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Changes in contraceptive use and method mix in India: 1992–92 to 2015–16

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ABSTRACT

Objective: Contraceptive use is subject of scientific interest for its contribution to reduced fertility and improved maternal and child health in India. This study answers the changes in method mix and the influence of factors associated with contraceptive use in India during 1992–93 to 2015–16.

Methods: The study used data from all the four rounds of National Family Health Survey (NFHS) conducted during 1992–93 to 2015–16. Binary logistic regression was conducted in the pooled data of contraceptive users of four rounds of the survey to examine the adjusted contribution of various contraceptive methods over time. Also analysed the determinants of contraceptive use in 1992–93 and 2015–16. The pooled data of 1992–93 and 2015–16 was used to explore the change in users through creating interaction between time and predictors. STATA (V 13) was used for analyses and result was reported at 5 percent level of significance.

Results: Female sterilization continued to dominate the contraceptive method mix, use of pills and condoms had considerably increased, and traditional method use had remained almost unchanged during 1992–93 to 2015–16. Age, education, surviving son, religion, social group, household size, region, and economic condition of the woman remained as significant determinants of contraceptive use during the study period.

Conclusion: Contraceptive use, method mix, the profile of the users, and determinants of contraceptive use has changed significantly during 1992–93 to 2015–16 in India. Increased use of modern spacing methods albeit continuous dominance of female sterilization in method mix suggests relooking at the family planning implementation strategy.

Introduction

Contraceptive use plays an important role in reducing fertility, and the cross-cutting contributions of reduced fertility and population growth to poverty reduction, better maternal and child health, enhanced education, gender equality, and the environment make continued research in family planning compelling [1]. India introduced a nationwide family planning program in the early 1950s, and various approaches such as clinical, extension, cafeteria, integrated, camp, and target oriented have been developed and implemented until early 1990s to increase the acceptance of family planning methods and reduce fertility [2,3]. Stagnation in the family welfare program, organized pressure to bring issues of quality and choice into the program, and the recognition of inherent constraints in the program contributed to remarkable changes in family welfare policy approach in the 1990s [4]. In 1996, the government replaced the method-specific contraceptive targets with the target-free approach later renamed as Community Needs Assessment approach, and thus initiating decentralized participatory planning in family planning. The same year witnessed the enactment of the Reproductive and Child Health program, aiming client satisfaction plus quality comprehensive and integrated health services and brought a significant change in the culture of the family welfare program [5].

The quality of services presented in the family planning program, however, was far away from satisfactory and has not improved over time [6]. Restricted choice of methods, limited information provided to clients, poor technical standards, low levels of follow up and continuity of care, and the inflexible approach to service delivery at government facilities considered as the major weakness of the program [7]. This study examines whether the pattern of contraceptive use in India changed between 1992–93 and 2015–16. Specifically, the study answers – (a) How did the method mix change between1992–93 and 2015–16 (b) Do the influence of factors associated with contraceptive use change between 1992–93 and 2015–16.

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Table 1
Sample characteristics of currently married, non-pregnant, fecund women and currently married, non-pregnant, fecund women who use contraception, India, 1992–2016.

