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Unmet Need of Contraception in India's Demographically Backward EAG States

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Abstract: Unmet need for contraception is substantially high in the 8 empowered action group (EAG) states of India viz. Bihar, Uttar-Pradesh, Madhya-Pradesh, Rajasthan, Orissa, Jharkhand, Uttarakhand and Chattisgarh; comprising of 45.9% of India's population as of 2011 census. Data on battery of socioeconomic, demographic and program factors affecting demand for contraception have been drawn from the fourth National Family Health Survey, 2015-16. The primary data pertain to 19,248 currently married and fecund women aged 15-49 years in the EAG states. The Multinomial Logit Regression analysis has elicited relative significance and directions of effects of the selected socioeconomic and demographic variables on the four components of demand for contraception Multiple classification analysis suggests that strengthening of IEC component on family planning need to be prioritized, misapprehensions on side effects and health risks of contraception, alleviation of son-preference in the Indian society, improvement in girls school enrolment and women's education, women's gainful employment, mandatory implementation of legal age at marriage, reduction in infant and child mortality, involvement of village level health functionaries.

Keywords: Unmet Need, Contraception, Spacing Births, Limiting Births, Women's Empowerment.

Introduction

The role of contraception in fertility regulation has always been crucial to success of historical as well contemporary fertility control (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 (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 regulation (Gulati, 1996).Realizing the potential dangers of burgeoning population, in 1952 India became the first country to launch an official family planning program promoting contraception and responsible parenthood to control fertility and hasten the process of demographic transition in India. Official efforts have succeeded in averting about 443 million births till 2010-11 (GoI, 2011). Although fertility decline has set-in all over India, yet 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 Cairo's International Conference on Population and Development in 1994. The earlier method-mix target oriented approach had shifted to a client-entered demand-driven approach to reproductive and child health. This new approach was enshrined in the National Population

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Policy 2000, with tangential reference to fertility control. The policy then called for vigorous promotion of a small family norm to achieve replacement levels of fertility by 2010.

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, is 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). One particular 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).

Unwanted fertility is likely to be nearly non-existent at the two extreme stages of transition-initially when fertility desires are mostly unrestricted and at the end of the transition when couples have nearly complete control over their fertility (Kulkarni, 1998). Reducing the unmet need for contraception is also important for helping couples achieve their reproductive goals and enhancing wellbeing of women and children (Malcolm Potts, 2006) and may help in reducing unintended pregnancies that lead to abortions and unwanted birthsð both of which are unacceptably high in many developing countries witnessing fertility transition (Becker, 1999). Interestingly, unwanted fertility or proportion of unwanted births was discerned to be low in countries with very low or very higher levels of fertility and highest in countries with intermediate levels of fertility (Bongaarts, 1990; 1997). One particularly harmful consequence of unintended pregnancies is unsafe abortion. An estimated 18 million unsafe abortions take place each year in less developed regions, contributing to high rates of maternal death and injury in these regions (Murray and Lopez, 1998: p 280). Additionally, unwanted births pose risks for childrenôs health and wellbeing and contribute to rapid population growth in resource constrained countries.

However, promotion of contraception as a fertility regulation strategy seems to had been consigned to the back burner in India in late 1990ôs, especially since ICPD conference in 1994, despite the fact that almost all the empirical studies had demonstrated that contraception had always been the most significant catalytic factor and cost effective strategy for fertility control in almost in all the circumstances. Nevertheless, a report by the Planning Commission had aptly concluded that ñthere appears to be an urgent need for bringing back promotion of contraception as the main concern of Family Welfare programmes in the high fertility states of India and thus the couplesô felt need for contraception should be fully metò (GoI, 2006).

Objectives

The study intends to analyze factors influencing different components of the total demand for contraception viz. met as well as unmet need for spacing as well as limiting births, in India, especially demographically backward empowered action group (EAG) states, viz. Bihar, Uttar

Pradesh, Madhya Pradesh, Rajasthan, Orissa, Jharkhand, Chattisgarh and Uttarakhand, of India. The EAG states of India comprise around 45.9% of Indiaôs population as per 2011 Census, and within the EAG states we find Uttar Pradesh and Bihar are the most populous states of India comprising 16.5% and 8.6% of Indiaôs population. For the purpose some selected socioeconomic, demographic and program factors affecting met and unmet need for contraception in India would be brought under the purview of the present study. Identification of the key contributing factors and their relative significance in impacting the different components of the total need of contraception would be elicited using multinomial logit regression analysis. Multiple classification analysis would elicit likelihood or probabilities of met and unmet need of contraception for spacing and limiting births and non-use of contraception methods for women with different socioeconomic and demographic parameters.

Database and Methodology

The fourth National Family Health Survey (NFHS-4) collected detailed information on fertility, mortality, family welfare, and important aspects like nutrition, sexual behavior, domestic violence, adolescent reproductive health, testing of adult population for HIV, etc. NFHS-4 provides detailed data from 568,200 households, 625014 women and 93,065 eligible men stretched over 640 districts spanned over 29 states and 6 Union Territories of India. NFHS-4 provides updates and evidence of trends in key population, health and nutrition indicators, including HIV prevalence.

