Contraception in India: Exploring Met and Unmet Demand

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Abstract

Our study examines factors influencing demand for contraception for spacing as well as for limiting births in India. Data on socio-economic, demographic and program factors affecting demand for contraception in India are from the National Family Health Survey, 1998–99. The recent document from the *National Rural Health Mission* has completely ignored the use of contraception in controlling fertility in India. Empirical results of our study suggest giving priority to and focusing attention on supply-side factors such as a regular and sustained supply of quality contraceptive methods to improve accessibility and affordability. Further, strengthening the information, education and communication (IEC) component of the reproductive and child health (RCH) package would allay misapprehensions about the side effects and health risks of contraception. Focusing attention on demand-side factors such as women's empowerment through education, gainful employment and exposure to mass-media would help reduce the unmet demand for family planning. The resulting reduction in fertility would hasten the process of demographic transition and population stabilization in India.

Introduction

The role of contraception in fertility regulation has always been crucial to success of historical as well contemporary fertility regulation (Harvey 1996). The advent of effective contraception made fertility a choice in most of the socio-economic theoretical frameworks that evolved during the Sixties and Seventies (Becker 1960; Easterlin 1969). However, most empirical studies have aptly demonstrated that contraception had always been the most significant catalytic factor and cost-effective strategy for fertility control (Gulati, 1998).

Realizing the potential dangers of a burgeoning population, in 1952 India became the first country to launch an official national family planning program, promoting contraception and responsible parenthood to control fertility and hasten the process of demographic transition in India.

Official efforts succeeded in averting about 339 million births up to 2005 (Government of India [GoI] 2006a). Although fertility decline has set in all over India, the slow pace in certain regions remains a serious concern to population and development planners.

Major paradigm shifts in India's population policies have occurred since the Cairo International Conference on Population and Development in 1994. The earlier method-mix target-oriented approach has shifted to a client-centered demand-driven approach to reproductive and child health. This new approach is enshrined in the National Population Policy 2000, with tangential reference to fertility control. The policy calls for vigorous promotion of a small-family norm to achieve replacement levels of fertility by 2010. The latest policy document, the *National Rural Health Mission*, launched in India in 2005, focused attention on mother and child healthcare and its determinants such as nutrition, sanitation, hygiene and safe drinking water to improve quality of life. Contraception as a fertility-control strategy is altogether missing from the document (National Rural Health Mission [NRHM] 2005). Nevertheless, a working group constituted by the National Population Commission and meeting on population stabilization has recommended to bring back the promotion of contraception as the main concern of family welfare programs in high-fertility states of India (GoI 2006b).

More importantly, using contraception to curtail fertility has been stressed for accelerating population stabilization in developing countries (Robey et al 1996; Westoff and Bankole 2000). The extent of unintended pregnancies, that is, unwanted or mistimed ones, was still around one in four worldwide (Haub and Herstad 2002). Reducing the unmet demand for contraception would help couples achieve their reproductive goals and reduce unintended pregnancies that lead to abortions and unwanted births, both of which are unacceptably high in many developing countries (Becker 1999; Potts 2006). The total unmet need for family planning in India was 15.8% in 1998–99 and has come down to 13.2% in 2005–06 (International Institute for Population Sciences [IIPS] 2000; 2007). One particularly harmful consequence of unintended pregnancies is unsafe abortion, leading to high rates of maternal morbidity and mortality in less-developed countries. An estimated 18 million unsafe abortions take place in these countries annually (Murray and Lopez 1998). Conceptual modifications to the measurement of unmet need for contraception have brought forth a lot of literature recently (Westoff 1992; Bhushan 1997; Casterline and Sinding 2000).

"Unmet need" refers to the proportion of sexually active women who are exposed to the risk of pregnancy and either do not want more children or wish to postpone the birth of their next child for at least 2 years but are not using any method of contraception. "Sexually active" means fecund women married or living in a union. Further, women who are currently pregnant but either said their pregnancy was mistimed or didn't want the pregnancy but are not using contraception also belong to the "unmet need" category. The category also includes women who are amenorrheic but whose last child was unwanted or mistimed. Definitions of unmet and met need for spacing as well as for limiting births are provided in the National Family Health Survey report (IIPS 2000: 172)

Several empirical studies have highlighted the influence of socio-economic, demographic and program factors such as age, religion, caste, place of residence, standard of living, female education, status of women, sex composition of living children, exposure to mass media and spousal communication about family planning on the demand for contraception in India and abroad (Bongaarts 1997; Gulati 1996a; 2005).

