Differentials in Sterilization and Modern Spacing Methods of Contraception in India: An Equity Analysis Based on the National Family Health Survey

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Introduction

Contraceptive choice is an element of quality of care in the provision of family planning services and the central dimension of women's reproductive rights *(*Díaz et al., 1999). India was the first country to introduce a comprehensive family planning program in 1951. Compared to spacing methods such as intrauterine devices (IUDs), condoms, and pills, female sterilization has been the most commonly used method since the program's inception. With the introduction of injectable contraceptives and improved health care in India, the Indian government announced an expansion of contraceptive options for women. Contraceptive use has increased dramatically over decades. However, limiting methods remain dominant, accounting for more than 75% of CPR of modern methods (IIPS & ICF, 2021). Prusty, 2014 and Iyer, 2002, have also found wide disparities in contraceptive use by socioeconomic groups in India. Poorer populations often face limited access to services, require increased education on service value, and face economic pressures on their time and resources. Oral rehydration therapy, a program specifically designed for the poorest, is more likely to reach those with more money, albeit in a less affluent manner than general health care (Gwatkin 2000, 2001). Research on 74 nations reveals a decrease in family planning inequity trends between 1990 and 2013, with significant declines in mCPR inequality and in meeting demand for family planning (Alkenbrack et al., 2015). Women who use contraception for family planning have fewer children and more space between pregnancies (Cleland & Machiyama, 2015), which reduces the number of high-risk pregnancies and unsafe abortions and improves maternal and child health and survival (Cleland & Machiyama, 2015; Fabic et al., 2015). Consequently, investments in family planning programs are crucial for achieving the SDGs. In India, spacing methods are increasing among all age groups, residence points, and social groups, resulting in a mixing method and increasing contraceptive prevalence rates. However, the availability of spacing methods can still be improved as many couples use the traditional method of contraception (RGI, 2011). The availability of family planning services has enabled couples to plan for the number and spacing of children and allow more women to enter the labor market, contributing to the national economy and family well-being (Sonfield et al., 2013). Contraceptive use has significantly increased over the past five decades (from 13 percent of ever-married women in 1971 to 67 percent in 2019-21), highlighting global disparities in knowledge and access to contraception, despite the significant increase in contraceptive use since 1970-21 (IIPS, 1995; IIPS & ICF, 2021). Evidence suggests that modern methods have increased, i.e., spacing and sterilization. India faces challenges in addressing the quantitative

disparities in contraceptive use across different group levels, including residence, social, and economic factors, highlighting the inequitable distribution of modern contraceptive methods by religion, caste, and wealth status. With this backdrop, we want to dig into a study to examine the equity in sterilization and modern spacing methods across social, and economic factors in India.