The survey has covered a range of health-related issues, including fertility, infant and child mortality, maternal and child health, perinatal mortality, adolescent reproductive health, high-risk sexual behaviour, safe injections, tuberculosis, and malaria, non-communicable diseases, domestic violence, HIV knowledge, and attitudes toward people living with HIV. The information was elicited to enable the GOI to provide national and international agencies to monitor and evaluate policies and programmes related to population, health, nutrition, and HIV/AIDS. This study intends to elicit the effects of selected socioeconomic and demographic factors on met and unmet demand for contraception in the EAG states of India. The data on usage or non-usage of contraception amongst currently married and fecund women in the EAG states provided by NFHS-4 would be utilized for the purpose.

The data over battery of socioeconomic, mother and child health, contraceptive usage and reasons for non-usage for currently married and fecund women has been filtered for 1,64,950 currently married and fecund women covered in the 8 EAG states has been utilized in this study. The definitional aspects of unmet and met need of contraception for spacing and limiting births are detailed in the NFHS-4documents[3]. This study has employed multinomial logit regression

[3] Unmet Need for Spacing Births refers women whose pregnancy was mistimed; amenorrheic women who are not using family planning and whose last birth was mistimed, or whose last birth was unwanted but now say they want more children; and fecund women who are neither pregnant nor amenorrheic, who are not using any method of family planning, and say they want to want to wait 2 or more years for their next birth.
Unmet Need for Limiting Births refers to pregnant women whose pregnancy was unwanted, amenorrheic women who are not using family planning and whose last child was unwanted and who do not want any more children; and fecund women who are neither pregnant nor amenorrheic, who are not using any method and who want no more children.

analysis to highlight important predictors of met and unmet demand for contraception. The response variable is intended to be into five mutually exclusive and exhaustive categories: (1) respondents not using any type of contraception, (2) respondents with unmet need for spacing births, (3) respondents with unmet need for limiting births, (4) respondents using spacing methods and (5) respondents using limiting methods. The reference category (1) comprises of respondents who are not using any contraceptive method and have not expressed any need for the same. Each respondent can fall into only one of the five mutually and exhaustive categories.

Parametric estimates of the regression coefficients in the multinomial logit model are computed through the maximum likelihood estimation procedure. The estimated regression coefficients can be used for multiplicative effects of the odd ratios and thereby probabilities or likelihood of respondents being in different categories of non-users or users stated earlier with different background characteristics have been provided in multiple classification analysis (MCA) in this study. Alternatively, the effects of predictor variables on the response variable are the form of estimated probabilities subject to changes in the predictor variables. A note on cautious interpretations of increase or decrease in the odd ratios in the multinomial regression analysis is provided in an earlier study (Gulati, 1996). 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). Some technical aspects of theestimational procedure and methodology are provided in Appendices too.

Findings

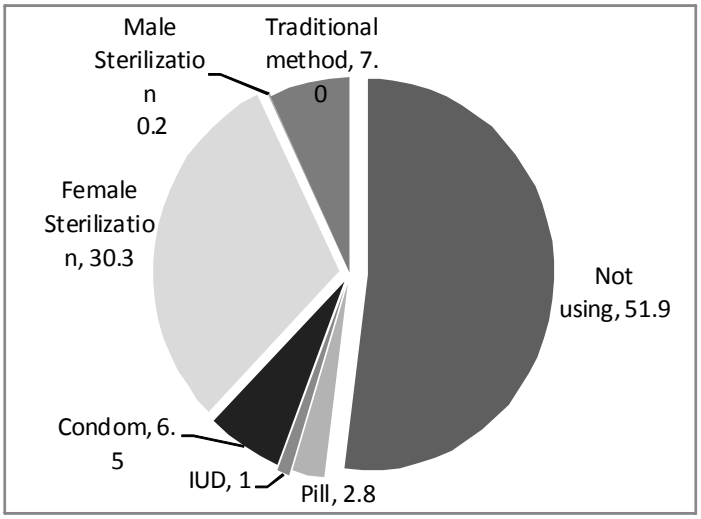
Method-Mix Usage of Contraception

The current usage of contraception of any method in the eight EAG states has been drawn from the 19248 currently married and fecund women aged 15-49 years covered in the National Family Health Survey in 2015-16 (NFHS-4). The use of any method of contraception amongst these women turns out to be around 48%. The use of any modern method of contraception turns out to be around 40% whereas still7% of the couples use traditional methods like withdrawal, rhythm, or other traditional methods. Usage of different methods of family planning, among currently married and fecund women aged 15-49 years or whose husbands are using any method, in the eight EAG states is presented in the following pie chart.