Our study explores factors influencing met and unmet need for family planning in India. Identifying the key factors and their relative significance would facilitate prioritization of factors influencing unmet as well as met demand for contraception for birth spacing as well as limiting births in India.

Data and Methodology

The second National Family Health Survey 1998–99 (NFHS-2) collected detailed information on fertility, mortality, family planning and important aspects of nutrition, health, and healthcare,

including maternal and child health. Primary data from 25 states and union territories of the country were collected from 88,562 households and 84,862 currently married women aged 13–49 years (IIPS 2000). Our study employs multinomial logit regression analysis to highlight important predictors of met and unmet demand for contraception. The response variable has been categorized into five mutually exclusive and exhaustive categories: (1) respondents not using any type of contraception, (2) respondents with an unmet need for spacing births, (3) respondents with an unmet need for limiting births, and (4) respondents whose need for contraception has been met for both spacing and limiting births. The reference category (5) comprises respondents who were not using any family planning method and had no unmet need for contraception at the time of the survey. Each respondent can fall into only one of the five categories.

Parametric estimates of the multinomial logit model are computed through the maximum likelihood estimation procedure. The estimated regression coefficients can be used to estimate multiplicative effects on the odds ratios and thereby probabilities of respondents with different background characteristics reporting use or non-use of contraception. The effects of the predictor variables on the response variable in the form of estimated probabilities based on parametric estimates are also calculated in our study. Proper interpretations of increase or decrease in odds ratios in the multinomial logit regression analysis are provided in an earlier study (Gulati 1996b). For further details on formulation, estimation procedures and proper interpretations of the effects, one can look into technical literature on the causal analysis (Retherford 1993).

Reasons for Non-use of Contraception

It may be of interest to first examine the reasons for non-use of contraception, as they could provide important clues about the demand- and supply-side constraints to contraception (Zappella 1997). Supply-side constraints such as inaccessibility or effectiveness of contraception methods, or misapprehensions about contraception methods, suggest that program interventions can improve the demand for contraception. On the other hand, demand-side constraints such as familial or societal opposition to family planning or lack of knowledge may suggest strengthening the IEC component to improve demand for family planning.

Table 1 provides information on reasons for non-use among women who depict an unmet need for contraception to space and limit births and also among women who have no unmet need and are not using any contraception. Table 1 shows that the majority of women with an unmet need for contraception for spacing births have given fertility-related reasons for not using contraception. Around 44% of these women report non-use because of their desire for more children.

Table 1. Percent distribution of women by reasons for not using any contraception

Reasons	Unmet Need for Spacing Births (%)	Unmet Need for Limiting Births (%)	Non-use and No Unmet-Need (%)	Total Number of Women (%)
Wants more children	44.1	-	35.8	13834
Pregnant	16.4	9.2	16.0	6508
Fertility-related reasons	7.7	10.5	19.2	6901
Not having sex	0.6	1.3	1.1	448
Infrequent sex	0.5	1.4	0.8	365
Menopausal/had hysterectomy	0.0	0.2	8.2	2436
Subfecund/infecund	0.2	1.0	4.0	1257
Postpartum/breastfeeding	6.4	6.6	5.1	2395

Table 1. Continued

Opposition to use	4.3	10.5	4.3	2283
Respondent opposed	0.3	1.1	0.6	281
Husband opposed	2.6	6.2	2.1	1206
Other people opposed	0.5	1.1	0.3	201
Against religion	0.9	2.1	1.3	595
Lack of knowledge	4.6	5.6	2.8	1542
Knows no method	1.1	1.7	1.1	511
Knows no source	3.5	3.9	1.7	1031
Method-related reasons	4.7	15.5	5.0	2817
Health concerns	1.2	5.3	2.0	1028
Worry about side effects	2.5	6.4	2.2	1243
Hard to get method	0.3	0.9	0.2	126
Costs too much	0.6	2.3	0.5	347
Inconvenient to use	0.1	0.6	0.1	73
Other miscellaneous reasons	6.9	13.5	7.3	3548
Do not know	11.6	35.3	9.7	5902
Total number of women	6980	6747	29,608	43,335

Of 6980 women with an unmet need for spacing births, 16.4% were not using contraception because they were pregnant, which clearly shows that these pregnancies were mistimed. However, 7.7% of these women gave fertility-related reasons such as not having sex or infrequent sex, postpartum amenorrhea, infecundity because of menopausal conditions and hysterectomy; 4.3% reported opposition to family planning, predominantly from their husbands (2.6%). A further 4.7% of the women reported family-planning method-related problems such as concerns about side effects and health risks. Thus, overall we found that the majority of women with an unmet need for spacing births gave reasons for non-use such as a desire for additional children, familial opposition, especially from husbands, and concerns about side effects and health risks.