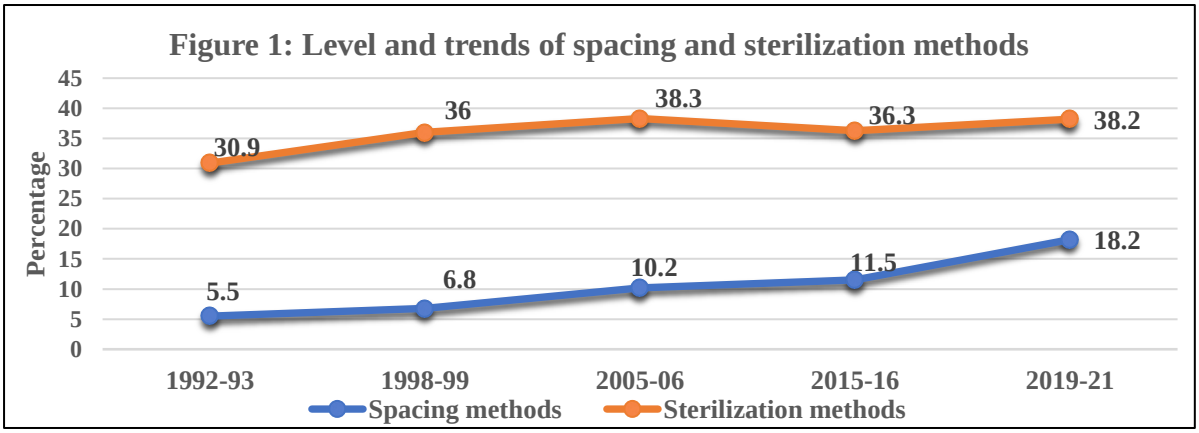
Data source & Methods

The study used the fifth round of National Family Health Survey (NFHS) data, which is a nationally representative cross-sectional survey that collected information on the family planning methods used by women. The present study used information from the women's data file to meet the objective of this study. We applied national sample weights to the women's data file to make the results nationally representative. Furthermore, study samples included 83,154, 84,862, 87,925, 499,627, and 512,408 samples of women from the first, second, third, fourth, and fifth rounds of NFHS, respectively.

Univariate and bivariate analyses have been used to assess the level and trends of contraceptive use using various methods. Concentration Furthermore, chi-square tests and p-values were used to see the association of variables, independence, and the significance level of outputs, respectively. For equity analysis, married women were ranked according to their wealth score, stratified by social and economic factors of women in India. The concentration index (CI) is a statistical tool incorporating data from all wealth score to analyze inequity. CI has been used to measure the equity in sterilization and modern spacing methods of contraception across selected background characteristics of women in India. Furthermore, equity score was calculated to determine the equity of using spacing and sterilization methods in India. Furthermore, the decomposition method was used to see which factors contribute to spacing and sterilization at different time points.

Results

Level of contraceptive use by type of methods India from 1992-93 to 2019-21



The figure 1 shows a significant increase in spacing methods (SM) from 5.5 to 18.2% over time, while sterilization methods (STM) usage increased from 30.9 to 38.2%, indicating a significant increase. Round three level sterilization showed a slightly higher level than round 5 level sterilization, but no significant changes in sterilization methods have been observed in recent decades.

Equity in spacing and sterilization methods by socio-demographic factors in India

Table 1 reveals the equity in SM and STM of contraception by socio-demographic factors in India. The results display that SM have a higher CI value from 0.163 to 0.084 and a lower equity score from 4.6 to 16.7 across the surveys than the STM with the value of CI from 0.040 to 0.004 and equity score from 29.7 to 38.1, which showed that STM were more equitably used than SM over the three decades. For women aged at marriages ≤ 16 years, the lower equity score from 2.6 to 13.8 for SM over time and the higher equity score from 31.7 to 47.2 for STM over time showed lower equitable use of STM and higher equitable use of STM. But women aged at marriage more than 21 years with the higher equity score for SM, from 16.2 to 20.3 over time, and the lowest equity score for STM, from 21.2 to 27.1, over time, showed that the higher equitable use of SM and lower equitable use of STM. For the place of residence, in urban areas, women had a lower CI for the SM and STM. The CI for women in urban areas women ranges from 0.86 to 0.11 for the SM, and for STM, it goes from -0.033 to -0.037, which shows the inequity in using the SM have declined, whereas inequity in using the STM have uptake over the period. The equity score also showed higher SM and STM scores in urban women than rural women. In the case of the education level of women, the results show that women with secondary and higher educated women with a lower value of CI for SM and STM with 0.087 and 0.010 for the first round of the survey had higher equitable in use of SM and STM but equity score for sterilization suggest the higher accessibility among women educated up to primary level for all rounds of the survey. The CI and equity scores for the women educated up to primary suggest the lower equitable use of SM and higher equitable use of STM. The results specify that women educated up to primary level and secondary/higher educated women were equitable in the use of STM and SM, respectively.