The Figure 1 depicts that almost 51.9 percent of the couples are not using any contraception in the EAG states. Among the users of contraceptive methods we find almost 30.3 percent of women are using female sterilization, which amounts to almost 58% of the usage of contraception of any kind. Second most widely used method is condom by 6.5 percent of male partners, which amount to almost 12.5% of the contraception usage. Out of modern spacing methods of contraception we find pills are being used by 2.8% and IUD by 1.3% of the female users. Interestingly, 7% of the users of contraception still report usage of traditional methods like withdrawal, rhythm and other traditional methods, which is slightly lower than all India average of 7.8.

Met Need for Spacing Births Using for spacing is defined as women who are using some method of family planning and say they want to have another or are undecided whether to have another child. Met Need for Limiting Births refers to women who are using contraception and who do not want to have any more children.

Figure 1: Methods-Mix Usages in the EAG states of India during, NFHS 4



Main Reasons for Non-Use and No Intention to Use Contraception During 2015-16 in the EAG States

It may be of interest to examine the reasons for non-use of contraception and no intention to use anytime in future, as they could provide important clues about the demand side and supply side constraints to contraception (Zappella, 1997). Supply side constraints such as inaccessibility or effectiveness of contraception methods, or misapprehensions about contraception methods, would 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 suggests for strengthening the IEC component to improve demand for family planning. Distribution of women not using and no intention to use contraception too is provided in Table 1.

Perusal of Table 1 reveals that women who are neither using nor intend to use contraception in 2015-16predominantly extended fertility related reasons (71.8%) comprising 22.2 percent extending reason like infrequent or no sex, and around 26.5 percent extending menopausal or hysterectomy reasons. Interestingly around 18.2 percent expressed societal reasons like husbandôs opposition (12.2%), self-opposed (5.3%) or others (.7%). We still find women expressing lack of knowledge (1.9%), and women expressing method specific reasons (18.4%) with women expressing health-risks by 4.7% as reasons for no use.

Most of the reasons cited for non-use and no intention to use in future too are primarily because of wrong perceptions about FP methods or possibly lack of follow-up of some contraception methods where minor clinical interventions are needed at the time of adoption like IUD insertions, tubectomy or vasectomy. Thus, the demand for family planning can be improved through proper sensitization of women and alleviation of method specific misapprehensions and alleviation of opposition to use amongst the 27.2 percent of the women who cited such reasons for non-use and no-intention to use in future too.

Table 1: Percent distribution of women by main reason for neither-using nor having any intention to use contraception, NFHS-4

Reasons	Percentage (%)
Fertility Related Reasons	**71.8**
Infrequent sex, no sex	22.2
Menopausal, hysterectomy	26.5
Subfecund, infecund	6.0
Postpartum amenorric	3.3
Breastfeeding	3.8
Fatalistic	10.0
Opposition to Use	**18.2**
Respondent opposed	5.3
Husband opposed	12.2
Others opposed	0.7
Religious Reasons	**1.7**
Religious prohibition	1.7
Lack of Knowledge	**1.9**
Knows no method	1.2
Knows no source	0.7
Method related Reasons	**18.4**
Fears side effects	2.7
Lack of access	0.3
Cost too much	2.4
Inconvenient to use	0.3
Health Risks/No-liking of existing methods	4.3
Other	6.7
DK	**1.7**
Number of women	**21522**

Multinomial Logit Regression Results

Parametric estimates of the multinomial logit regression coefficients with all the predictor variables are presented in Table 2. The estimated coefficient (ϐi) depicts the additive effect of one-unit change in the predictor variable (Xi) on the log of odds (log Ý) of the response variable. Equivalently, the term ($e^{\beta i}$) depicts 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.

Perusal of Table 2 reveals that the effects of demographic variables such as womenôs age, age at marriage, number of living children, and number of living sons are significant on all the four components of demand for contraception viz. unmet need of contraception for spacing (UNSB) as well as limiting births (UNLB) and met need for spacing (MNSB) as well as limiting births (MNLB). Furthermore, the relationship of the number of living sons turns out to be non-linear and significant for all the four components as revealed by coefficients of number of living sons square. This means that met and unmet need for contraception for spacing as well as limiting births tend to increase and peaks at the threshold level of number of living sons and thereby levels off. Interestingly, the met need for limiting births (MNLB) is impacted more by number of living sons (ϐ=0.889) than by living children (ϐ=0.818).

Table 2: Multinomial Logit Regression Model Parametric Estimates for Unmet & Met Need for Spacing & Limiting Births for Contraception with No-Use and No-Demand for Contraception as Reference Category in the EAG States of India, NFHS-4

