

# Trend Analysis of Contraceptive Tapestry in India between 2015-2021

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**ABSTRACT:** Family planning is a crucial component of social and public health policy, with profound implications on people, communities, and countries. For family planning and reducing the pace of population growth, utilizing contraceptives is essential. This study investigates the changes in the trend of contraceptive practices between the year 2015-2021 by analyzing the data on family planning practices of fourth and fifth round of National Family Health Survey (NFHS) in India. The data is extracted from the NFHS factsheets and analysed by calculating the relative and absolute change between the two surveys. The proportion of the use of any methods of contraception shows a positive trend of improvement from 53.5% to 66.7% in 2015-2021. States like, Manipur, Bihar and Nagaland show the highest improvement in the overall use of contraceptive practices. Female sterilization emerges as the most commonly used modern method of contraception. However, the prevalence of male sterilization, despite its reversibility and minimal side effects, remains significantly lower, highlighting gender disparities in contraceptive decision-making. The variation in contraceptive pattern is influenced by complex interplay of literacy rate, socio-economic status, cultural and religious beliefs. Improved accessibility and utilization of safe contraceptive methods can be achieved through improved access to family planning services and medical professionals with the necessary training. Additionally, attaining contraceptive uptake that is in line with personal preferences and family planning objectives depends on resolving gender disparities and enabling women to make educated reproductive decisions.

## INTRODUCTION

India has become the most populated nation in the world, overtaking China with 142.86 crore people, after staying in second place for a definite period (United Nations Department of Economic and Social Affairs, 2023; Aggarwal, 2023; The Hindu Bureau, 2023b). In India, for family planning and reducing the pace of population growth, utilizing contraceptives is essential (Ewerling *et al.*, 2021). The 17 Sustainable

Development Goals (SDGs) of the United Nations seek to attain a decent standard of living for everyone by 2030 (World Population Prospects - Population Division - United Nations, 2022). Most targets, however, are likely to be missed, partially because they do not address the issue of human population growth (He *et al.*, 2022). Positive and empowering population solutions are essential for achieving the SDGs and addressing population growth sustainably and equitably (United Nations Department of Economic and Social Affairs, 2023). This could involve increasing access to family planning services,

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encouraging education and empowerment for women and girls, and supporting sustainable development practices that include both people's and the environment's needs (World Health Organization (WHO), 2023). Globally, out of 1.9 billion women of reproductive age, around 842 million uses modern contraception (Abeid *et al.*, 2023) with 219 million relying only on female sterilization, followed by male condoms (189 million) (Contraceptive Use by Method, United Nations, 2019).

Historically, the goal of family planning policy in India have always been focused on population growth control rather than the advancement of women's reproductive rights and choices. In India, with descriptions of contraceptive herbs and plants appearing in early Indian medical writings including the *Charaka Samhita* and the *Sushruta Samhita*. Herbs, spices, and other organic materials including neem, saffron, and honey have been used in traditional birth control methods in India (Medicine, 1999). Western contraceptive methods like condoms and diaphragms were introduced to India by colonial authorities and Christian missionaries in the late 19th and early 20th centuries (Jütte, 2008). However, the mass of people did not have easy access to or acceptance of these tactics, which were mostly restricted to urban regions (Jütte, 2008). Birth control use was first promoted by Indian social reformers M.S. Srinivasan<sup>1</sup> and Margaret Sanger<sup>2</sup> as a way to promote public health and reduce poverty (Wardell, 1980). A birth control committee was founded by the All-India Women's Conference in the 1930s, and it pushed birth control education and argued for the legalization of contraception (Garner and Michel, 2016). The Indian government introduced its first family planning program in 1952 to slow the population increase (Muttreja and Singh *et al.*, 2018). The first focus was on supporting male sterilization or vasectomy (Reference Manual for Male Sterilization, 2013). In 1974, the Government of India launched the "Sterilization Program" despite a landmark achievement of 6.2 million people sterilized in just one year, this program has left many negative consequences of forceful sterilization on a large population (Biswas, 2014). Due to cultural and religious obstacles, the program was not widely adopted (Parija *et al.*, 2022). In the 1960s, the focus

shifted to female sterilization or tubectomy which is currently the main form of contraception used in India (Shafi *et al.*, 2020). With changing of the time contraceptive practices have evolved and this paper will be exploring all type of family planning methods that has been considered in NFHS questionnaire in all the states and UTs. This paper is focusing on the trends of utilization of contraceptive methods between the year 2019- 2021 by observing the absolute and relative change in fourth and fifth round NFHS.

