A Retrospective Cohort Analysis of Family Planning Behaviour in India

Ajay Gupta

International Institute for Population Sciences

Shekhar Chauhan (✉ shekhariips2486@gmail.com)

International Institute for Population Sciences <https://orcid.org/0000-0002-6926-7649>

Ratna Patel

International Institute for Population Sciences

Vaishali Chaurasia

International Institute for Population Sciences

Research

Keywords: Family Planning, Contraception, Fertility, Cohort analysis, India.

Posted Date: June 22nd, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-592933/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Family Planning programs influence women's health by contributing to universal access to sexual and reproductive healthcare services. Access to contraception assists in delaying, spacing and limiting pregnancies. Despite being the first country that had implemented the family planning back in 1952, the Indian government has failed to achieve desirable family planning outcomes. This study examines the cohort-wise family planning behaviour of married women.

Methods: Data from four rounds of National Family Health Survey (NFHS), India conducted in 1992-93, 1998-2000, 2005-06, and 2015-16 were pooled to construct marriage cohorts with sample size of 749102 women aged 15-49 years. Twelve consecutive marriage cohorts were made from 1957 to 2016. A trend analysis was performed on cohorts married after 1957 to determine if they will ultimately attain ever-use of family planning levels. Bivariate and multivariate analysis were carried out to understand the family planning behaviour by marital cohorts and marital duration.

Results: The result found that ever use of contraception has decreased among the recent cohorts in all the four rounds of survey. The study found that the odds of use of contraception has increased in recent cohorts. The women in 2012-16 cohort were 1.6 times more likely to use any contraception than women from 1957-61 cohort. Results found that use of contraception increases with increase in marital duration of the women. After attaining the parity of 3 children, the desire of conceiving additional child among women has decreased significantly over the cohorts. The result also found that among the older cohorts, the sterilization was preferred after 5+ parity, and for the recent cohorts, sterilization is being preferred with 0-2 parity.

Conclusion: There is a need to identify the groups with the unmet need for contraception, and an attempt to reach these groups with contraceptive services is highly desirable.

Background

India is known to be as the first country that had implemented the family planning back in 1952. Only two countries adopted family planning policies in 1960, and the same figure rose to 74 countries by 1975, and around 115 countries adopted family planning policies by 1996 [1]. Family planning is one of the widely known cost-effective public health and development interventions, and this could be understood by the fact that cost of unwanted child is always higher than the cost of averting an unwanted child [2]. During the early years of 1960s, India was the only country that had a full-fledged government sponsored family planning program [3]. Controlling population growth through adopting family planning measures has always been stressed out by the Government of India. Despite launching a family planning program, the government failed to put an end to the escalating concerns of rising population in the country. A study found that however Indian couple has the desire to limit the family size, they wanted at least four children [4]. With such a desire, it is not possible for any country to control the population growth, no matter if the country is first to implement the family planning programs in the world. When the Indian government first

implemented the family planning program in 1952, it failed in understanding it completely as Government of India only allowed rhythm method as a part of birth control during starting years of the program [3]. Even after many years of family planning program, the country's population continues to grow. Quereishi et al. (2017) in their study found that despite knowing family planning methods, people do not use these methods as there exists a knowledge practice gap [5].

Family Planning in India:

During three decades from 1960s to 1990s, fertility in the developing countries declined from six children to three children per women, moreover, the progress in contraceptive prevalence use also increased from less than 10 percent to around 60 percent in Indian states during those three decades [6]. Since the family planning programs in India were not successful at the beginning, because the programs were not culturally appropriate and were not sensitive to the client needs, the Indian government resorted to the coercive measures to control the population growth [7-8]. The problem of population growth was so severe that Union Health Minister of India in 1975 wrote down to the Prime Minister of India about the need of elements of compulsion in the family planning methods [9]. As a result of adopting coercive measures to bring down the population growth rate, the figure of 1.3 million sterilization in 1974-75 doubled to 2.6 million in 1975-76, which further tripled to nearly 8.1 million of sterilization in 1976-77. The Indian government adopted the coercive measures to control the population growth, but it is always advised that family planning programs should be culturally appropriate and monitored and modified according to the client needs. When in 1977, as a result of the general election in the country, a new party had formed the government at the center, a new policy of family planning was formulated with the idea of voluntarism, as a result of which sterilizations dropped to around 1 million during 1977-78.