Among 6747 women with an unmet need for limiting births, we found that 9.2% were not using contraception because they were pregnant; these pregnancies can be categorized as unwanted. Other predominant reasons for not using contraception among these women were fertility related (10.5%), opposition to family planning (10.5%) and reasons specific to the contraceptive method (15.5%). However, lack of knowledge about methods (1.7%) and about source of contraception (3.9%) were also important reasons for non-use among 5.6% of these women. Similarly, societal and spousal opposition to using contraception or sterilization here, termed "high social cost from the social influence group" (Nag 1984), also turned out to be an important reason for non-use of contraception among women with an unmet need for limiting births or women who did not want more children. Other predominant reasons for non-use among women with an unmet need of contraception for limiting births were fear of side effects (6.4%) and health risks (5.3%).

Coming to the category of women with non-use and no unmet need for contraception, we found that predominant reasons were the desire for more children (35.8%), pregnancy (16%), menopausal/hysterectomy (8.2%), postpartum or breastfeeding (5.1%), husband's opposition to use (2.1%) and fear of side effects (2.2%).

Not all women with an unmet need may be potential users of contraception (Ashford 2003). However, analysis of reasons for non-use presented in Table 1 reveals that use of family planning can be improved in these categories of women through addressing method-specific reasons for non-use (n = 2817), elimination of familial and societal opposition through IEC interventions (n = 2283), increased knowledge about and accessibility of contraception (n = 1542), and taking

care of mistimed (n = 1067) and unwanted pregnancies (n = 599). By addressing these reasons, we can easily bring about a 19.2% increase in contraception use.

Determinants of Demand for Contraception

Factors influencing unmet and met demand for contraception for spacing and limiting births are highlighted through the multinomial logit regression analysis. For the multinomial logit model, responses about contraception use from the 84,862 currently married women are classified into five mutually exclusive and exhaustive categories: 6780 women with an unmet need for contraception for spacing births, 6747 women with an unmet need for limiting births, 3392 women with a met need for spacing births and 38,135 women with a met need for limiting births; the remaining women number 29,428 and belong to the reference category of non-use and no unmet need for contraception.

The predictor variables used in the model are both quantitative and categorical. The quantitative predictor variables are women's age (AGE) and its squared term (AGESQ), number of living sons (NLS) and its squared term (NLSSQ), and number of living daughters (NLD) and its squared term (NLDSQ). The categorical predictor variables in the model are women's education, with illiterate or no education as the reference category; women's religion, with Hindus as the reference category; women's rural–urban residence, with rural as the reference category; women's caste, with "others" as reference category; standard of living, with low standard as the reference category; women's occupation, with not working out of the home as the reference category; exposure to family planning through media, with no exposure as the reference category; exposure to family planning through a public health facility, with no exposure as the reference category; discussion of family planning with friends, husbands, etc., with no discussion as the reference category; and aspirations for children's education up to primary, secondary or higher education, with no aspiration as the reference category.

Multinomial Logit Regression Results

Parametric estimates of the multinomial logit regression model with all the predictor variables are presented in Table 2. The estimated coefficient (βi) suggests the additive effect of one unit change in the predictor variable (X_i) on the log of odds ($\log \Omega i$) of the response variable. Equivalently, the term ($e^{\beta i}$) suggests the multiplicative effect on the odds ratio or the ratio at which the odds of the response variable would increase or decrease depending upon the positive or negative sign of the coefficient, respectively. Parametric estimates of the coefficients and levels of significance of underlying models for unmet and met need for contraception for spacing and limiting births are provided in Table 2.

Table 2 reveals that the effects of demographic variables such as woman's age and number of living sons and daughters significantly affect all four components of demand for contraception. Moreover, the relationship of the demographic variables turns out to be non-linear. This means that met and unmet need for contraception for spacing as well as limiting births tend to increase to some threshold level of the age and the number of children and then level off or even decline. Interestingly, the fact that MNLB for sons (β=2.044) is higher than for daughters (β=0.913) suggests a much stronger impact (β = 2.044) on use of contraception for limiting births compared to daughters (β = 0.293) and accordingly the positive multiplicative effect on the odds ratio of number of living sons (e^{β}=7.723) is much more pronounced compared with number of living daughters (e^{β} =2.491) on the use of contraception for limiting births. The multiplicative effects on the odds ratios of the response variable in the multinomial logit regression analysis are provided in Appendix Table 2.