Background characteristics	Currently married, non-pregnant, fecund women				Currently married, non-pregnant, fecund women who use contraception			
	NFHS1 (1992–93)	NFHS2 (1998–99)	NFHS3 (2005–06)	NFHS4 (2015–16)	NFHS1 (1992–93)	NFHS2 (1998–99)	NFHS3 (2005–06)	NFHS4 (2015–16)
Current age								
15–19	10.6	9.6	7.2	3.6	1.8	1.6	1.7	1.0
20–24	20.7	19.0	18.0	15.7	10.7	10.3	10.7	8.5
25–29	19.9	20.4	19.9	20.1	20.7	20.9	19.9	18.0
30–34	16.5	17.1	17.7	17.8	22.6	22.2	22.1	20.7
35–39	13.8	14.4	15.6	16.5	20.6	20.1	20.2	20.7
40–44	10.4	11.2	12.5	13.7	14.3	15.1	15.2	16.9
45–49	8.2	8.3	9.1	12.6	9.2	9.8	10.2	14.3
Schooling								
Non-literate	61.1	53.4	47.3	33.2	50.7	46.7	43.7	33.5
< 5 years	7.5	9.1	8.2	6.7	9.6	10.6	9.2	7.5
5–9 years	19.5	22.8	26.6	3.7	23.9	25.4	27.7	31.7
10 and above years	11.7	14.7	17.9	29.5	15.8	17.4	19.4	27.3
Number of surviving son								
No	27.3	25.6	25.4	26.2	9.8	9.7	11.8	13.6
At least one	72.7	74.4	74.6	73.8	90.2	90.3	88.2	86.4
Exposed to family planning message from Television/Radio/News Paper								
No	57.3[a]	44.4	42.9	37.3	47.6*	36.1	37.9	33.9
Yes	42.7[a]	55.6	57.1	62.7	52.4*	63.9	62.1	66.1
Religion								
Hindu	82.2	81.9	81.5	81.4	84.3	83.7	83.6	82.8
Muslim	11.9	12.5	13.2	13.2	8.1	9.6	10.7	11.1
Others	6.0	5.6	5.3	5.4	7.6	6.7	5.7	6.1
Social group								
Scheduled Caste	12.1	18.3	19.2	21.2	10.3	16.9	18.8	21.7
Scheduled Tribe	8.7	8.7	8.4	9.6	7.1	7.0	7.2	8.8
Other Backward Classes	–	33.2	41.2	45.7		32.1	39.7	44.0
Others	79.2[b]	39.8	31.2	23.5	82.5**	43.9	34.3	25.5
Household size								
< 5 members	21.5	25.1	32.3	37.7	19.3	24.1	31.8	37.8
5+ members	78.5	74.9	67.7	62.3	80.7	75.9	68.2	62.2
Wealth quintile								
Poorest	17.6	17.7	18.7	18.2	13.5	12.9	14.0	14.3
Poorer	19.2	19.8	19.9	19.7	15.3	16.1	18.0	19.1
Middle	21.3	20.9	20.1	20.5	18.6	20.3	20.2	21.3
Richer	21.1	21.0	20.4	21.0	23.1	23.8	22.6	22.5
Richest	20.9	20.6	21.0	20.6	29.5	27.0	25.1	22.8
Type of place of residence								
Urban	26.1	26.1	30.7	33.4	32.8	31.6	34.9	35.7
Rural	73.9	73.9	69.3	66.6	67.2	68.4	65.1	64.3
Region								
North	12.1	12.2	13.2	13.4	13.4	13.4	13.2	15.5
Central	25.0	23.8	23.5	22.6	15.5	16.5	19.9	20.4
East	22.1	22.1	23.3	23.1	20.5	20.2	21.0	20.8
Northeast	3.6	3.4	3.6	3.4	3.7	3.0	3.4	3.1
West	14.3	14.5	14.6	14.4	18.5	18.1	17.3	15.7
South	22.8	24.0	21.9	23.1	28.4	28.8	25.3	24.5
Total	**84,325**	**84,682**	**93,089**	**511,356**	**34,337**	**40,846**	**52,438**	**273,805**

[a] Based on exposure to Television/Radio.
[b] Includes OBC.

Methods

Data

The study used data from all the four rounds of the National Family Health Survey (NFHS) conducted in the year 1992–93, 1998–99, 2005–06 and 2015–16. The NFHS is a nationally representative household survey that provides data for a wide range of monitoring and impacts evaluation indicators in the areas of population, health, and nutrition. The design of the surveys is developed in such a way that it should provide maximum precision in fertility and family planning indicators. For example, the sample is selected through two-stage stratified sampling with an overall response rate of 98 percent in the fourth round of NFHS. Informed consent procedures were followed, and only those respondents who voluntarily consented to participate in the surveys were included. These surveys were approved by the Institutional Review Board of the Institutions involved, and the datasets are available to the public at https://www.dhsprogram.com for wider use in social research. Data of the currently married women aged 15–49 years in each round, i.e., NFHS-1 (1992–92), NFHS-2 (1998–99), NFHS-3 (2005–06) and NFHS-4 (2015–16) were considered for analysis. The sample sizes were 84,327 for round 1, 84,682 for round 2,

93,089 for round-3 and 511,356 for round 4 of the survey.

Outcome variables

In NFHS, the currently married women were asked whether they or their husbands were doing something or using any method to delay or avoid getting pregnant at the time of the survey. The women using any contraceptive method including traditional practice at the time of the survey were considered as 'currently using any contraception' and has been coded as "1″ and those not using are coded as "0"; and this regression results for NFHS-1 and NFHS-4 are presented in Table 4. However, the significance level of interaction between survey period and predictors presented in the last column of Table 4 was generated using the pooled data of NFHS-1 and NFHS-4 to examine the changes in the predictors between the two surveys. For assessing the contribution of different methods over time among the users, five sets of logistic regression was carried out. The dependent variables for these five sets of regression analysis were the use of- male sterilization, IUD, Pills, Condoms and traditional methods. In these regression analyses the use of female sterilization was considered as the reference category. These regressions were carried out in the pooled data of contraceptive users of four rounds of the survey, and the results in the form of predicted probabilities are presented in Fig. 2.