Predictor Variable	Unmet Need for Spacing Births (UNSB) (1)		Unmet Need For Limiting Births (UNLB) (2)		Met Need for Spacing Births (MNSB) (3)		Met Need For Limiting Births (MNLB) (4)	
	Coeff (b)	ε	Coeff (b)	ε	Coeff (b)	ε	Coeff (b)	ε
Intercept	-0.221	0.556	-5.390	0.000	0.095	0.789	-5.115	0.000
Age	-0.1	0.000	0.090	0.000	-0.077	0.000	0.170	0.000
Age at Marriage	0.074	0.000	-0.036	0.003	0.082	0.000	0.087	0.000
Number of Living Children	0.754	0.000	1.370	0.000	0.818	0.000	1.209	0.000
Number of Living Sons (NLS)	0.731	0.000	2.400	0.000	0.883	0.000	3.090	0.000
NLS Square	-0.14	0.000	-0.393	0.000	-0.216	0.000	-0.508	0.000
Any Child Died-	-0.929	0.000	-1.880	0.000	-1.013	0.000	-1.809	0.000
Number of Years of education	0.166	0.000	0.308	0.000	0.116	0.011	0.198	0.000
Urban	-0.111	0.315	0.120	0.278	0.156	0.119	0.226	0.024
Not working	0.285	0.142	0.167	0.201	-0.181	0.152	-0.261	0.027
Agricultural	-0.24	0.177	-0.187	0.249	-0.423	0.011	-0.125	0.396
Muslim	0.299	0.012	-0.738	0.000	0.487	0.000	-1.367	0.000
Watching TV	0.228	0.014	-0.104	0.295	-0.526	0.000	-0.608	0.000
Husband Ever Slapped	0.057	0.637	0.049	0.677	-0.102	0.399	0.099	0.365
Wealth Index-Poorer	-0.096	0.567	-0.479	0.006	-0.898	0.000	-0.961	0.000
Wealth Index-Poor	-0.149	0.343	-0.268	0.099	-0.608	0.000	-0.506	0.001
Wealth Index-Middle	-0.027	0.858	-0.224	0.155	-0.309	0.024	-0.236	0.091
Wealth Index-Richer	-0.129	0.393	-0.024	0.875	-0.278	0.032	-0.072	0.586
ANM Visit-No	-0.775	0.000	-0.534	0.000	-0.652	0.000	-0.276	0.006
N	1327		2382		1456		11676	

Notes: ε: Level of Significance, N: Number of Observations in Each Category; 2407is the number of thewomen inthe Reference Category, who are neither using nor expressing any intention to use contraception (NUND). NLC: Number of Living Children; NLS: Number of Living Sons; HES: Husband Ever Slapped;WI: Wealth Index Based Categories

Interestingly, the usage of contraception for limiting births get much more pronounced after having sons than daughters. Furthermore, the threshold level, at which met need for spacing births seems to peak up around two sons, and for limiting births at three sons. Impact of experience of any child-death in family during the family building process depicts significant and negative impact on all the four components of demand for contraception. Womenôs education depicts significant and positive impact on met need of FP for spacing as well as limiting births. Womenôs occupational hierarchy also depicts significant and positive impact on met need of FP for spacing as well as limiting births. Alternatively, met need of FP for spacing as well as limiting births is higher amongst educated women compared with less educated and uneducated women. Thus, womenôs education as enabling factor for womenôs empowerment plays an important role towards adoption of family planning methods for spacing as limiting births. Muslim women compared to non-Muslim women depict significantly higher usage of spacing methods and lower usage of limiting methods, respectively. Alternatively, prevalence of utilization of permanent methods of contraception is significantly lower amongst Muslim women

compared to non-Muslim women whereas utilization of temporary methods of contraception is the other way round. This could be a cultural phenomenon amongst Muslim society that adoption of permanent methods of contraception like sterilization has some religious prohibition or constraints. Exposure to electronic media, like watching television, depicts significant and positive impact towards improvement in the utilization of spacing as well as limiting methods of contraception. Furthermore, womenôs empowerment characterized by less of domestic violence, depicted by slapped by husband or not, also depicts higher tendency of utilization of spacing as well as limiting methods of contraception. Urban women depict higher tendency of using spacing methods compared to limiting methods compared to their counterpartsô i.e. rural women. Program factors like active participation of ANMs and LHVs and other village level functionaries seem to depict significant and positive impact in facilitating higher utilization of temporary as well as permanent methods of contraception. Rather, utilization of permanent methods of contraception becomes much more pronounced with the active participation of village level health functionaries.

Adjusted Probabilities of Unmet and Met Need for Contraception

Adjusted probabilities of met and unmet need for contraception for spacing and limiting births in Table 3 are calculated, using multinomial regression coefficients from Table 2, and averages of the predictor variables from Appendix Table 2. In the binary logit model, the sign of the coefficient depicts the direction of the impact because the sum of probabilities in the numerator and denominator add up to one, and hence probabilities based on the coefficients follow the same direction as of coefficient. Thus, an increase in the odds ratio automatically implies an increase in probability, as the probability is monotonically increasing function of the odds ratio. However, in the multinomial logit model, the sum of probabilities in the numerator and the denominator donot add up to one. Thus, interpretation in 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 which are neutral to selection of any category as the reference category. Multiple classification analysis (MCA) in Table 3 provides adjusted values of probabilities for changes in selected background characteristics under study.