Adjusted Probabilities of Needing Contraception, by Background Characteristics

Adjusted probabilities of met and unmet need for contraception to space as well as limit births have been calculated using multinomial logit regression coefficients, and averages of the predictor variables are presented in Table 3. In the binary logit model, the sum of probabilities in the numerator and denominator add up to one, and hence an increase in the odds ratio automatically implies an increase in the probability, as the probability is monotonically increasing the function of the odds

ratio. However, in the multinomial logit model, the sum of probabilities in the numerator and the denominator do not add up to one, and thus an increase in the odds ratio could be possible even when both the probabilities in the numerator and denominator are decreasing, with a proportionate decline in the numerator being less than a proportionate decline in the denominator. Thus, interpretation of the regression coefficients and multiplicative effects on the odd ratios needs careful interpretation in the multinomial logit model compared with the binary logit model. Rather, clear understanding about the effect of a predictor variable is provided by the calculated probability rather than the coefficient or the odds ratio. Multiple classification analysis for the adjusted values of probabilities (p_j, j = 0, 1... 4) for women by background characteristics is provided in Table 3.

Table 2: Multinomial logit regression coefficients of the model with unmet need for spacing births (UNSB), unmet need for limiting births (UNLB), met need for spacing births (MNSB) and met need for limiting births (MNLB), with non-use of contraception as the reference category in the response variables

Predictor Variables	UNSB Log(p1/p0)		UNLB Log(p2/p0)		MNSB Log (p3/p0)		MNLB Log(p4/p0)	
	Coeff.	σ	Coeff.	σ	Coeff.	σ	Coeff.	σ
Intercept	-1.044	0.00	-10.592	0.00	-8.265	0.00	-13.556	0.00
AGE	0.051	0.00	0.438	0.00	0.379	0.00	0.612	0.00
AGESQ	-0.004	0.00	-0.007	0.00	-0.008	0.00	-0.009	0.00
NLS	0.363	0.00	1.650	0.00	0.294	0.00	2.044	0.00
NLSSQ	-0.035	0.00	-0.196	0.00	-0.139	0.00	-0.334	0.00
NLD	0.424	0.00	1.077	0.00	0.187	0.00	0.913	0.00
NLDSQ	-0.037	0.00	-0.125	0.00	-0.043	0.00	-0.165	0.00
WEDNP	0.157	0.00	0.248	0.00	0.470	0.00	0.460	0.00
WEDNHS	0.331	0.00	0.425	0.00	0.906	0.00	0.570	0.00
WEDNHIGR	0.624	0.00	0.782	0.00	1.408	0.00	0.404	0.00
RELMUS	0.114	0.01	-0.277	0.00	0.276	0.00	-0.885	0.00
RELCHR	0.718	0.00	-0.324	0.00	0.314	0.00	-0.776	0.00
RELOTH	0.147	0.04	-0.173	0.02	0.240	0.00	-0.107	0.02
EXPFPM	0.075	0.03	0.168	0.00	0.457	0.00	0.583	0.00
EXPFPHF	0.115	0.45	0.787	0.00	1.706	0.00	1.638	0.00
ASDEDNM	0.011	0.93	0.046	0.68	-0.025	0.92	0.157	0.05
ASDEDNH	0.192	0.10	0.264	0.02	0.121	0.61	0.669	0.00
ASDEDND	0.242	0.04	0.334	0.00	0.183	0.44	0.727	0.00
ASSEDNM	-0.301	0.04	-0.099	0.52	0.697	0.02	0.236	0.03
ASSEDNH	-0.242	0.08	-0.084	0.56	0.218	0.45	0.146	0.15
ASSEDND	-0.340	0.01	-0.090	0.53	0.114	0.69	0.225	0.03
LSS1	0.039	0.23	0.043	0.22	0.296	0.00	0.213	0.00