Predictor variables

The predictor variables used in the analysis were women's age (15–19/20–24/25–29/30–34/35–39/40–44/45–49 years), women's years of schooling (no schooling/ < 5 years/5–9 years/10 + years), number of surviving son (no/at least one), exposure to family planning messages (no/yes), religion (Hindu/Muslim/Others), social groups (scheduled caste/scheduled tribe/other backward classes/others), number of household members (< 5/5 +), wealth quintile (poorest,/ poorer/middle/richer/richest), type of place of residence (urban/ rural), and region (north/central/east/ north-east/west/south). Wealth quintile which was not readily available in the data set for NFHS-1 and NFHS-2 were calculated through Principal Component Analysis using information on household amenities and assets as followed in NFHS-3 and NFHS-4. Bar diagram and stacked diagram were used to present the unadjusted and adjusted method mix during1992–93 to 2015–16. Sample weights were used to adjust the non-response. STATA (V 13) was used for analyses and result was reported at 5 percent level of significance.

Results

Sample characteristics

Eleven percent of the currently married women in the 1992–93 samples were adolescents (15–19 years) which decreased to 4 percent in 2015–16 (Table 1). Married women's education increased considerably during this period: 33% of the women in 2015–16 compared with 61% of the women in 1992–93 were non-literates. The proportion of women exposed to a family planning message from mass media increased from 43% in 1992–93 to 63% in 2015–16. There was a remarkable shift in the profile of the contraceptive users between 1992–93 and 2015–16. A higher percentage of the contraceptive users (67%) had any formal schooling in 2015–16 than in 1992–93 (49%). A majority of contraceptive users (66%) were exposed to family planning messages in 2015–16 compared with 1992–93 (52%). In 2015–16, 23% of the contraceptive users were in the wealthiest quintile down from 30% in 1992–93.

Trends in contraceptive use

The current contraceptive prevalence rate (CPR) is 54% (Table 2). In-between 1992–93 and 2005–06, the CPR increased by 1.2 points annually and decreased by 0.3 points between 2005–06 and 2015–16. Any modern method use increased from 36% in 1992–93 to 49% in 2005–06 and decreased marginally to 48% in 2015–16. Eleven percent of the women in 2015–16 were using any modern spacing method compared to 6% of women in 1992–93. Female sterilization acceptance increased from 27% in 1992–93 to 37% in 2005–06 and decreased marginally to 36% in 2015–16. Use of pills had raised more than three times (1.2% vs. 4.1%), and condom uses increased more than twice (2.4% vs. 5.6%) between 1992–93 and 2015–16. The urban-rural gap in contraceptive use had declined from 14 percentage points in 1992–93 and 1998–99 to 11 percentage points in 2005–06 and further to six percentage points in 2015–16. The disparity in acceptance of any modern method too declined to five percentage points in 2015–16 as against 12 percentage points in 1992–93.

Contraceptive method mix

The unadjusted share of female sterilization in contraceptive method continued to be high and remained almost unchanged (67–71%) in different rounds of NFHS (Fig. 1). The contribution of male sterilization however gradually declined during the same period; down from 9% in 1992–93 to 4% in 1998–99, 2% in 2005–06 and less than one percent (0.5%) in 2015–16. The share of IUD in contraceptive method use also declined from 5% in 1992–93 to 3% in 2015–16. The percentage of women adopting pill increased between 1992–93 and 2015–16; up from 3% in 1992–93 to 8% in 2015–16. The role of condom in contraceptive method use increased from 6% in 1992–1999 to 9% in 2005–06 and further to 11% in 2015–16.

Method mix by background characteristics of users

Female sterilization acceptance continued to be high among women- age 30 and more, with less than 10 years of schooling, with at least one surviving son, follow Hinduism, from non-SC/ST/OBC category, belong to non-richest quintile, from rural area, and from southern and western region between 1992–93 and 2015–16 (Table 3). Among the users with 10 or more years of schooling, 52% used female sterilization in 2015–16 compared with 40% in 1992–93. Sterilization use among women from rural area remained almost unchanged- 70% in 2015–16 vs. 71% in 1992–93. The acceptance of IUD among the contraceptive users regardless of their background characteristics declined between 1992–93 and 2015–16. Among the users with 10 or more years of schooling, IUD use declined from 13% in 1992–93 to 10% in 1998–99, to 8% in 2005–06 and further to 6% in 2015–16.