Met Need of Contraception for Limiting Births (MNLB)

Column in Table 3 reveals likelihood of usage of contraception for limiting births (p4) for women with different background characteristics. The met need of contraception for limiting births increases with age. Alternatively, likelihood of usage of contraception for limiting births improves from almost 31% at age 25 to 88% at the age of 45. Similarly, likelihood of usage of contraception for limiting births increases amongst women who marry late such as the probability improves from 50% amongst women marrying at 18 to almost 64% amongst women marrying at age 25. The curvilinear nature of linkage with number of living sons discussed earlier also gets reflected in the family composition. Interestingly likelihood of using limiting methods of contraception is almost 78% amongst women with 3 sons, whereas the likelihood with two sons and no daughter is almost 76 % against just 22% with no son and two daughters. Thus, strong son preference in the EAG states gets revealed by substantial increase in likelihood of using limiting methods of contraception to 60% after having even one son and one daughter.

Table 3: MCA Table of Adjusted Values of Probabilities (p*j's*) from the Model of Unmet and Met Need of Family Planning for Spacing and Limiting Births and No Use & No Intention to Use of Contraception in the EAG States, NFHS-4

Predictor Variables	Unmet Need For Spacing Birth	Unmet Need For Limiting Birth	Met Need For Spacing Births	Met Need For Limiting Births	No Use and No Demand
Women's Age					
25	0.158	0.367	0.130	0.307	0.038
35	0.025	0.210	0.026	0.723	0.017
45	0.002	0.114	0.003	0.877	0.004
Age at Marriage					
18	0.051	0.237	0.049	0.502	0.025
21	0.074	0.249	0.073	0.575	0.029
24	0.105	0.253	0.106	0.638	0.033
Family Composition					
0son 0daughter	0.112	0.023	0.092	0.053	0.721
1son1daughter	0.070	0.201	0.071	0.602	0.056
2sons 0daughter	0.025	0.179	0.024	0.758	0.015
0son 2daughters	0.191	0.133	0.179	0.224	0.273
3sons 0daughter	0.010	0.194	0.008	0.785	0.003
Any Child Died					
No	0.044	0.246	0.043	0.649	0.018
Yes	0.089	0.193	0.081	0.546	0.091
Women' s Education					
No education	0.054	0.214	0.055	0.646	0.031
Primary	0.052	0.235	0.050	0.637	0.025
Secondary	0.049	0.258	0.045	0.627	0.020
Higher	0.047	0.282	0.041	0.614	0.016
Women's Occupation					
Not working	0.048	0.286	0.041	0.608	0.016
Agricultural	0.029	0.206	0.033	0.715	0.017
Professional	0.032	0.214	0.044	0.697	0.015
Watching Television					
No	0.061	0.309	0.043	0.569	0.019
Yes	0.032	0.224	0.048	0.684	0.012
Place of Residence					
Rural	0.053	0.284	0.045	0.601	0.017
Urban	0.040	0.269	0.044	0.633	0.014
Religion					
Muslim	0.136	0.305	0.147	0.377	0.035
Non-Muslim	0.043	0.273	0.039	0.631	0.015
Wealth Index					
Lowest	0.185	0.329	0.134	0.305	0.047
Middle	0.136	0.315	0.139	0.374	0.037
Highest	0.103	0.299	0.143	0.428	0.027
ANM-Visit					
No	0.051	0.284	0.046	0.602	0.016
Yes	0.034	0.243	0.035	0.665	0.023
Husband Ever Slapped					
No	0.054	0.236	0.055	0.629	0.025
Yes	0.053	0.231	0.046	0.646	0.023

p_j: Adjusted values are obtained using estimated coefficients from Table 2 in the formulae and putting other predictor variables on their mean values and for the requisite variable the exact value.

Thus, extent of son preference being still deep rooted in the EAG states warrants promotion of family planning methods amongst women having only daughters like that in Tamil Nadu where postpartum sterilization incentives in the form of term deposits in the names of daughters at the time of their birth, which would mature during their education and marriage timings, have proved to be quite successful. Experience of child death during family building process also depicts negative impact on likelihood of using contraception for limiting births. The probability of use of FP for limiting births reduces from .65 to .55 due to experience of any child death while controlling all other background characteristics in the multivariate analysis. Womenôs gainful employment depicts significant and positive impact on the likelihood of using contraception for limiting births. The likelihood improves from 60%amongst non-working women to more than 70% amongst professionals. Possibly, womenôs education and gainful employment depicts significant impact towards higher likelihood of using contraception for limiting births in the EAG states. Womenôs exposure to electronic media like watching television depicts positive impact on the usage of contraception for limiting births as the likelihood increase from .57 to .68 amongst women watching TV compared to their counterparts not watching TV. Similarly, rural women depict lower likelihood of using contraception for limiting births compared to the urban women Muslim compared to non-Muslim women depicts substantially lower likelihood of usage of permanent methods of contraception for limiting births. Interestingly we find met need of contraception for spacing births is higher amongst Muslim (.15) compared to Non-Muslim women (.04). Muslim women depict less likelihood of using permanent method of FP for limiting births compared to non-Muslim women. Women from better economic background characterized by wealth index based categories also depict higher usage of contraception for limiting births. The likelihood of using permanent methods of contraception improves from .30 to .43 amongst women from poorer to richer category households, respectively. ANM and other village level health functionaries are depicted to have positive role in enhancing the likelihood of using contraception for limiting births. Thus, womenôs who have exposure to electronic media, more of autonomy and who interact with village level health functionaries whether at health facility or at home depict higher likelihood of using FP for limiting births. However, IEC strategies to sensitize Muslim women or their religious leaders towards alleviation of misapprehensions about use of contraception for limiting births would increase demand for contraception, especially limiting methods, and would bring forth better results towards met need of contraception for limiting births amongst Muslim women.