## MATERIALS & METHODS

The NFHS is comprehensive and national representative survey of India. It provides valuable data on various aspects of population and health, with a particular focus on family and maternal health, child health, nutrition, and related social issues. The primary purpose of the NFHS is to collect data on key demographic and health indicators in India. NFHS-5 fieldwork for India was conducted in two phases (phase one from 17 June 2019 to 30 January 2020 and phase two from 2 January 2020 to 30 April 2021) by 17 Field Agencies. NFHS-5 gathered information from 636,699 households, 724,115 women, and 101,839 men. Data collection was conducted by using 1,061 field teams. Each team consisted of one field supervisor, three female interviewers, one male interviewer, two health investigators.

The current, investigation has focussed to the aspects of family planning and trends of contraceptives practices between 2015 and 2021. The fourth (2015-2021) and fifth (2019-2021) rounds of the NFHS has been used for this investigation. Both surveys used probability proportionate sampling techniques to gather data in two rounds while following to established procedures and tools. All the information regarding the Data collection methods and tools were published online on the official website of NFHS, India.

For the current analysis data that has been focused is belongs to women of reproductive age group (15- 49 years). Current use of 'Family Planning Methods' and 'Literacy Rate' among the currently married women were extracted from the published factsheets of different states and UTs. Jammu & Kashmir (J&K) state was divided into two UTs J&K and Ladakh in 2019. The NFHS-4 data for J&K

represents both J& K and Ladakh UTs. Similarly, data of Dadra & Nagar Haveli, and Daman & Diu were reported as one UT during NFHS-5. So, these has not been included in the analysis.

Data were extracted from the national and state/UTs of NFHS-4 and NFHS-5 excluding J&K, Ladakh, Daman & Diu and Dadar & Nagar Haveli. Data of family planning practices such as overall prevalence of contraceptive methods use, male and female sterilization, Use of IUDs and PPIUDs, OCPs and barrier methods were extracted in proportion (%) along with the literacy rate. Data was analysed by calculating the absolute and relative change between NFHS-4 and NFHS-5.

Absolute change (AC) refers to the simple difference in the indicator over two periods in time i.e.,

$$AC = \text{Value of NFHS-4} - \text{value of NFHS-5}$$

Relative change (RC) expresses the absolute change as a percentage of the value of the indicator in the earlier period.

$$RC = \frac{\text{Value of NFHS-4} - \text{value of NFHS-5}}{\text{Value of NFHS-4}} * 100$$

There was no conflict of interest.

## RESULTS

The Nation Family Health survey's fourth and fifth round in conducted among 6,99,686 women and 1,03,525 men in 2015-2016 and 7,24,115 women and 1,01,839 men in 2019-2021 respectively.

### *Any Contraceptive Method*

The proportion of the use of any methods of contraception was 53.5% in the 4th round to 66.7% in the 5th round of NFHS is a significant positive trend. There were states/UTs (13/3) that reported the more substantially higher growth than national growth proportion (66.7%) in 2021. Among these states/UTs (13/3) a trend towards the higher proportion was reported in Manipur (23.6 vs 61.3), Bihar (24.1 vs 55.8) and Nagaland (26.5 vs 57.4) and lowest negative growth was reported observed among Punjab (75.8