Furthermore, Hindu women were more equitable in using STM across all rounds of the survey. In contrast, Muslim women were more equitable in using the SM for the recent survey (-0.045, 26.6), but for the other rounds (first to fourth) of the survey, Sikh religion women were more equitable in using SM with CI and equity scores; 0.006 and 16.9, 0.029 and 22.3, 0.168 and 21.8, and 0.129 and 23.2, respectively. Afterward, castes showed another picture of equitably using SM and STM; other caste women were more equitable in using SM over three decades, with CI and equity scores from 0.170 to 0.129 and 5.3 to 20, respectively. The second and third rounds' results showed that OBC women were more equitable in using STM, with CI and equity scores of 0.034 to 0.024 and 37.4 to 39.5, respectively. But, after the third round of surveys, equitable use of STM shifted from OBC to Scheduled Tribes. The recent round results showed that ST women were more equitable in using STM, with scores of 41.3, than the women who belonged to SC, OBC, and other castes. Afterward, the results for the ideal number of children suggest that women with ≤ 2 children were more equitable in the use of SM with equity scores of 8.3 to 17.8 over time, and higher equitable in the use of STM (except fifth rounds) with the equity scores 33.1 to 35.6. But, for the recent rounds, women with 3 & above children showed higher equitable use of STM with an equity score of 40.3. In the case of the regions, the results indicate that North region women with equity scores of 9.1 and 11.5 were more equitable in SM for the first and second rounds, but after that (third rounds onwards), North-east region women were more equitable in using SM, whereas the South and West region women were

more equitable in STM across all rounds of the surveys with the equity scores 43.1 to 61.3 and 45.8 to 48.9.

Conclusion

The findings of this study based on the equity results suggest that sterilization methods are more equitable than modern spacing methods in India. Findings suggest that women with secondary/higher education, residing in urban areas, Sikh and Muslim religion, and rich wealth status were more equitable in use of SM, which showed higher educational level of play a significant role in equitable use of SM. Women from northeast region, Muslim, Sikh, and the north region, secondary/higher educated, and married >21 years were more equitable in SM. However, women residing in southern region, married <17 years, up to primary educated, Hindu, ST, OBC, and women with >2 children were more equitable in STM. The decomposition findings also predicted that all the above explained factors contributed in equitable use of SM and STM. The study suggests that when a country seeks to increase the use of modern methods, it should provide top priority equity in access to services and contraceptive use.

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Table 1: Equity and achievement of spacing and sterilization methods in India by age at marriage, residence, education level, religion, caste, wealth status, ideal no. of children, and regions from the first round of NFHS to the fifth rounds of NFHS (1992-93 to 2019-21)