Met Need of Contraception for Spacing Births (MNSB)

Probabilities of usage of contraception for spacing births (P_3) amongst women with different background characteristics are provided in column (3) in Table-3. Overall we find that the met need of contraception for spacing births is comparatively much lower than for limiting births. However, the curvilinear nature of relationship between usages of contraception for spacing births is also shown, along with age, and number of living sons and daughters. The likelihood of usage of spacing births is substantially higher among urban compared to rural women. Again we find that likelihood of usage of FP for spacing births is substantially higher among Muslim compared to non-Muslim women.

Unmet Need of Contraception for Limiting Births (UNLB)

Likelihood of unmet need of contraception for limiting births (P_2) amongst women with different characteristics is provided in column (2) in Table-3. Unlike met need for limiting births we find unmet need of FP for limiting births declines with age. The probability of UNLB is higher amongst women with two sons than for women with daughters. Similarly, the likelihood of unmet need of FP needing contraception for limiting births is lower among women who only have two or three compared to women having two or three daughters, reflecting strong son preference in Indian society. Likelihood of UNLB is also marginally lower among educated and gainfully employed women compared to uneducated and non-working women. Likelihood of UNLB is lower among women who interact more with the village level health workers compared to women interact less.

Unmet Need of Contraception for Spacing Births (UNSB)

Probabilities of having unmet need of contraception for spacing births (p_1) are provided in column 1 of Table 3. The UNSB is relatively much higher amongst younger women and declines to almost zero above age 35. Also we find that the unmet need is slightly lower amongst women with more of sons than daughters, especially women having two sons compared to women having two daughters. It may be of interest to mention that an unmet need for spacing births is higher among Muslim than non-Muslim women.

Not-Using and No Demand for Contraception

Column 5 in Table 3 provides probabilities or likelihood of not using contraception (p0) by background characteristics. The non-use of contraception seems to be substantially higher among women with no children. Further the non-use of contraception is relatively much higher amongst women with only daughters compared to women having only sons. Muslim women depict higher extent of no-use no intention to use contraception compared to their Non-Muslim counterparts. The NUND is also higher among illiterate and non-working women compared to the educated and professional women, respectively.

Summary and Concluding Remarks

Total demand for family planning in India being sum total of met and unmet of contraception for spacing and limiting births turns out to be around 89.4 percent, comprising of unmet need of 20% and met need of 69.4 as per NFHS-4. Perusal of Appendix Table 1 reveals that for India still the met need of contraception is only 77.6 percent and still 22.4% of the demand is unmet. The unmet need for contraception for spacing and limiting births is still around 8.5 percent and 11.5 percent, respectively. Whereas, the demand for contraception in EAG states vary from 82.3 percent in Bihar to 91.6 percent in Uttarakhand. Further, percent of the demand satisfied varies from 53.4 percent in Bihar to 83.9 percent in Rajasthan. Thus, unmet need of FP for spacing as well as limiting births is still quite high in most of the EAG states. The study has highlighted effects of selected socioeconomic and demographic predictor variables on the four components of demand for contraception viz. met and unmet need of contraception for spacing and limiting births in eight EAG states of India. The selected predictor variables under the purview of the study comprise women's age, number and sex composition of children, experience of death of a child during reproductive career, women's education and working

status, domestic violence, religion, rural-urban residence, and exposure to electronic-media, wealth index, and interaction with village health functionaries.

The Multinomial Logit Regression analysis has elicited relative significance and expected directions of effects of the selected socioeconomic and demographic predictor variables on the four components of demand for contraception. The MCA has elicited estimated likelihood/probability of womenôs met and unmet need of contraception for spacing and limiting births in the EAG states of India. The unmet need of contraception for spacing births is predominantly amongst younger age group married women in the age groups 15-24, and that for limiting births is predominantly amongst women in peak fertility reproductive age groups of 25-39. Similarly, the usage of contraception for spacing births is high amongst the low parity women having none or one living child and for limiting births amongst women with two or more living children. Further, the usage of contraception for limiting births gets much higher amongst women having more of sons than daughters, implying deep rooted son-preference phenomenon in the Indian society. The Multinomial Logit Regression results clearly reveals that womanôs demographic characteristics such as age, age at marriage, parity, and experience of child death influence significantly all the four components of demand for contraception and socioeconomic factors like education, gainful employment, living standards characterized by wealth index, exposure to electronic media like television, etc., significantly affect met need of contraception for spacing as well as limiting births. Active participation of village health functionaries like ANM, VHG, etc. also depicts positive impact over contraceptives usage for spacing as well as limiting births.