Table 2. Continued

LSS2	0.076	0.15	0.076	0.17	0.514	0.00	0.353	0.00
LSS3	-0.099	0.40	-0.126	0.29	0.595	0.00	0.326	0.00
WWNoCash	-0.103	0.02	-0.175	0.00	-0.132	0.08	0.028	0.34
WWWithCash	-0.171	0.00	-0.035	0.37	0.100	0.06	0.422	0.00
SC/ST	-0.003	0.93	-0.270	0.00	-0.169	0.00	-0.398	0.00
OBC	0.022	0.54	-0.148	0.00	-0.415	0.00	-0.194	0.00
FPDWOthers	0.172	0.00	0.127	0.03	-0.171	0.01	0.158	0.00
FPDWHusband	0.074	0.04	0.557	0.00	0.993	0.00	-0.015	0.58
FPDWFriends	-0.101	0.04	0.060	0.21	0.194	0.00	0.342	0.00
RES-Urban	-0.027	0.46	0.130	0.00	0.259	0.00	0.306	0.00
n	(n = 6980)		(n = 6747)		(n = 3392)		(n = 38,135)	

σ: Level of Significance; *n*: number of observations.
Note. *n* = 84,862 currently married women; *n* = 29,608 women in reference, or no-use, category.
Note. Details for abbreviated names of predictor variables are available in Appendix Table 1.

Met Need for Contraception for Limiting Births (MNLB)

Column 4 in Table 3 shows that the probability of using contraception for limiting births (p4) is not linear with women's age, as the likelihood of use increases from 0.04 at age 15 to 0.58 at age 35 and declines thereafter to 0.35 at age 45. The curvilinear nature of the relationship depicted by the estimated structural coefficients pertaining to age of women noted earlier is reflected in patterns of probabilities of contraception use.

We found a marginal difference in the probability of contraception use for limiting births among women with two sons (0.52) compared with women with one son and one daughter (0.45). However, the preference for sons in India is clearly shown, as the probability of using contraception for limiting births was much higher among women with only two sons (0.52) compared with women with only two daughters (0.20).

Women's education had a significant and positive impact on the likelihood of using contraception for limiting births. Similarly, exposure to family planning messages by mass media as well as at health facilities had a significant impact on use. The coefficient for exposure to family planning at a health facility was much higher (1.638) in the MNLB equation in Table 2, and accordingly the likelihood of contraception use for limiting births turned out to be much higher (0.72) compared with the reference category of no exposure (0.41) in Table 3.

Table 3. MCA Table of adjusted values of probabilities (*pj*) from the model for unmet and met need of FP for spacing and limiting births and no use of contraception

Predictor Variable	UNSB (p1) (1)	UNLB (p2) (2)	MNSB (p3) (3)	MNLB (p4) (4)	No Use (p0) (5)	Number of Women
Women's age						
p age 15*	0.40	0.04	0.03	0.04	0.49	
p age 25	0.10	0.14	0.04	0.37	0.35	
p age 35	0.01	0.13	0.01	0.58	0.27	

Table 3. Continued

p age 45	0.00	0.08	0.00	0.39	0.53	
Sex composition of children						
p 0s 0d	0.03	0.02	0.03	0.08	0.84	9481
p 1s 1d	0.03	0.10	0.02	0.45	0.40	10,813
p 2s 0d	0.02	0.10	0.01	0.52	0.35	6369
p 0s 2d	0.04	0.08	0.03	0.20	0.65	3412
Women's education						
No education[a]	0.04	0.15	0.02	0.25	0.54	41,798
Secondary	0.03	0.16	0.03	0.38	0.40	20,618
Higher	0.04	0.19	0.04	0.40	0.34	8111
Religion						
Hindu[a]	0.03	0.13	0.01	0.45	0.38	66,136
Muslim	0.04	0.14	0.03	0.26	0.53	10,121
Christian	0.07	0.12	0.03	0.28	0.50	4544
Exposure to family planning						
By media–no[a]	0.03	0.14	0.01	0.34	0.48	30,666
By mass media	0.03	0.12	0.02	0.47	0.37	54,196
At health facility–no[a]	0.03	0.13	0.02	0.41	0.41	83,450
At health facility	0.01	0.10	0.03	0.72	0.14	1412
Aspirations for children's education						
Aspiration–no[a]	0.05	0.16	0.02	0.19	0.59	
Daughter's edn. sec.	0.04	0.15	0.01	0.38	0.42	33,465
Son's edn. sec	0.03	0.13	0.02	0.29	0.53	31,242
Living style score						
Iss0[a]	0.03	0.14	0.01	0.38	0.44	22,569
Iss1	0.03	0.13	0.02	0.42	0.40	44,409
Iss2	0.03	0.12	0.02	0.45	0.37	15,738
Iss3	0.02	0.11	0.02	0.46	0.39	2146
Women's working status						
Not working[a]	0.03	0.14	0.02	0.39	0.42	54,828
Working no wage	0.03	0.12	0.01	0.41	0.43	11,267
Working with wage	0.02	0.11	0.02	0.50	0.35	18,767