Family Planning programs influence women's health by contributing to universal access to sexual and reproductive healthcare services. Furthermore, the benefits of family planning go beyond the health impacts as it also impacts all the 17 sustainable development goals [10]. Also, family planning has been perceived as a cost-effective solution for achieving gender equality by empowering women [10]. A women access to chosen method of family planning has been aligned with the gender equality [11]. Access to contraception assists in delaying, spacing and limiting pregnancies, lower healthcare costs and warrant that more girls complete their education and stay in the workforce [11]. In the backdrop of above background, this study attempts to examine cohort analysis of family planning behaviour of married women in India. The studies of time trends in family planning behaviour with various factors are common [12-13], little is known about the cohort analysis of family planning. Cohort analysis helps in studying the past scenario. Since India adopted family planning program in 1952, this is a study of 12 cohorts of women where cohorts have been categorised into four-year groups from 1957-61 to 2012-16. Minimum levels of birth controls is a process that can lead to transition in the control of marital fertility. Such transitions take place within as well as across marriage cohorts. Marriage cohorts are the base of this study and the study focuses cohorts in which the event of utilization of family planning methods occurred. Ideally, the period of study should encompass the entire Indian demographic transition from 1910 to 1976, but data limitations preclude such a lengthy analysis. Still, the period 1957-62 begins at a

time when the mortality transition was underway but far from complete, and includes the entire fertility transition to date. The specific objective of the study was to study the cohort-wise family planning behaviour of married women in India from 1957 to 2016. This study did cohort analysis on ever use of any contraception, ever had a terminated pregnancy and sterilization among married women.

Methods

Data Source:

The study utilized the secondary source of data from four rounds of Demographic Health Survey (DHS), India which is known as National Family Health Survey (NFHS). This survey is the most significant demographic health survey in India funded by the government of India, along with other international organizations and provides the estimated of fertility, mortality, reproductive and family planning. The survey also covers the maternal and child health related indicators, child nutrition, water and sanitation, health insurance, domestic violence and HIV/AIDS among others. All the NFHS conducted by International Institute for Population Sciences (IIPS), Mumbai as the nodal agency under the auspices of the Ministry of Health & family Welfare (MoHFW), Govt. of India. The series of NFHS has covered different set of population (sample) according to existing population i.e., 89777 ever-married women aged 13-49 and 88562 households in 1992-93 (NFHS-1); 89199 eligible women aged 15-49, 32393 children and 91196 households in 1998-99 (NFHS-2); 109041 households, 124385 women age 15-49 and 74369 men age 15-54 in 2005-06 (NFHS-3); and 601509 households, 699686 eligible women age 15-49 and 112122 men aged 15-54 in 2015-16 (NFHS-4). All these surveys have a minimum response rate of 90 percent. The first three rounds provides estimates at state/union territory and national level as well as separate estimates for urban and rural areas while the last NFHS even provide the estimates at the district level covering 640 districts. It utilizes multistage stratified sampling where census 2011 served as sampling frame, PSUs (Primary Sampling Unit) were villages in rural areas and Census Enumeration Blocks (CEBs) in urban areas. Sampling of the same is provided in the NFHS reports published by IIPS (IIPS &, 1993; IIPS &, 2000; IIPS &, 2006; IIPS and ICF, 2017). The data from the Survey conducted in 1992-93, 1998-99, 2005-06, and 2015-16 were pooled to construct the marriage cohorts. The study considered only those women aged 15-49 who were married after 1957 and have given birth to at least one child. Twelve consecutive marriage cohorts were made from 1957 to 2016, and marital duration is calculated using the year of marriage and surveyed year. The total sample of ever-married women of age 15-49 years was 749102.

Study Variables:

Dependent variables:

In each of the survey, the questions related to family planning has been asked including ever use of contraception, type of contraception, when did respondent starting using it, etc. Similarly, questions include whether the respondent had any terminated pregnancy (pregnancy resulted in abortion, miscarriage or stillbirth) and respondent had sterilized.

Independent variables:

Different background variables such as state, place of residence (urban/ rural), women and husband education level (no education, Primary, Secondary and Higher), religion (Hindu, Muslim, Sikh and others), caste (Schedule Caste/ Tribe (SC/ST), Other Backward Caste (OBC) and others), wealth index (Richest, Rich, Middle, Poor and Poorest) of household are directly available in the data and duration of marriage has been included as independent variables. Wealth index is based on the number and kinds of consumer goods, the household owns. All the independent variables are included in this study after going through the literature and discussion in the introduction.