Usage of contraceptives for spacing births is higher amongst younger and low parity women and for limiting births is higher amongst higher aged and high parity women, especially after having two or more sons. The likelihood of using contraception to limit births increases substantially amongst women even after having one son and still higher after having two or more sons. Alternatively, strong son-preference gets revealed in the EAG states too. More educated women are less likely to have an unmet need of FP for spacing as well as limiting births. Womenôs gainfully employment depicts higher likelihood of usage of contraception for limiting births than their non-working counterparts. Similarly, urban women depict higher tendency to use spacing compared to higher utilization of limiting methods by their rural counterparts. Womenôs exposure to electronic media like watching television depicts significant impact on their utilization of permanent methods of contraception for limiting births. Womenôs autonomy characterized by less of domestic violence also depicts higher tendency to use contraception for spacing as well limiting births. Usage of permanent methods of contraception for limiting births is significantly lower among Muslim than among non-Muslim women. However, likelihood of usage of contraception for spacing births is significantly higher among Muslim than among non-Muslim. This possibly reflects some religious bias against using permanent methods of contraception for limiting births amongst Muslim women. ANMôs visit significantly improves likelihood of met need of contraception for spacing as well as limiting births. Thus, role of active involvement and participation of village level health functionaries can bring about significant results in promotion of family planning in the EAG states of India.

The MCA clearly suggests that the usage of permanent methods of FP increases sharply after having two sons. The analysis also suggests preference for the balanced sex ratio amongst

living children such as likelihood of usage of contraception for limiting births is substantially higher amongst women with two living sons (.76) compared with women having one son and one daughter (.60) and much higher than amongst women with two daughters (.22). Womenôs empowerment, especially economic empowerment characterized by working as professionals for wages, and also with better living standards characterized by wealth index based richer categories depict higher levels of met need for spacing as well as limiting births. Womenôs education also depicts positive and significant effect on the usage of contraception for spacing as well as limiting births. Interestingly, impact of womenôs education on the usage of contraception for spacing births are much more pronounced compared with effects on the usage for limiting births. Exposure to family planning by media and interaction with village health functionaries also depict positive influence on met need of contraception for spacing as well as limiting births. Higher standards of living depict significant impact on the usage of contraception for spacing as well as limiting births. Thus, women from higher standards of living households also depict higher usage of contraception for spacing as well as limiting births. Usage of contraception for spacing as well as limiting births is significantly higher in urban compared with the rural areas possibly because of higher accessibility and awareness about the family planning methods. All women with unmet need of contraception may not be potential users of contraception. However, analysis of reasons for no-use and no-intention to use in future too reported by 21522 women reveals that the usage of family planning can be conveniently enhanced by around 22.9 percent amongst these non-users category of women through assuaging method-specific reasons for non-use like elimination of familial and societal opposition through IEC interventions, alleviation of fear of side effects and health risks through proper counseling through electronic media or interactions with village level health functionaries like ANM, LHV and AWW and more importantly now involvement of ASHAs would definitely enhance not only demand for contraception but also usage of contraception in India.

Policy Imperatives

Amongst 21522 currently married and fecund women neither using nor expressing any demand for contraception we find majority of them extended reasons like infrequent or no sex, societal or husbandsô opposition, lack of knowledge, health risks, menopausal or hysterectomy. Thus, strengthening of IEC component can facilitate and motivate such women towards adoption of contraception towards reduction in unintended pregnancies and fertility curtailment in the EAG states. Coming to socioeconomic and demographic variables affecting usage or non-usage of contraception we find that the Unmet need of contraception for spacing births is much higher among women in younger age groups and for limiting births among women in peak fertility age groups of 25-34. Focused attention of provisioning spacing methods to the younger women, who are obviously at lower parities too, and limiting methods to women in peak fertility age groups would bring about optimal results in terms of reduction in unwanted and mistimed pregnancies and unwanted fertility too. Thus, focused attention on younger women for spacing and peak fertility age group women for limiting methods can bring about good results towards promotion of FP in the EAG states.

Use of contraception for limiting births is discerned to increase much faster among women with more of sons than daughters. Womenôs empowerment through better education and gainful employment, which by itself is an ideal goal and would alleviate son preference, also

would help increased demand for contraception to space and limit births. Experience of any child death during family building process is discerned to bear significant and negative impact on usage of permanent methods of contraception. Thus, reduction in infant and child mortality, which is an ideal goal in itself, would bring around impact on usage of permanent methods of contraception in the EAG states of India. 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.