Table 3. Continued

Caste						
Others[a]	0.03	0.13	0.02	0.45	0.37	36,051
SC/ST	0.03	0.12	0.02	0.37	0.45	24,334
OBC	0.03	0.13	0.01	0.42	0.41	24,477
Discussion on family planning						
With no one[a]	0.03	0.12	0.01	0.42	0.42	51,419
With husband	0.03	0.19	0.03	0.37	0.38	17,742
Residence						
Rural[a]	0.03	0.13	0.02	0.40	0.43	58,554
Urban	0.03	0.13	0.02	0.46	0.37	26,308

* *p* age 15: signifies likelihood of the usage by respondent at age 15.
[a] Reference category.

Met Need of Contraception for Spacing Births (MNSB)

Probabilities of using contraception for spacing births (*p*3) among women with different background characteristics are provided in Column 3 of Table 3. Overall, we found that the met need or use of contraception for spacing births far lower than for limiting births. However, the curvilinear relationship between usage for spacing births is also shown, along with age, and number of living sons and daughters. The likelihood of usage for spacing births increases marginally to age 25 and then levels off or even declines in higher age groups. The probability of usage for spacing births is substantially higher among women who are working for wages than for others, as well as among women in urban compared with rural areas.

Unmet Need of Contraception for Limiting Births (UNLB)

The likelihood of an unmet need for contraception for limiting births (*p*2) among women with different background characteristics is provided in Column 2 in Table 3. The UNLB increases with age but tapers off and even declines in higher age groups. Thus, the curvilinear nature of the relationship between respondent's age and unmet need for contraception for limiting births is also shown in the calculated probabilities. The probability of UNLB is higher among women with two sons than for women with two daughters. Similarly, the likelihood of needing contraception for limiting births is greater among women who only have boys reflecting the strong preference for sons in Indian society.

Unmet Need of Contraception for Spacing Births (UNSB)

The probabilities of having an unmet need for contraception for spacing births (*p*1) are provided in Column 1 of Table 3. The UNSB was around 8.2%. The unmet need for spacing births is also relatively high among younger women and declines to almost zero above age 35. Also, we find that the unmet need for spacing births is marginally lower among women with more sons than daughters. It may be of interest that the probability of an unmet need for spacing births is higher among Muslim and Christian than Hindu women. On the other hand, we find that unmet need for spacing births is high among women who don't state any aspiration for their children's education.

No Use of Contraception

The likelihood of not using contraception (*p*0) by background characteristics is provided in Column

5 of Table 3. It seems to be higher among illiterate and less educated than educated women. The curvilinear relationship of probability of no-use of contraception with women's age, number of living sons and daughters also emerges for obvious reasons as one minus the probability of no-use depicts demand for contraception and all the four components of the demand depict curvilinear relationship with the three demographic variables. Similarly, we find that the likelihood of non-use of contraception is higher among women who are less educated, who are not exposed to family planning messages by the media or at health facilities, whose aspirations for their children's education are low, who are not working, etc. Also we find that the likelihood of not using contraception is higher among Muslim and Christian women than Hindu women.

Discussion

Women's socio-economic background characteristics such as education; gainful employment or working for cash; living standards; exposure to family planning messages through mass media; participation in discussions on family planning, especially with their husband, and aspirations for their children's education significantly affect all four components of demand for contraception. Interestingly, the effect of women's higher education on met need for contraception for limiting as well as spacing births turns out to be much more pronounced than the effect on the unmet need for contraception. Women from households with higher standards of living also show a higher tendency to use contraception for spacing births. Exposure to family planning at a health facility shows a much stronger impact on met need or usage of contraception for spacing as well as limiting births compared to exposure through other sources.

Contraception use as well as unmet need for contraception for limiting births is significantly lower among Muslim and Christian women than among Hindus. On the other hand, use of as well as unmet need for contraception for spacing births is significantly higher among Muslim and Christian women than among Hindus. This possibly reflects a religious bias against using permanent methods of contraception for limiting births.