vs 66.6) and Mizoram (35.3 vs 31.2) in 2015-21. The top most states with highest proportion of Use of contraception were Chandigarh (74 vs 77.4), Delhi (54.9 vs 76.4) and West Bengal (70.9 vs 74.4) and bottommost states were Meghalaya (24.3 vs 27.3), Mizoram (35.3 vs 31.2) and Bihar (24.1 vs 55.8). Overall, highest trend of improvement was observed in Goa (26.3 vs 67.9), Manipur 923.6 vs 61.3), Bihar (24.1 vs 55.8), Nagaland (26.5 vs 57.4) and lowest trend was observed in Punjab (75.8 vs 66.6), Mizoram (35.3 vs 31.2) and Meghalaya (64.8 vs 66.2) in 2015-2021. Punjab, West Bengal and Andhra Pradesh were among the top five states with highest proportion of 75.80%, 70.90% and 69.50% in 2015 and except West Bengal none of other two states showed significant growth and along with West Bengal (70.9 vs 74.4), Himachal Pradesh (57.0 vs 74.2), Odisha (57.3 vs 74.10) and Haryana (63.7 vs 73.10) appeared among top 5 states in 2021. While Manipur, Bihar showed the absolute improvement of 37.7% and 31.7% still Bihar (55.0 vs 24.1) remains at the last in 5<sup>th</sup> round and 2<sup>nd</sup> last at 4<sup>th</sup> round of NFHS (Table 1).

### *Modern Methods of Contraception*

The proportion of modern contraceptive use among states and UTs of India was 47.8% in 2015-2016 and 56.5% in 2019-2021. More than half of Indian states/UTs (15/4) had lower than national proportion of modern contraception use during 2019-2021. Among these states/UTs Arunachal Pradesh (26.6 vs 47.2), Nagaland (21.3 vs 45.3), Bihar (23.3 vs 44.4), Jharkhand (37.7 vs 44.5), Uttar Pradesh (31.7 vs 44.5) showed increasing trends on more than 10% growth in 2015-21. Despite having the less than national average proportion in Punjab (66.3 vs 50.5), Mizoram (35.2 vs 30.8) and Chandigarh (58.2 vs 55.6) a trend of negative growth in modern contraceptive use proportion was observed in 2015-2021. Andhra Pradesh (69.4 vs 70.8), Karnataka (51.3 vs 68.2) and Telangana (57 vs 66.7) were among the top three states and Lakshadweep (15.7 vs 30.1), Meghalaya (22.5 vs 21.9) and Manipur (18.2 vs 12.7) were bottommost three states in the using modern contraceptive methods (Table 1).

TABLE 1  
Trend analysis of National Family Health Survey (NFHS)-4 and NFHS-5 of contraceptive practices among States & UTs of India