Contraception use for limiting births is significantly lower among Muslim compared to non-Muslim women. On the other hand, contraception for spacing births remains significantly higher among Muslim compared to non-Muslim women. This could be because of some religious bias against limiting contraception among Muslim women. The study suggests that though all women in the non-use of contraception category may not be the potential users of contraception but assuaging some important reasons of non-use like religious and familial opposition to use contraception, alleviation of misapprehensions about side effects and health risks, awareness and accessibility of quality contraceptive methods, active involvement of village health functionaries like ANMs, VHGs, ASHAs, etc. for proper counseling would facilitate substantial increase in the usage of contraception amongst currently married and fecund women aged 15-49 years in the EAG states of India.

Way Forward

Multivariate analysis of unmet and met need of contraception for spacing and limiting births in the 8 EAG states reveals that focused attention on currently married and fecund women with different background characteristics can bring around positive results towards enhancement of usage of contraception towards meeting the objective of reducing the unmet need of contraception and thus reduction in unwanted pregnancies and fertility in these demographically backward states. Some specific recommendations emerging out of the analysis are as follows:

1. Strict promulgation of minimum age at marriage act and girlsô education can bring about substantial improvements towards promotion of family planning program towards the objective of meeting the unmet need of contraception for spacing as well as limiting births for curtailment of fertility in the EAG states.
2. Infant and child mortality reduction have far reaching impact on adoption of contraception towards reduction in unwanted fertility. Empirically likelihood of usage of contraception and infant and child mortality reinforces each other and facilitates fertility reduction objective.
3. Alleviation of deep rooted son-preference in the EAG states would facilitate motivation of women having only daughters towards adoption of contraception for spacing and especially for limiting births
4. Involvement of Muslim religious leaders towards alleviation of unfounded beliefs towards adoption of limiting methods of contraception amongst Muslim women can bring around substantial impact on their unwanted pregnancies and unwanted fertility.

5. Womenôs education and gainful employment can bring around significant results towards promotion of family planning program in the EAG states to meet the unmet need of contraception.
6. Promotion of spacing methods amongst newly married and low parity women can bring around better health effects on mothers as well as children and enhancement of met demand for contraception.
7. Focused attention towards motivational efforts and sensitization of women towards adoption of contraception in rural areas can bring around much better results towards reduction in the unmet need in the EAG states.
8. Financial incentives programs like term deposits for newly born daughters for women having only one or two daughters can promote post-partum sterilizations to meet demand for contraception and to curtail unwanted fertility like it succeeded in Tamil Nadu
9. Improvements in living standards also promotes likelihood of usage of contraception for spacing and limiting births
10. Active participation of village health functionaries towards promotion of contraception usage, especially in rural areas, can also bring around significant improvements towards objective of meeting the unmet need of contraception in the EAG states.

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Appendix Table 1: Distribution of Women by Contraception Usage Status in the 8 EAG States of India: 2015-16, NFHS-4

India/State/UT	**NUND**	**UNSB**	**UNLB**	**MNSB**	MNLB	**TD**	**UNTD**	**(N)**
INDIA	10.6	8.5	11.5	8.7	60.7	89.4	22.4	324642
EAG States	11.7	8.5	13.0	7.3	59.6	88.3	24.3	162928
Bihar	17.7	15.7	22.7	1.5	42.4	82.3	46.6	17598
Madhya Pradesh	11.4	8	11.4	4.8	64.4	88.6	21.9	29046
Rajasthan	10.3	6.5	7.9	8.3	67.0	89.7	16.1	23365
Uttar Pradesh	11.9	7.6	14.3	9.1	57.1	88.1	24.9	43729
Jharkhand	13.5	12.7	15.3	4.6	54.0	86.6	32.3	13091
Uttarakhand	8.5	6.3	13.4	7.5	64.3	91.5	21.5	8297
Chattisgarh	10.9	6.7	8.4	6.5	67.5	89.1	16.9	11272

Notes: NUND: No Use & No Demand; UNSB: Unmet Need for Spacing Births; UNLB: Unmet Need for Limiting Births; MNSB: Met Need for Spacing Births; MNLB: Met Need for Limiting Births, TD: Total Demand which is sum total of UNSB, UNLB, MNSB and MNLB; UNTD: Unmet Need as sum total of UNSB and UNLB to TD; N: Number of the Respondents

Appendix Table 2: Descriptive statistics of the selected variables under the study of Met and Unmet Need of Contraception of Currently Married Women in EAG States, 2015-16

Description of the Variables	Min.	Max.	Mean	Std. Deviation
Current age - respondent	15	49	31.8	7.94
Number of living children	0	15	2.7	1.7
Number of living son	0	9	1.3	1
Number of living son square	0	81	2.8	3.8
any child died	0	1	0.16	0.37
Age at effective Marriage	0	47	18.1	3.9
womenôs education	0	3	1.1	1.1
Womenôs occupation	0	2	0.42	0.7
Watching Television	0	1	0.67	0.46
Husband ever slapped	0	1	0.1	0.35
Place of Residence	1	2	1.7	0.43
Religion	1	2	1.8	0.3
Wealth index	1	5	2.7	1.4
In past 3 months met with ANM or LHV	0	1	0.13	0.33
			N = 19248	