Characteristics	Concentration Index										Equity score									
	NFHS-1		NFHS-2		NFHS-3		NFHS-4		NFHS-5		NFHS-1		NFHS-2		NFHS-3		NFHS-4		NFHS-5	
	SM	STM	SM	STM	SM	STM	SM	STM	SM	STM	SM	STM	SM	STM	SM	STM	SM	STM	SM	STM
India	**0.163**	**0.040**	**0.128**	**0.015**	**0.316**	**0.002**	**0.201**	**0.020**	**0.084**	**0.004**	**4.6**	**29.7**	**5.9**	**35.5**	**7.0**	**38.3**	**9.2**	**35.5**	**16.7**	**38.1**
Age at marriage																				
≤ 16 years	0.049	0.064	0.139	0.032	0.219	0.118	0.039	0.100	-0.033	0.067	2.6	31.7	3.0	38.3	4.7	39.3	7.4	41.8	13.8	47.2
17-21 years	0.139	0.070	0.071	0.039	0.315	0.043	0.154	0.067	0.063	0.039	6.6	26.7	8.4	32.5	7.6	34.4	9.9	32.8	17.0	36.5
22 and above	0.099	-0.001	0.042	0.058	0.302	-0.101	0.228	-0.028	0.132	-0.051	13.6	21.2	16.2	22.9	13.9	29.9	11.7	26.5	20.3	27.1
Place of residence																				
Urban	0.086	-0.033	0.055	0.037	0.234	-0.047	0.159	-0.011	0.110	-0.037	10.7	34.8	12.7	36.4	13.0	40.7	12.8	36.4	19.6	37.9
Rural	0.130	0.071	0.144	0.002	0.278	0.040	0.171	0.045	0.047	0.030	2.9	27.8	3.8	35.3	5.2	36.6	8.0	34.8	15.8	37.8
Education level																				
Up to Primary	0.090	0.072	0.125	0.037	0.191	0.116	0.069	0.120	-0.022	0.072	2.5	29.3	2.9	36.2	4.6	37.0	6.6	37.8	12.9	44.6
Secondary/Higher	0.087	0.010	0.049	0.024	0.230	-0.004	0.113	0.054	0.061	0.035	13.8	28.6	14.0	31.6	13.6	32.7	13.5	28.6	20.8	30.2
Religion																				
Hindu	0.161	0.042	0.141	0.024	0.363	-0.016	0.247	0.009	0.120	-0.013	4.2	31.5	5.2	37.3	5.9	41.6	7.8	38.2	15.0	41.4
Muslim	0.173	0.072	0.068	0.072	0.153	0.152	0.021	0.142	-0.045	0.151	5.1	14.9	9.2	18.9	12.4	18.5	16.7	17.9	26.6	18.6
Christian	0.023	0.015	0.050	-0.041	0.212	0.163	0.043	0.155	-0.031	0.191	6.4	34.1	6.0	40.1	5.8	34.7	7.1	34.2	12.6	34.2
Sikh	0.006	0.012	0.029	-0.004	0.168	-0.207	0.125	-0.109	0.129	-0.198	16.9	32.6	22.3	31.9	21.8	38.8	23.2	43.1	23.7	31.6
Others	0.085	0.054	0.056	-0.054	0.225	0.098	0.108	0.095	0.095	0.018	9.5	34.3	8.4	47.9	8.5	38.6	14.5	35.3	16.8	39.7
Castes																				
Scheduled Caste	0.109	0.080	0.143	0.055	0.310	0.027	0.230	0.040	0.087	-0.002	2.5	26.8	3.3	34.3	5.3	38.3	8.0	37.2	15.4	40.2
Scheduled Tribe	-0.015	0.007	0.160	-0.020	0.351	0.045	0.175	-0.050	0.069	-0.008	2.0	28.9	2.8	32.4	3.1	36.2	6.6	39.0	13.1	41.3
Other backward caste	na	na	0.140	0.034	0.346	0.024	0.232	0.031	0.092	0.004	na	na	4.0	37.4	4.9	39.5	6.9	36.4	14.4	40.5
Others	0.170	0.036	0.088	0.002	0.248	-0.046	0.168	-0.007	0.129	-0.051	5.3	30.3	9.7	34.6	12.0	37.9	14.2	33.7	20.0	35.0
Ideal no. of children																				
≤ 2	0.103	0.005	0.080	0.019	0.332	-0.021	0.157	0.010	0.086	-0.007	8.3	33.1	9.0	37.1	8.2	40.1	10.9	35.6	17.8	37.4
Three and above	0.095	0.080	0.121	0.037	0.278	0.117	0.143	0.101	0.054	0.034	3.0	28.4	3.4	32.9	4.5	32.4	6.3	33.5	13.6	40.3
Region																				
North	0.122	0.003	0.092	0.006	0.319	-0.070	0.215	-0.048	0.156	-0.122	9.1	30.7	11.5	33.7	11.5	36.9	15.3	37.5	21.4	37.6
Central	0.172	0.041	0.095	0.007	0.456	0.007	0.335	-0.047	0.149	-0.070	4.1	18.3	5.3	22.8	5.5	26.9	7.7	28.7	19.2	30.7
East	0.043	0.025	0.051	0.020	0.270	0.025	0.221	0.032	0.108	-0.012	4.1	24.6	6.6	27.3	7.6	28.3	11.2	25.4	17.4	32.6
North-east	0.086	0.027	0.025	-0.053	0.105	0.169	-0.027	0.091	-0.012	0.065	5.5	14.5	10.6	18.7	13.5	11.8	25.8	9.0	34.3	8.6
West	-0.020	-0.030	0.080	-0.007	0.341	-0.105	0.319	-0.083	0.251	-0.089	6.4	45.8	7.2	50.0	8.0	54.9	7.3	48.8	11.6	48.9
South	0.155	0.009	0.110	0.001	0.476	-0.053	0.281	-0.038	0.117	-0.029	3.6	43.1	3.2	52.0	2.1	62.1	1.8	55.6	5.5	61.3

Note: SM: Spacing Methods, STM: Sterilization Methods