Statistical analysis

Bivariate analysis has been carried out to find the proportion of the different indicators of family planning behaviour by marital cohorts. All independent variables which have been found to be associated using Chi-square test, included in the multivariate logistic regression model for finding the differentials across the marriage cohort taking the initial cohort to be base, and dependent variable to ever use contraception, ever had terminated pregnancy and sterilization. The data on the total number of children and child preference was also available in the survey and hence was included for the subsequent analysis. All the data analysis is carried out in SPSS 25 and STATA 14.0. Adjusted odds were calculated to measure the difference between the target variable. Appropriate weights were applied to account the complex sampling design and respondent attrition as available in the data.

The Equation for multivariate logistic regression model is as follows

$$\ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots \dots \dots + \beta_n X_n$$

Where $\hat{p}$ is the expected probability that the outcome is present; X_1 through X_n are distinct independent variables; and β_0 through β_n are the regression coefficients.

Results

Table 1 shows the prevalence of family planning measures (Ever use any contraception method, Ever had a terminated pregnancy, and sterilization) by the marriage cohorts. About half of the married women in the 1962-66 cohort had ever used any contraception. In the marriage cohort of 1972-76, the highest percentage of married women had ever used any contraception. This cohort coincided with that regime of the Indian government which had adopted coercive measures of family planning. For the recent cohort, about 13 percent of the married women had ever used any contraception. Nearly one in every four women of the marriage cohort 1957-61 had a terminated pregnancy. Pregnancy termination is one such measure that has declined among women of successive cohorts except few. The decline in termination in pregnancy can be attributed to the improvement in medical care and better health-care infrastructures.

About half of the women in marriage cohorts from 1967-71, 1972-76, and 1977-81 adopted sterilization as a measure of family planning. The highest prevalence of sterilization among women is found to be associated with the marriage cohort of 1972-76.

Table 1: Prevalence of family planning measures (Ever use any contraception method, Ever had a terminated pregnancy, and sterilization) by the marriage cohorts in India

Marriage Cohorts	Ever Use any Contraception Method	Ever had a terminated pregnancy	Sterilization	Total Sample
1957-1961	42.4	24.9	42.0	3,125
1962-1966	49.7	23.4	48.5	9,057
1967-1971	55.3	22.6	53.2	16,446
1972-1976	56.5	22.1	53.5	26,145
1977-1981	54.5	20.0	50.4	42,126
1982-1986	52.2	17.7	47.9	75,416
1987-1991	49.9	16.2	45.1	1,06,839
1992-1996	52.3	17.2	46.7	1,07,428
1997-2001	51.9	17.4	45.2	1,06,021
2002-2006	46.6	17.3	39.1	97,166
2007-2011	32.9	15.8	23.9	93,282
2012-2016	12.6	8.1	8.2	66,051
Total	45.6	16.8	39.9	7,49,102

Table 2 shows the prevalence of ever use of contraception among women of different marriage cohorts by their marital duration. In the marriage cohorts of 1967-71 and 1977-81, 100 percent of women with marital duration 15-19 years and 5-9 years respectively had ever used contraception. In the marriage cohort of 1972-76, more than half of the women with marital duration 15-19, 20-24, 25-29, and 30+ had ever used contraception. Around 13 percent of women with 0-4 years of marital duration, of marriage cohort 2012-16, had ever used any contraception.

Table 2: Prevalence of ever use of contraception among women of different marriage cohorts by their marital duration in India

Marriage Cohorts	Marital duration						
	0-4	5-9	10-14	15-19	20-24	25-29	30+
1957-1961							42.4
1962-1966					0.0	50.3	48.6
1967-1971				100.0	55.7	54.1	56.5
1972-1976			0.0	53.8	58.5	59.3	55.6
1977-1981		100.0	46.5	57.1	59.2	58.7	54.8
1982-1986		27.9	49.2	57.8	62.6	58.9	57.4
1987-1991	9.3	31.5	49.8	63.0	61.3	60.2	
1992-1996	12.0	31.1	54.0	61.5	61.1		
1997-2001	9.1	36.9	58.2	59.5			
2002-2006	12.5	47.5	53.0				
2007-2011	25.4	35.7					
2012-2016	12.6						

Table 3 shows the prevalence of terminated pregnancy among women of different marriage cohorts by their marital duration. Women with 0-4 years of marital duration in various cohorts have lesser termination of pregnancies than the women in 5-9 years of marital duration. The result found that the termination of pregnancies was higher among the women who had a higher marital duration than those women who had lesser marital duration. As the marital duration increases, there are perceived chances of higher termination of pregnancy as with increase in marital duration, the exposure time increases. In the marriage cohort of 2012-16, about 8 percent of women with 0-4 years of marital duration ever had a terminated pregnancy.