The contribution of the pill in the method mix had increased during the study period. Twenty-seven percent of the contraceptive users age 15–19 in 2015–16 used pill up from 11% in 1992–93. Among the users with less than five years of schooling, 11% used pill in 2015–16 compared with 2% in 1992–93. Pill use considerably increased among users from poorest/poorer households between 1992–93 and 2015–16 (< 3% vs. more than 10%). Forty-one percent of the contraceptive users from Northeast region in 2015–16 used the pill, up from 7% in 1992–93. Use of condoms had increased across different age of the users between 1992–93 and 2015–16, and a sizable increase was noticed among users age 15–19 (18% vs. 30%) and 20–24 (13% vs. 24%). Use of condoms increased by household economic condition of the users- three percentage points increase among poorest users vs. seven percentage points increase among richest users between 1992–93 and 2015–16. Twenty-one percent of the users from the northern region used a condom in 2015–16 compared with 13% in 1992–93. Traditional method use had declined considerably among users age 15–19 (9 percentage points), users with no surviving son (9 percentage points), and users from the northeast (19 percentage points) between 1992–93 and 2015–16. There was, however, a sizable increase in traditional method use among users from the central region (15 percentage points) and

Table 2
Level and trends of contraceptive use by place of residence, India, 1992–93 to 2015–16.

Percentage of currently married women

	NFHS-1 (1992–93)			NFHS-2 (1998–99)			NFHS-3 (2005–06)			NFHS-4 (2015–16)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Any method	51.1	37.1	40.7	58.2	44.7	48.2	64.0	53.0	56.3	57.2	51.7	53.5
Any modern method	45.3	33.3	36.5	51.2	39.9	42.8	55.8	45.3	48.5	51.2	46.0	47.8
Any modern spacing method	11.7	3.4	5.6	13.4	4.5	6.8	17.0	7.2	10.2	15.2	9.5	11.4
Female sterilization	30.4	26.4	27.4	36.0	33.5	34.2	37.8	37.1	37.3	35.7	36.1	36.0
Male sterilization	3.2	3.5	3.5	1.8	1.9	1.9	1.1	1.0	1.0	0.3	0.3	0.3
Pill	1.9	0.9	1.2	2.7	1.9	2.1	3.8	2.8	3.1	3.5	4.3	4.1
IUD	3.9	1.2	1.9	3.5	1.0	1.6	3.2	1.1	1.7	2.4	1.1	1.5
Condom	5.8	1.2	2.4	7.2	1.6	3.1	9.8	3.2	5.2	9.0	3.9	5.6
Any traditional method	5.7	3.8	4.3	7.0	4.8	5.4	8.1	7.6	7.8	6.0	5.8	5.9

#Total for NFHS-3 and 4 may not add to 100 due to use of other modern methods which is less than 0.2 in percentage.

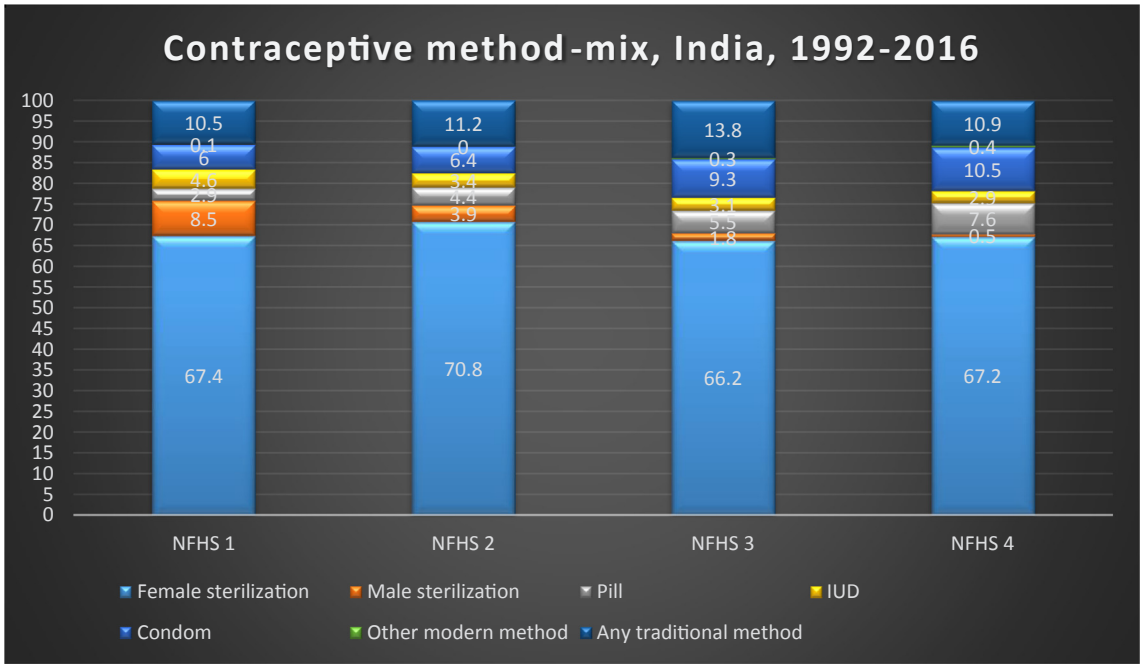

Fig. 1. The unadjusted contraceptive method mix during 1992–93 to 2015–16, India.

users from poorest wealth quintile (5 percentage points).