Exposure of women to family planning through mass media has a significant and positive impact on met as well as unmet need for contraception for spacing as well as limiting births. However, the impact of exposure at a health facility has a much more pronounced effect on demand for contraception for limiting as well spacing births. Urban women shown a higher tendency to use contraception for spacing as well limiting births than their rural counterparts.

The probability of using contraception to limit births also increases with an increase in the number of living sons as well as daughters. Further, the likelihood of usage increases much faster with more living sons than daughters. It may be of interest to mention that probabilities of using contraception to limit births show that couples or women want a balanced number of boys and girls.

Using contraception for limiting births is also higher among women with aspirations for higher education for their children compared to women who do not have such aspirations. The probability of use is significantly higher among women working for wages. Also we find that the likelihood of use increases with an increase in the standard of living and is also higher in urban than in rural women.

More-educated women are more likely to have an unmet demand for contraception to limit births than their less-educated counterparts. Possibly, more-educated women are more intent on limiting births than less-educated women. Also we find that unmet need for contraception to limit births is higher among Hindu than Muslim and Christian women. Similarly, the likelihood of an unmet need for limiting births is higher among women who have discussed family planning with their husband. Also we find that women counselled about family planning at health facilities show a much higher demand for contraception to limit births. Overall we find that the unmet demand of contraception to limit births is higher among middle-aged women or those in peak-fertility years, among the more educated, among women with more sons than daughters and among women who discuss family planning with their husband.

The analysis reveals that 27% of the total pregnancies among non-users of contraception were unintended These are mistimed and unwanted pregnancies, which implies a lot of unfulfilled

demand for contraception. Thus, potential users of contraception could be many more. Just satisfying important reasons of non-use could increase demand for contraception by 19.2% among non-user categories of women implying usage of contraception could easily be increased from 48.9 to 57.5%. Still we find that increased awareness and accessibility of quality contraception is needed and can conveniently increase contraception use.

The multinomial logit regression analysis clearly reveals a curvilinear relationship between the four components of demand for contraception and the three demographic variables of age of respondent, number of living sons and number of living daughters, suggesting that the effects on the four components of demand for contraception increase along with age, and number of living sons and daughters, up to a certain level, beyond which the effects taper off or even decline. The unmet demand for contraception for spacing births is highest among younger women, aged 15–24 years, and for limiting births is highest among women of 25–39 years. However, use of contraception to limit births is much higher among women with more sons than daughters, implying a deep-rooted son-preference phenomenon in Indian society.

Unmet need of contraception to limit births is higher among women beyond age 25 with at least two children. Thus, advocating methods to limit births should focus on women in the middle age groups and predominantly on women with at least one or two children, with special focus on those with only daughters whose contraception use is low because of their desire for a son. Alleviating the preference for sons, deeply rooted in Indian society, could lead to changes in fertility preferences and increase contraception use to limit births.

Use of contraception to limit births increases much faster among women with more living sons than daughters. Women's empowerment through better education and gainful employment, which by itself is an ideal goal and would alleviate son preference, also helps increase demand for contraception space and limit births. Counselling about family planning at health facilities has a more pronounced effect than that of mass media on using contraception to space as well as limit births.

Religious differentials in contraception use for limiting as well as spacing births narrowed after accounting for other socio-economic factors in the multivariate analysis, but use to limit births remains significantly higher among Hindu than Muslim and Christian women. On the other hand, contraception for spacing births remains significantly higher among Muslim and Christian women than among Hindus. This could be reflect a religious bias against limiting contraception among Muslim and Christian women. Such religious biases can be alleviated through interventions from religious leaders, or by appropriate and effective IEC interventions through mass media.

Conclusions

The study's primary conclusions are that policies and programs should focus on promoting contraception use among the categories of women who do not currently use it. Women's fears can be allayed through counselling on side effects and health risks, by imparting accurate information on contraceptive methods through mass media and through appropriate counselling at health facilities, and through increased supply and accessibility of quality contraceptive methods. Promoting contraception will also reduce unintended pregnancies, which often lead to unsafe abortions and are detrimental to women's health. Awareness-building activities in health facilities will contribute significantly to improved contraception use. Education and gainful employment of women will improve their status and enhance their use of contraception. Increased demand for and use of family planning and an easily accessible, wider range of quality contraception methods will be important factors in improving the health of women, reducing fertility, achieving demographic goals and enhancing individual rights.