Table 3: Prevalence of ever had a terminated pregnancy among women of different marriage cohorts by their marital duration in India

Marriage Cohorts	Marital duration						
	0-4	5-9	10-14	15-19	20-24	25-29	30+
1957-1961							24.9
1962-1966			0.0	0.0		24.34	21.7
1967-1971					23.2	22.6	20.9
1972-1976			0.0	23.0	23.1	21.7	18.7
1977-1981		0.0	20.9	23.0	23.6	18.0	13.2
1982-1986		17.2	23.0	23.2	19.5	14.0	14.4
1987-1991	9.2	18.7	22.0	21.7	16.0	15.2	
1992-1996	10.5	18.7	21.0	17.9	17.2		
1997-2001	8.4	18.5	18.4	18.1			
2002-2006	9.8	17.2	18.7				
2007-2011	13.0	16.8					
2012-2016	8.1						

Table 4: Prevalence of sterilization among women of different marriage cohorts by their marital duration in India

Marriage Cohorts	Marital duration						
	0-4	5-9	10-14	15-19	20-24	25-29	30+
1957-1961							42.0
1962-1966			0.0	100.0		48.9	47.8
1967-1971				100.0	52.9	51.9	56.0
1972-1976			0.0	49.4	55.0	57.2	55.0
1977-1981		100.0	40.2	50.9	55.1	57.2	54.2
1982-1986		19.6	41.0	51.2	59.7	57.2	56.5
1987-1991	2.0	21.3	41.0	58.1	57.9	58.0	
1992-1996	3.2	21.6	47.6	56.8	56.8		
1997-2001	3.5	28.8	50.8	53.1			
2002-2006	8.2	39.6	44.9				
2007-2011	15.1	26.8					
2012-2016	8.2						

Table 4 shows the prevalence of sterilization among women of different marriage cohorts by their marital duration. Sterilization was once a most trusted measure of family planning, but in recent times the sterilization has not been the preferred choice. Nearly all the women in the cohorts of 1962-66 and 1967-71 with a marital duration of 15-19 years had opted for sterilization. Only 8 percent of women with 0-4 years of marital duration in the marriage cohort of 2012-16 had opted for sterilization. The rate of sterilization has increased consistently with the increase in marital duration in most of the marriage cohorts. More than 50 percent of the women, who are corresponding to the 1972-76 cohort by their marital duration, had sterilization. Sterilization was used as a coercive measure of family planning in India during 1976-77.

Table 5: Odds of family planning measures among women of various marriage cohorts in India

Marriage Cohorts	Ever Use any Contraception Method	Ever had a terminated pregnancy	Sterilization
1957-1961			
1962-1966	1.66*	0.88*	1.05
1967-1971	2.62*	0.91*	1.02
1972-1976	3.41*	0.88*	1.04
1977-1981	4.16*	0.85*	1.1
1982-1986	4.07*	0.8*	1.05
1987-1991	3.6*	0.68*	0.95
1992-1996	3.79*	0.65*	1.05
1997-2001	3.91*	0.61*	1.23
2002-2006	3.65*	0.55*	1.47*
2007-2011	3.53*	0.62*	1.37*
2012-2016	1.6*	0.32*	1.4*

Controlled variable are State, Place of residence, Women education level, Husband education level, religion, caste, Wealth index and Duration of marriage, * shows that it is significant at 5% level

Table 5 shows the result of regression analysis by keeping the 1957-61 cohort as a reference cohort. For the analysis, variables of state, place of residence, women education level, husband education level, religion, wealth index, and duration of marriage were controlled. The result found that ever used any contraceptive method is higher for all the marriage cohort than the reference cohort; the trend, however, is not the same. For the marriage cohort of 1977-81, the ever use of any contraception method is highest than the rest of cohorts, this cohort faced the regressive government policies where sterilizations were conducted forcefully. The termination of pregnancy has been declining in the successive cohorts, except few cohorts. The use of sterilization is not significant for most of the cohorts, except for the recent three cohorts. In recent times, sterilization has become more regular, and women are opting for sterilization. Women in the recent cohorts are about 1.4 times more likely to opt for sterilization than the women in the reference cohort.