The logistic regression revealed that after adjusting the effect of predictors used in the model; women's age, education, number of surviving son, household size, religion, social groups, and wealth status continued to be the significant determinants of contraceptive use in 1992–93 and 2015–16 (Table 4). The pattern of contraceptive use however changed between the two surveys. Contrary to the trend in 1992–93, the likelihood of any contraceptive use was significantly low (OR: 0.737; 95% CI: 0.721–0.753) in the southern region compared with the northern region. Women with 10 or more years of schooling were significantly less likely to use any contraceptive method (OR: 0.926; 95% CI: 0.908–0.945) compared with non-literates in 2015–16. However, in 1992–93, the chances of using any contraception were significantly high (OR: 1.822; 95% CI: 1.715–1.935) among women with 10 or more years of schooling. Differing from the pattern in 1992–93 (OR: 1.136; 95% CI: 1.079–1.196), non-Scheduled caste/Scheduled tribe women in 2015–16 were significantly less likely to use any contraceptive method (OR: 0.960; 95% CI: 0.944–0.976) compared with Scheduled caste women. Wealth status of the women found to be a significant predictor of contraceptive use in both surveys, although the interaction was not significant for women from richest quintile.

Female sterilization continued to be the most adopted method during1992–93 to2015–16 (mean value in percentage-47% in 1992–93, 55% in 1998–99, 45% in 2005–06, 49% in 2015–16) (Fig. 2). The contribution of male sterilization acceptance significantly declined during 1992–93 and 2015–16 (12% vs. 1%). The IUD use also declined in the same period (8% vs. 6%). The probability of pill acceptance increased during 1992–93 and 2015–16 (mean value in percentage-5% in 1992–93 to 12% in 2015–16). The likelihood of condom use too increased during the study period (mean value in percentage-12% in 1992–93 to 16% in 2015–16). The chance of women adopting traditional method remained almost unchanged during 1992–93 to 2015–16 (mean value in percentage-16% in 1992 and 17% in 2015–16).

Discussion

The study found that female sterilization continued to dominate the contraceptive method mix, use of pills and condoms had considerably increased, and acceptance of traditional method had remained almost unchanged during1992–93 to 2015–16 in India. Age, education, surviving son, religion, social group, household size, region, and economic condition of the women remained as significant determinants of

Table 3
Contraceptive use by background characteristics of users, India, 1992–93 to 2015–16.