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Appendices

Appendix Table 1. Descriptive statistics of the selected variables under study

	Description of the Variable	Min.	Max.	Mean	Std. Deviation
AGE	Current age – respondent	15	49	31.0	8.6
AGESQ	Age squared	225	2,401	1,037.5	559.3
NLS	Number of living sons	0	10	1.4	1.2
NLSSQ	nlssq	0	100	3.2	4.9
NLD	Number of living daughters	0	11	1.3	1.2
NLDSQ	nldsq	0	121	3.1	5.3
WEDNP	Primary education	0	1	0.2	0.4
WEDNHS	Secondary education	0	1	0.2	0.4
WEDNHIGR	Higher education	0	1	0.1	0.3
RELMUS	Muslim	0	1	0.1	0.3
RELCHR	Christian	0	1	0.1	0.2
RELOTH	Other religion	0	1	0.0	0.2
EXPFPM	Exposure to family planning by mass media	0	1	0.6	0.5
EXPFPHF	Exposure to family planning at health facility	0	1	0.0	0.1
ASDEDNM	Aspirations for daughter's education up to middle	0	1	0.1	0.3
ASDEDNH	Aspirations for daughter's education up to higher level	0	1	0.4	0.5
ASDEDND	Aspirations for daughter's education up to her desired level	0	1	0.4	0.5
ASSEDNM	Aspirations for son's education up to middle	0	1	0.0	0.2
ASSEDNH	Aspirations for son's education up to higher level	0	1	0.4	0.5
ASSEDND	Aspirations for son's education up to his desired level	0	1	0.6	0.5
LSS1	Living style score low	0	1	0.5	0.5
LSS2	Living style score medium	0	1	0.8	0.4
LSS3	Living style score high	0	1	1.0	0.2
WWNoCash	Working without wage	0	1	0.1	0.3

Table 1. Continued

WWWithCash	Working with wage	0	1	0.2	0.4
SC/ST	Scheduled castes/schedules tribes	0	1	0.3	0.5
OBC	Other "backward" castes	0	1	0.3	0.5
FPDWOthers	Family planning discussed with others	0	1	0.1	0.3
FPDWHusband	Family planning discussed with husband	0	1	0.2	0.4
FPDWFriends	Family planning discussed with friends	0	1	0.1	0.3
RES – Urban	Urban residence	0	1	0.3	0.5

Appendix Table 2. Multiplicative effects of predictor variables (eâi) on the odds ratios (Ωi's) in the multinomial logit model

	Exp (βi)			
Abbreviated Variable	**UNSB (p1/p0)**	**UNLB (p2/p0)**	**MNSB (p3/p0)**	**MNLB (p4/p0)**
AGE	1.053	1.549	1.461	1.845
AGESQ	0.996	0.993	0.992	0.991
NLS	1.438	5.205	1.342	7.723
NLSSQ	0.965	0.822	0.87	0.716
NLD	1.528	2.935	1.206	2.491
NLDSQ	0.964	0.883	0.958	0.848
WEDNP	1.17	1.281	1.6	1.584
WEDNHS	1.392	1.53	2.474	1.769
WEDNHIGR	1.866	2.185	4.086	1.498
RELMUS	1.12	0.758	1.317	0.413
RELCHR	2.051	0.723	1.369	0.46
RELOTH	1.159	0.841	1.272	0.899
EXPFPM	1.077	1.183	1.579	1.792
EXPFPHF	1.122	2.197	5.508	5.147
ASDEDNM	1.011	1.047	0.976	1.17
ASDEDNH	1.212	1.303	1.128	1.95
ASDEDND	1.274	1.397	1.201	2.068
ASSEDNM	0.74	0.906	2.009	0.79
ASSEDNH	0.785	0.92	1.244	0.864
ASSEDND	0.712	0.914	1.121	0.799

Appendix Table 2. Continued

LSS1 (Low)	1.04	1.044	1.345	1.238
LSS2 (Med)	1.079	1.079	1.673	1.423
LSS3 (High)	0.905	0.881	1.813	1.385
WWWNoCash	0.902	0.839	0.876	1.029
WWWCash	0.843	0.966	1.105	1.525
SC/ST	0.997	0.764	0.844	0.671
OBC	1.022	0.862	0.661	0.824
FPDWOthers	1.188	1.135	0.843	1.172
FPDWHusband	1.077	1.746	2.699	0.985
FPDWFriends	0.904	1.062	1.214	1.408
RES-Urban	0.974	1.139	1.296	1.357

UNSB = unmet need for spacing births; UNLB = unmet need for limiting births; MNSB = met need for spacing births; MNLB = met need for limiting births (with non-use of contraception as the reference category).