Table 6: Percentage of women in various cohorts desiring additional children after attaining the parity of three in India

Marriage Cohorts	Atleast have 3 children	Wants more children
1957-1961	91.7	1.0
1962-1966	89.0	1.8
1967-1971	87.3	3.5
1972-1976	83.8	6.3
1977-1981	77.3	9.7
1982-1986	66.9	13.1
1987-1991	53.2	19.3
1992-1996	48.4	16.7
1997-2001	42.2	18.4
2002-2006	31.7	26.1
2007-2011	11.7	45.2
2012-2016	0.5	82.5
Total	43.9	25.9

Table 6 shows the probability of having more children after having three children from the women's perspective. In India, the fertility has been high since long, and that is why we choose to ask the probability of having more children after having three children. Two premises can be drawn from this table; first is that the fertility is declining continuously and the proportion of women having three children reduced from about 92 percent of women in 1957-61 cohort to 0.5 percent of women in the 2012-16 cohort. Second, as the proportion of women having three children decreasing in the successive cohorts, the probability that women want more children is increasing in the successive cohort, except 1992-96. Taking all the cohorts together, around 44 percent of women had three children, and of them, 26 percent of women wanted more children. The desire of having more children even after having three children is determined by many factors like son preference, poverty, social status, and social security.

Table 7 depicts the ever use of contraception among different cohorts of the women during all the four rounds of NFHS. The result found that ever use of contraception has decreased among the recent cohorts in all the four rounds of survey. The ever use of contraception is higher among the cohorts of the 70s and 80s.

Table 7: Prevalence of Ever use of contraception among women of various cohorts

Marriage Cohorts	Ever use of contraceptive			
	NFHS-1	NFHS-2	NFHS-3	NFHS-4
1957-1961	42.6	37.5		
1962-1966	49.3	51.1		
1967-1971	55.3	56.0	54.3	
1972-1976	54.7	59.5	57.1	
1977-1981	48.6	59.3	58.9	49.8
1982-1986	31.9	55.1	61.3	53.4
1987-1991	12.8	41.3	62.0	55.6
1992-1996	3.8	20.9	53.9	57.2
1997-2001		5.6	36.9	55.6
2002-2006			15.4	48.2
2007-2011				30.4
2012-2016				12.6

Table 8 depicts the parity at the time when the women opted for sterilization. This is one of the important indicators that help in determining the usefulness of sterilization. The result found that sterilization has increased among the women with 0-2 parity for the successive cohorts. The result found that among the older cohorts, the sterilization was preferred after 5+ parity; and for the recent cohorts, sterilization is being preferred with 0-2 parity. About 40 percent of women have opted for sterilization after attaining 0-2 parity, and nearly 46 percent of women have opted sterilization after achieving 3-4 parity. Nearly 15 percent of women went for sterilization after attaining the 5- parity.

Table 8: Percentage of women in various cohorts opted for sterilization after attaining a certain parity

Marriage Cohorts	Parity at Sterilization		
	0-2	3-4	5+
1957-1961	4.52	28.52	66.95
1962-1966	6.57	36.69	56.74
1967-1971	8.3	43.91	47.78
1972-1976	11.64	53.63	34.73
1977-1981	19.14	56.83	24.03
1982-1986	26.18	54.74	19.08
1987-1991	35.56	49.47	14.97
1992-1996	43.25	46.17	10.59
1997-2001	51.13	42.52	6.35
2002-2006	62.55	35.42	2.03
2007-2011	80.71	19.01	0.28
2012-2016	83.76	14.54	1.7
Total	39.49	45.55	14.96

Discussion

In this paper, we have attempted to study the family planning behaviour in India using cohort analysis. We have taken three indicators namely ever used any contraception method, Ever had a terminated pregnancy, and sterilization as a measure of family planning. During the 70s when the emergency was put upon the people of India, the Government of India adopted widespread coercive measures to reduce the fertility; As a result of that, the sterilization is highest among the women falling in the 70s cohorts. The coercive measures of family planning adopted during the 70s were so sinful that Indian National Congress lost the people's confidence during national election took place in 1977. Coercive sterilization was widely adopted in Uttar Pradesh, Haryana, Bihar [7]. The sterilization is highest among the women of 1972-76 cohort. During the time of emergency in 1976, a total of around 1.7 million sterilizations were reported, this number was nearly equal to the annual average of last ten years in the history of sterilization in India [14]. Forcefully sterilization became a norm during the emergency period, and it was so much in fashion that Maharashtra government in August 1976, prompted a bill making sterilization compulsory among couples having three or more children [15].