Background characteristics	NFHS-1 (1992–93)						NFHS-4 (2015–16)					
	Female sterilization	Male sterilization	Pill	IUD	Condom	Traditional methods	Female sterilization	Male sterilization	Pill	IUD	Condom	Traditional methods
Current age												
15–19	18.0	0.7	11.2	8.4	17.5	43.6	5.8	0.1	26.6	3.3	29.6	34.2
20–24	49.9	1.8	7.5	10.2	12.7	17.6	31.6	0.1	19.0	5.7	23.5	19.3
25–29	66.5	2.8	4.4	7.2	8.2	10.9	53.6	0.3	11.2	4.5	16.7	13.1
30–34	73.3	5.1	2.3	4.6	5.8	8.8	65.2	0.6	8.0	3.4	11.7	10.6
35–39	73.1	9.4	1.6	3.0	3.7	9.2	73.3	0.5	5.7	2.3	7.7	10.2
40–44	70.9	16.1	0.7	1.2	2.8	8.1	80.4	0.7	3.5	1.5	5.2	8.6
45–49	66.8	25.0	0.6	0.6	1.5	5.5	88.6	0.7	1.8	0.7	2.1	6.1
Schooling												
Non-literate	75.7	11.2	1.9	1.7	2.3	7.1	79.1	0.5	4.8	1.1	4.7	9.5
< 5 years	72.7	7.6	2.3	3.5	2.2	11.7	73.8	0.6	11.1	1.5	3.9	8.8
5–9 years	65.5	6.2	4.0	5.5	6.4	12.4	66.0	0.5	9.9	2.7	9.1	11.4
10 + years	40.4	3.9	5.1	13.4	19.6	17.6	52.4	0.5	7.3	5.5	21.0	12.7
Number of surviving son												
No	32.2	7.6	6.2	9.7	16.2	28.0	40.2	0.4	14.0	4.3	21.6	18.9
At least one living son	71.2	8.6	2.6	4.1	4.9	8.6	71.5	0.5	6.6	2.6	8.7	9.7
Exposed to family planning message from Television/Radio/News Paper[a]												
No	72.3	9.8	2.4	2.4	2.7	10.3	70.6	0.5	8.5	1.8	6.2	12.1
Yes	62.9	7.3	3.4	6.7	9.0	10.6	65.5	0.5	7.1	3.4	12.7	10.3
Religion												
Hindu	69.7	8.8	2.5	4.2	5.4	9.4	70.3	0.5	6.3	2.6	9.5	10.4
Muslim	52.1	5.7	7.0	6.1	8.7	20.1	46.0	0.2	17.7	3.1	15.9	16.3
Others	57.8	8.3	3.5	8.1	9.6	12.6	65.0	0.7	7.0	5.3	13.4	8.3
Social group												
Scheduled Caste	74.2	9.4	2.0	2.3	3.9	8.2	70.2	0.5	7.0	2.3	9.2	10.5
Scheduled Tribe	70.2	17.1	2.1	1.7	2.2	6.6	74.0	1.1	8.3	2.5	4.6	9.1
Other Backward Classes							72.4	0.5	4.6	2.7	9.6	9.9
Others[b]	66.3	7.6	3.1	5.2	6.6	11.1	57.5	0.4	9.8	3.7	15.3	12.7
Household size												
< 5 members	55.0	13.2	2.8	6.1	7.7	15.1	69.4	0.6	7.9	2.7	9.2	9.9
5+ members	70.3	7.4	3.0	4.3	5.6	9.4	65.9	0.4	7.4	3.0	11.3	11.6
Wealth quintile												
Poorest	74.8	12.8	1.4	1.2	1.1	8.5	69.2	0.5	10.5	1.3	4.3	13.9
Poorer	75.4	10.7	2.3	1.3	1.4	8.8	68.1	0.5	11.3	1.7	5.9	12.1
Middle	72.8	9.0	2.7	2.7	2.7	9.9	72.1	0.4	7.5	1.9	7.7	10.1
Richer	69.3	7.4	3.3	4.6	5.0	10.3	69.4	0.5	6.0	3.2	11.0	9.6
Richest	54.9	5.9	3.9	9.2	13.4	12.8	58.7	0.6	4.3	5.4	20.3	10.3
Type of place of residence												
Urban	59.5	6.4	3.8	7.7	11.4	11.2	62.5	0.4	6.1	4.1	15.8	10.5
Rural	71.2	9.5	2.5	3.1	3.3	10.1	69.9	0.5	8.4	2.2	7.5	11.2
Region												
North	60.5	7.8	2.7	7.5	12.9	8.6	57.2	0.8	4.5	5.6	20.9	10.7
Central	65.2	10.3	3.6	4.5	11.4	4.7	56.3	0.5	3.6	2.1	17.4	19.6
East	59.5	7.3	5.1	2.6	3.7	21.7	54.3	0.2	20.3	1.9	6.8	16.0
Northeast	31.1	5.1	7.4	4.0	3.9	48.4	19.9	0.3	40.7	4.8	4.9	29.1
West	74.8	10.0	2.4	5.1	4.4	3.2	76.5	0.6	3.5	3.6	10.9	4.7
South	77.3	8.1	1.0	4.6	2.7	6.2	93.8	0.6	0.5	1.9	1.7	1.3
Total[c]	**67.4**	**8.5**	**2.9**	**4.6**	**6.0**	**10.5**	**67.2**	**0.5**	**7.6**	**2.9**	**10.5**	**10.9**

[a] Based on Television/Radio for NFHS-1.
[b] Includes OBC.
[c] Total may not add to 100 as use of other modern method which is less than 0.5% has not been shown.

contraceptive use. The urban-rural gap had narrowed downed considerably for any modern method; disappeared in female sterilization acceptance, remained almost unchanged for condom use, and reversed in pill use.

Female sterilization acceptance remained high, and the findings confirm to many past as well as recent studies [3,8,9]. Large-scale post-emergency resistances to vasectomy [10], health providers' continuous emphasis on female sterilization [11,12], fear of side-effects from modern reversible methods [12], the power struggle between mother-in-law and daughter-in-law [13] and relatively low son preference especially in the southern region [14] were the identified enablers. Early adoption of sterilization often without informed choice results in compression of reproductive span leading to lower fertility levels coupled with post-sterilization health problems, sterilization regret and increased vulnerability to HIV/AIDS due to lower condom use. For example, the state of Andhra Pradesh had achieved replacement fertility primarily by promoting female sterilization. The state had successfully reduced its total fertility rate (TFR) by almost one-third in just

Table 4
Odds ratio (95% CI) of contraceptive use among currently married women, India, in NFHS-1 (1992–93) and NFHS-4 (2015–16).

