductive health*, 35(2), 94-101.
8. Speizer, I. S. (2006). Using strength of fertility motivations to identify family planning program strategies. *International Family Planning Perspectives*, 185-191.
9. Tsui, A. O., Casterline, J., Singh, S., Bankole, A., Moore, A. M., Omidoyi, A. K., ... & Shellenberg, K. M. (2011). Managing unplanned pregnancies in five countries: Perspectives on contraception and abortion decisions. *Global public health*, 6(sup1), S1-S24.
10. OlaOlorun, F., Seme, A., Otupiri, E., Ogunjuyigbe, P., & Tsui, A. (2016). Women's fertility desires and contraceptive behavior in three peri-urban communities in sub Saharan Africa. *Reproductive health*, 13(1), 12.