Termination of pregnancy as such is not a measure of family planning, but in the analysis, we have counted for terminated pregnancy because low contraception use or unmet need of contraception may

increase the frequency of terminated pregnancies [16]. It has been found that the terminated pregnancy was higher among the older cohorts than in recent cohorts. One in every four women of marriage cohort 1957-61 had a terminated pregnancy whereas, only one in twelve women of the most recent cohort had a terminated pregnancy. There are various reasons given for the higher rate of termination of pregnancies; son preference [17-18]; Poverty [19], however, a study conducted in Japan found that sex-selective abortions are not a characteristics of poverty [20]; and education [21]. The occurrence of the termination of pregnancy increases with the increase in marital duration before it again declines at a higher marital duration. For all the cohorts of women, termination of pregnancy is higher when the marital duration is between 5 to 24 years. In the early years of marriage, women prefer not to terminate the pregnancy because, during the early years of marriage, the child about to born to them is most likely to be the first child. A high adverse pregnancy outcome risk is associated with the termination of pregnancy when the mothers are in their last stage of the reproductive span, and this is why termination of pregnancies are lower when the marital duration is higher. Higher maternal age is found to be associated with a range of adverse pregnancy outcomes, and these risks are independent of parity [22]. Many previous studies have noted an association between advanced maternal age and adverse pregnancy outcomes [23-30].

The use of contraception has increased among the recent cohorts of married women. As compared to the reference cohort (1957-61), the recent cohorts are about 3.5 to 4 times more likely to ever use any contraception method. This increase in contraception use among the women of recent cohorts has led to a decline in fertility. Contraception is one of the predictors of fertility transition and is also a proximate determinants of fertility [31-32]. The odds of ever had a terminated pregnancy had declined substantially for the subsequent cohorts. After attaining 0-2 parity, an increase in the proportion of women choosing for sterilization is observed in the successive cohorts. More than 80 percent of the women in the 2007-11 & 2012-16 cohorts opted for sterilization after attaining 0-2. The increase in sterilization is a result of persistent efforts in road to promoting family planning. The parity is said to be one of the best predictors of sterilization [33-34]. More than 50 percent of the women in the cohorts of 1957-61 & 1962-66 opted for sterilization after attaining the parity of 5, whereas, more than 50 percent of women in the 1997-2001 and successive cohorts had opted for sterilization after attaining the parity of 0-2. Sterilization has contributed to a greater extent in reducing the fertility rates in the country.

The study also focussed on the desire of more children among couples after having at least three children. The result found that the desire of more children after having three children has increased drastically among the subsequent cohorts of the married women, but at the same time, this has been accompanied by the decline in the proportion of women having at least three children. The desire of having extra children after having a few children are determined by various factors. The most crucial factor is the combination of sexes among the offspring already delivered to the women. Number of sons and daughters already a couple is having is also found to be a predictor of family size and may influence the fertility among parents [35-38]. The proportion of women having at least three children has declined drastically and as a result of which there is a decline in fertility rates in India. According to Chauhan & Arokiasamy (2018), the declining fertility rates promote conducive policy environments in a country [39].

Conclusion

The pooled data from the NFHS survey are categorised into various cohorts of married women to study the family planning behaviour in India. This cohort analysis helped in understanding the family planning behaviour in India from 1957 to 2016. The odds of ever use of contraception has increased in the subsequent cohorts. Still, there is a need for contraception promotion as not even 50 percent of married women are using contraception. Only one in 3 married women in the 2007-11 cohort has ever used any contraception, thus missing out 66 percent of the married women who have not used contraception in the same cohort. The women are not using contraception either by their choice, or there is an unmet need for contraception. Various studies have found that in India, there is a high unmet need for the contraception use [40-45]. The prevalence of contraceptive use is increasing not only in India but globally, with a challenge to tackle the unmet need for contraception [46]. There is a need to identify the groups with the unmet need for contraception, and an attempt to reach these groups with contraceptive services is highly desirable.

Abbreviations

NFHS: National Family Health Survey

Declarations

Ethics approval and consent to participate: The data is freely available in public domain and survey agencies that conducted the field survey for the data collection have collected a prior consent from the respondent. Local ethics committee of International Institute for Population Sciences (IIPS), Mumbai, ruled that no formal ethics approval was required to carry out research from this data source.

Consent for publication: Not applicable

Availability of data and materials: The study utilises secondary source of data which is freely available in public domain through <https://dhsprogram.com/methodology/survey/survey-display-355.cfm>

Competing Interests: The authors declare that they have no competing interests.

Funding: Authors did not received any funding to carry out this research.

Author's Contribution: The concept was drafted by AG; AG and VC contributed to the analysis design, SC and RP advised on the paper and assisted in paper conceptualisation. RP and SC contributed in the comprehensive writing of the article. All authors read and approved the final manuscript.