Background characteristics	NFHS-1 (1992–93)	NFHS-4 (2015–16)	The interaction between time and covariates using pooled data of NFHS-1 and NFHS-4
Region			
North ®			
Central	0.442 (0.42–0.465)*	0.631 (0.62–0.644)*	Yes
East	0.788 (0.747–0.832)*	0.567 (0.555–0.579)*	Yes
Northeast	0.75 (0.702–0.802)*	0.46 (0.449–0.472)*	Yes
West	1.008 (0.953–1.065)	0.733 (0.715–0.752)*	Yes
South	1.388 (1.319–1.46)*	0.737 (0.721–0.753)*	Yes
Type of place of residence			
Urban®			
Rural	0.904 (0.866–0.943*	0.988 (0.973–1.004)	Yes
Age			
15–24®			
25–29	2.607 (2.482–2.738)*	1.976 (1.935–2.017)*	Yes
30–34	4.346 (4.127–4.577)*	3.085 (3.019–3.152)*	Yes
35–39	5.397 (5.108–5.701)*	3.587 (3.508–3.669)*	Yes
40–44	4.307 (4.06–4.569)*	3.158 (3.084–3.234)*	Yes
45–49	2.67 (2.506–2.844)*	2.372 (2.315–2.431)*	Yes
Schooling			
Non-literates®			
< 5 years	1.686 (1.586–1.792)*	1.303 (1.269–1.337)	Yes
5–9 years	1.721 (1.644–1.803)*	1.17 (1.151–1.19)*	Yes
10 or more years	1.822 (1.715–1.935)*	0.926 (0.908–0.945)*	Yes
Number of surviving son			
No ®			
At least one	4.526 (4.327–4.735)*	3.422 (3.368–3.477)*	Yes
Religion			
Hindu®			
Muslim	0.478 (0.452–0.505)*	0.623 (0.611–0.635)*	Yes
Others	0.702 (0.664–0.742)*	0.708 (0.691–0.724)*	Yes
Social group			
Scheduled Caste®			
Scheduled Tribe	0.884 (0.822–0.951)*	0.802 (0.784–0.82)*	Yes
Others	1.136 (1.079–1.196)*	0.96 (0.944–0.976)*	No
Household size			
< 5 members®			
5+ members	1.191 (1.144–1.239)*	1.033 (1.02–1.047)*	Yes
Wealth quintile			
Poorest®			
Poorer	1.045 (0.985–1.108)	1.365 (1.339–1.392)*	Yes
Middle	1.154 (1.09–1.221)*	1.526 (1.494–1.558)*	Yes
Richer	1.442 (1.36–1.529)*	1.588 (1.552–1.626)*	Yes
Richest	1.83 (1.704–1.965)*	1.745 (1.699–1.793)*	No
Constant	0.057 (0.052–0.062)	0.203 (0.196–0.21)	

* $p \leq 0.05$, Yes denotes $p \leq 0.05$.

13 years from 2.6 in 1992–93 to 1.8 in 2005–06 and remained unchanged until 2015–16. The female sterilization acceptance in the state went up from only 38 percent in 1992–93 to 63 percent in 2005–06 and further to 68 percent in 2015–16; highest in the country and accounting for almost 98% of the total contraceptive users [15,16]. Evidence suggests women in Andhra Pradesh were making the decision to terminate childbearing earlier than the older generation, and the gradual compression in reproductive lifespan was primarily attributable to acceptance of female sterilization by younger women [17]. Inadequately informed choice and inferior quality of services further worsen the situation with many women having post-sterilization health problems [8] and often regret due to child loss experience and poor quality of services [18]. It was again difficult to motivate a couple who has undergone sterilization to use the condom which can prevent them from acquiring HIV/AIDS as most couples view contraception primarily as a means for spacing/regulating fertility [19].

The gradual reduction in male sterilization might be attributed to the exclusion of the men often criticized to be forcefully sterilized during the emergency period (1975–77) [2] and continued misconceptions about male sterilization debilitating men [12]. There was a minimal increase in the contribution of the modern spacing method in the method mix during the last three decades. The socio-economic development at large in addition to recent government initiatives of supplying condoms, and oral contraceptive pills (OCP) at home by Accredited Social Health Activists (ASHAs-a community level worker) in 2012; expanding basket of choices by introduction of Injectable DMPA, Progesterone only pill for the lactating mothers, and non-hormonal weekly pill Centchroman in the National Family Planning program in 2015; and, improved packaging for Condoms and OCP to influence the demand might have led to this increase[20].