Acknowledgements: Not applicable

References

1. UN Department of Social Affairs, Population Division World population policies 2004, United Nations, New York (2004).
2. Cleland, J., Bernstein, S., Ezech, A., Faundes, A., Glasier, A., & Innis, J. (2006). Family planning: the unfinished agenda. *The Lancet*, 368(9549), 1810-1827.
3. Ledbetter, R. (1984). Thirty years of family planning in India. *Asian Survey*, 24(7), 736-758.
4. Mukherjee, R. (1976). Family and planning in India.
5. Quereishi, M. J., Mathew, A. K., & Sinha, A. (2017). Knowledge, attitude and practice of family planning methods among the rural females of Bagbahara block Mahasamund district in Chhattishgarh State, India. *Glob J Med Public Heal*, 6(2), 1-7.
6. Sinding, S. W. (2007). "Overview and perspective," in Warren C. Robinson and John A. Ross (eds.), *The Global Family Planning Revolution: Three Decades of Population Policies and Programs*. Washington, DC: The International Bank for Reconstruction and Development/ The World Bank.
7. Mendelsohn, O. (1978). The Collapse of the Indian National Congress. *Pacific Affairs*, 51(1), 41-66.
8. Chadney, J. G. (1987). Family planning: India's Achilles' heel?. *Journal of Asian and African Studies*, 22(3-4), 218-231.
9. Shah Commission of Inquiry. 1978. Third and Final Report. New Delhi: Ministry of Home Affairs.
10. Starbird E, Norton M, Marcus R. Investing in family planning: key to achieving the sustainable development goals. *Global health: science and practice*. 2016 Jun 20;4(2):191-210. <https://doi.org/10.9745/GHSP-D-15-00374>
11. Muttreja P, Singh S. Family planning in India: The way forward. *The Indian journal of medical research*. 2018 Dec;148(Suppl 1):S1. https://doi.org/10.4103/ijmr.IJMR_2067_17
12. Kosunen, E. A., Rimpela, A. H., Kaprio, J. A., & Berg, M. A. (1997). Oral contraception and smoking: Time trends for a risk behaviour in Finland. *The European Journal of Public Health*, 7(1), 29-33.
13. Zheng, X., Tan, L., Ren, Q., Cui, Z., Wu, J., Lin, T., & Chen, H. (2012). Trends in contraceptive patterns and behaviors during a period of fertility transition in China: 1988–2006. *Contraception*, 86(3), 204-213.
14. Gwatkin, D. R. (1979). Political will and family planning: the implications of India's emergency experience. *Population and Development Review*, 29-59.
15. Maharashtra (India), Maharashtra Family (Restriction of Size) Bill, 1976 (Bill No. 25 of 1976).
16. Varkey, P., Balakrishna, P. P., Prasad, J. H., Abraham, S., & Joseph, A. (2000). The reality of unsafe abortion in a rural community in South India. *Reproductive Health Matters*, 8(16), 83-91.
17. Arnold, F., Kishor, S., & Roy, T. K. (2002). Sex-selective abortions in India. *Population and development review*, 28(4), 759-785.
18. Puri, S., Adams, V., Ivey, S., & Nachtigall, R. D. (2011). "There is such a thing as too many daughters, but not too many sons": A qualitative study of son preference and fetal sex selection among Indian immigrants in the United States. *Social science & medicine*, 72(7), 1169-1176.

19. Jones, R. K., Darroch, J. E., & Henshaw, S. K. (2002). Patterns in the socioeconomic characteristics of women obtaining abortions in 2000-2001. *Perspectives on sexual and reproductive health*, 226-235.
20. Chiavegatto Filho, A. D. P., & Kawachi, I. (2013). Are sex-selective abortions a characteristic of every poor region? Evidence from Brazil. *International journal of public health*, 58(3), 395-400.
21. Finlay, B. A. (1981). Sex differences in correlates of abortion attitudes among college students. *Journal of Marriage and the Family*, 571-582.
22. Kenny, L. C., Lavender, T., McNamee, R., O'Neill, S. M., Mills, T., & Khashan, A. S. (2013). Advanced maternal age and adverse pregnancy outcome: evidence from a large contemporary cohort. *PloS one*, 8(2), e56583.
23. Jolly, M., Sebire, N., Harris, J., Robinson, S., & Regan, L. (2000). The risks associated with pregnancy in women aged 35 years or older. *Human reproduction*, 15(11), 2433-2437.
24. Joseph, K. S., Allen, A. C., Dodds, L., Turner, L. A., Scott, H., & Liston, R. (2005). The perinatal effects of delayed childbearing. *Obstetrics & Gynecology*, 105(6), 1410-1418.
25. Delbaere, I., Verstraelen, H., Goetgeluk, S., Martens, G., De Backer, G., & Temmerman, M. (2007). Pregnancy outcome in primiparae of advanced maternal age. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 135(1), 41-46.
26. Aliyu, M. H., Salihu, H. M., Wilson, R. E., Alio, A. P., & Kirby, R. S. (2008). The risk of intrapartum stillbirth among smokers of advanced maternal age. *Archives of gynecology and obstetrics*, 278(1), 39-45.
27. Upadhyay SK, Srivastava S, Patel R, Chauhan S, Alagarajan M. Is There Any Link Between Death of Preceding Child and Child Health Care Services Utilization for Subsequent Birth?. *Indian Journal of Pediatrics*. 2021 Apr;88(4):363-6. <https://doi.org/10.1007/s12098-020-03452-3>
28. Chauhan S, Patel R, Bansod D. Are we ignoring the importance of sanitation while mourning the adverse pregnancy outcomes. *Clinics in Mother and Child Health*. 2020;17(2):1-3. <https://doi.org/10.35248/2090-7214.20.17.346>
29. Patel R, Chauhan S. Risk of low birth weight and exposure to type of cooking fuel in India. *Int J Pregn & Chi Birth*. 2020;6(1):8-11.
30. Patel R, Gupta A, Chauhan S, Bansod DW. Effects of sanitation practices on adverse pregnancy outcomes in India: a conducive finding from recent Indian demographic health survey. *BMC pregnancy and childbirth*. 2019 Dec;19(1):1-2. <https://doi.org/10.1186/s12884-019-2528-8>
31. Davis, K., & Blake, J. (1956). Social structure and fertility: An analytic framework. *Economic development and cultural change*, 4(3), 211-235.
32. Bongaarts, J. (1978). A framework for analyzing the proximate determinants of fertility. *Population and development review*, 4(1), 105-132.
33. Presser, H. B. (1980). Puerto Rico: recent trends in fertility and sterilization. *International Family Planning Perspectives*, 20-25.
34. Shapiro, T. M. (1985). Population control politics: women sterilization and reproductive choice.

35. Markle, G. E., & Nam, C. B. (1971). Sex predetermination: Its impact on fertility. *Social Biology*, 18(1), 73-83.
36. Stinner, W. F., & Mader, P. D. (1975). Sons, daughters or both?: An analysis of family sex composition preferences in the Philippines. *Demography*, 12(1), 67-79.
37. Coombs, L. C., & Sun, T. H. (1978). Family composition preferences in a developing culture: The case of Taiwan, 1973. *Population Studies*, 32(1), 43-64.
38. Sloane, D. M., & Lee, C. F. (1983). Sex of previous children and intentions for further births in the United States, 1965-1976. *Demography*, 20(3), 353-367.
39. Chauhan, S., & Arokiasamy, P. (2018). India's demographic dividend: state-wise perspective. *Journal of Social and Economic Development*, 20(1), 1-23.
40. Saini, N. K., Bhasin, S. K., Sharma, R., & Yadav, G. (2007). Study of unmet need for family planning in a resettlement colony of east Delhi. *Health and population-perspectives and Issues*, 30(2), 124-133.
41. Patil, S. S., Rashid, A. K., & Narayan, K. A. (2010). Unmet needs for contraception in married women in a tribal area of India. *Malaysian J Publ Health Med*, 10(2), 44-51.
42. Choudhary, S., Saluja, N., Sharma, S., Gaur, D., & Pandey, S. (2011). A study on the extent and reasons of unmet need for family planning among women of reproductive age group in rural area of Haryana. *The Internet Journal of Health*, 12(1).
43. Kumar, S. D., Pramod, G., Roli, G., Neeraj, G., & Manoj, B. (2011). A study to assess the unmet needs of family planning in Gwalior district and to study the factors that helps in determining it. *NJCM*, 2(1), 28.
44. Prusty, R. K. (2014). Use of contraceptives and unmet need for family planning among tribal women in India and selected hilly states. *Journal of health, population, and nutrition*, 32(2), 342.
45. Sulthana, B., Shewade, H. D., Sunderamurthy, B., Manoharan, K., & Subramanian, M. (2015). Unmet need for contraception among married women in an urban area of Puducherry, India. *The Indian journal of medical research*, 141(1), 115.
46. Alkema, L., Kantorova, V., Menozzi, C., & Biddlecom, A. (2013). National, regional, and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: a systematic and comprehensive analysis. *The Lancet*, 381(9878), 1642-1652.