We found a sizable increase in condom use among users age 15–24 and users from economically better-off households, probably due to their better knowledge and affordability. Pill acceptance had increased considerably among young users, less educated users, users following Islam, and users from poorest/poorer households. The eastern and north-eastern region showed a sizable increase in the use of pills and a significant decline in traditional method use, signaling a method shift. This was probably due to the availability of modern spacing methods

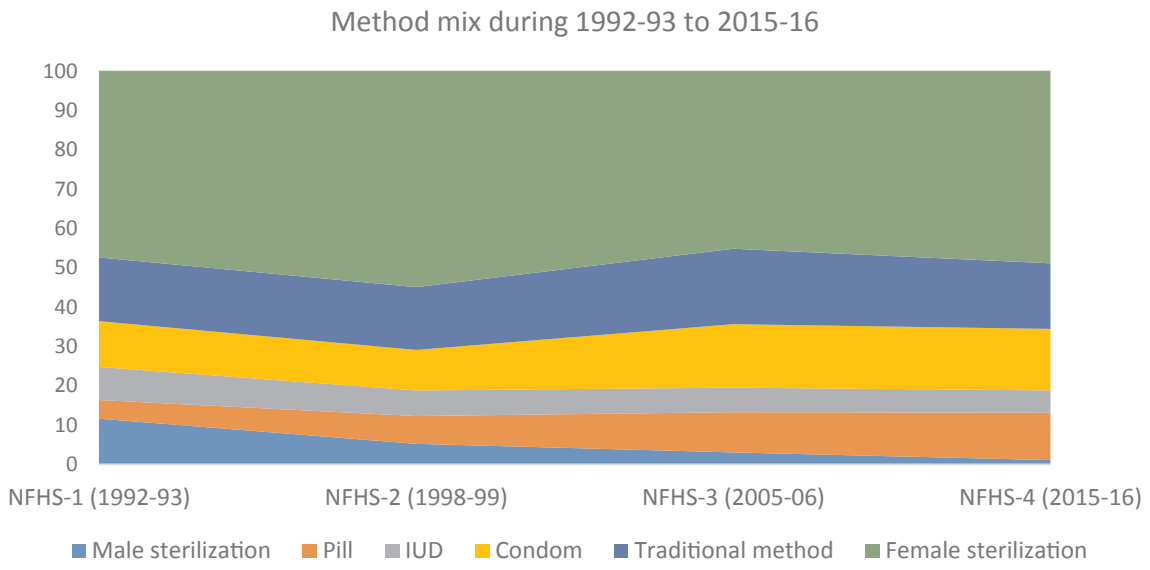

Fig. 2. Predicted probability of contribution of different method mix in using family planning methods during1992-93 to 2015–16, India. Note: Selected predictors as mentioned in the text were controlled.

with the minimal cost at the doorstep through ASHAs along with counseling for the methods [21]. Our result on the regional pattern in the use of traditional methods was also in conformity with a past study [22].

The contraceptive prevalence rate and unmet need for family planning had marginally declined between 2005–06 and 2015–16, in concurrence with the steady decline of the total fertility rate (TFR) from 2.7 to 2.2. The anomaly in the proved inverse association between CPR and TFR could be explained through proximate determinant of fertility. A recent estimate found 15.6 million abortions in the country (73% of it through medical abortion outside the facility) during 2015–16 signaling a paradigm shift in women's access to reproductive health services and approach to use and non-use of contraception [23]. Evidence also reveals the increased accessibility and acceptability of medical abortion over the past decade [24,25]. Examining other proximate determinants, we found the percentage of women getting married by 18 years of age had reduced drastically from nearly half (47%) of those age 20–24 in 2005–06 to 27% in 2015–16, effectively reducing the reproductive span. Post-partum infecundability found to have increased as the median duration of exclusive breastfeeding of last born child had risen to 2.9 months 2015–16 from 2 months in 2005–06 [16].

The strengths of the present study are that it is the first systematic examination of the changes in contraceptive use and method mix in India using all the four rounds of NFHS during last three decades. The findings will be helpful in program and policy decisions along with an avenue for future research on contraception. The cross-sectional design of the surveys, however, limits causal association of contraceptive use with socio-economic and demographic factors drawn from this analysis. There may be other factors influencing contraceptive method use, such as motivation to use, access to emergency contraception, and perceived side effects which we were unable to consider due to data unavailability. The inclusion of exposure to family planning message as a predictor has an inherent weakness as the data is silent on the frequency/duration of exposure.

Conclusion

Contraceptive use, method mix, the profile of the users, and determinants of contraceptive use has changed considerably during 1992–93 to 2015–16 in India. Increased use of modern spacing methods albeit continuous dominance of female sterilization in method mix suggests relooking at the family planning implementation strategy.

Declarations of interest

None.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.srhc.2018.12.006.

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