State	Any method			Any modern method			Female sterilization			Male sterilization			IUD/PIUD			Pills			Condoms			
	NFHS	AC	RC	NFHS	AC	RC	NFHS	AC	RC	NFHS	AC	RC	NFHS	AC	RC	NFHS	AC	RC	NFHS	AC	RC	
India	66.5	13.2	24.6	47.8	8.7	1.85	37.9	1.9	15.2	0.3	0.0	50.5	2.1	0.6	40.4	4.1	5.1	1.1	24.3	9.5	3.9	69.6
HR	73.1	9.4	14.7	59.4	1.1	1.85	38.1	-	15.2	0.3	0.0	50.7	5.0	0.7	12.28	2.7	2.8	0.1	3.7	1.1	18.6	50.83
PB	66.8	9.2	12.1	3.5	-16	23.8	37.5	-	14.39	2.8	0.0	50.7	6.3	3.7	54.41	2.5	1.5	-1.1	-40	2.2	3.3	17.46
RJ	72.3	12.6	21.1	53.7	8.6	7.7	40.4	1.7	4.18	2.3	0.0	50.2	1.4	0.2	16.67	2.4	3.1	0.0	29.1	1.3	5.0	57.47
GJ	65.9	3.4	39.2	43.6	10.24	33.35	33.9	2.3	6.85	0.0	0.0	100.3	3.1	0.1	3.33	1.4	2.3	0.0	64.2	1.1	6.5	132.6
GA	67.4	4.1	15.8	24.6	35.14	29.13	29.9	13.83	4.0	0.0	0.0	NC	0.2	1.5	166.6	0.3	2.7	2.0	800	2.1	16.2	226.7
KT	68.7	16.3	32.6	51.6	16.32	9.48	48.57	8.8	18.1	0.0	0.0	-100.8	2.9	2.1	262.5	0.4	2.1	1.0	425	1.3	4.1	215.3
KL	60.1	7.6	14.3	50.3	2.5	4.97	45.6	0.8	1.75	0.0	0.0	0.0	1.5	0.1	-6.25	0.2	0.4	0.0	100	2.6	3.4	30.77
MH	66.8	1.4	2.16	6.8	1.2	1.92	50.49	-	3.16	0.0	0.0	0.0	1.9	0.3	18.75	2.4	1.8	0.0	-25	1.0	3.1	43.66
WB	74.4	3.5	4.94	57.7	3.7	6.49	29.4	0.1	0.34	0.0	0.0	0.0	2.2	1.0	83.33	20.3	3.0	0.0	1.5	5.9	7.1	18.64
MPR	61.3	37.7	159.8	12.7	5.5	43.3	3.1	0.6	19.3	0.0	0.0	-100.7	3.4	1.2	32.43	4.2	4.4	0.0	4.76	1.3	4.8	269.2
MG	27.3	3.1	12.7	21.9	0.6	2.74	6.2	0.6	9.68	0.0	0.0	NC	2.4	2.3	109.5	11.7	8.3	3.0	-	1.3	2.7	107.6
MZR	31.4	4.1	11.6	2.8	4.4	12.5	4.13	-	25.2	0.0	0.0	NC	3.2	0.6	17.65	2.9	1.2	0.0	-	1.3	1.9	46.15
NL	57.3	30.1	116.2	21.4	24	112.7	9.1	5.3	58.2	0.0	0.0	NC	6.7	13.1	195.5	4.6	6.4	2.0	60	1.3	3.3	153.8
AP	59.7	27.4	86.4	26.4	20.7	77.4	11.18	7	62.5	0.0	0.0	NC	3.4	2.8	82.35	2.5	5.1	5.0	51.9	1.4	4.7	235.7
AS	60.8	8.4	16.0	37.3	22.4	8.3	9.5	-	5.26	0.0	0.0	0.0	2.9	0.7	31.82	22.5	2.7	5.0	25	2.7	4.9	81.48

BH	24.	55.	31.	131.	23.	44.	21.	90.5	20.	34.	14.	68.1	0	0.	0.	NC	5	0.8	0.3	60	0.8	1	2	150	1	4	3	300	
	1	8	7	5	3	4	1	6	7	8	1	2	0	1	1	1													
SK	46.	69.	22.	47.9	45.	54.	9	19.6	17.	14.	-	17.6	3.	1.	1.	-50	6.	6.2	-	-1.59	11.	18.	6.	56.9	5.2	9.3	4.1	78.85	
	7	1	4	7	9	9	9	1	6	5	3.1	1	4	7	7														
TP	64.	71.	7.1	11.0	42.	49.	6.3	14.7	13.	10.	-	24.4	0	0	0	NC	6	0.4	0.2	-	26.	32.	6.	24.7	1.9	3.3	1.4	73.68	
	1	2		8	8	1		2	9	5	3.4	6																	
HP	57	74.	17.	30.1	52.	63.	11.	21.6	34.	37.	3.2	9.28	2.	3.	0.	37.5	0.	1.1	0.2	22.22	1.5	1.5	0	0	12.	19.	6.5	51.18	
	2	2	8	1	4	3	9	5	7	7			4	3	9										7	2			
UP	45.	62.	16.	37.1	31.	44.	12.	40.3	17.	16.	-	-	0.	0.	0	0	1.	1.5	0.3	25	1.9	4.4	2.	131.	10.	19.	8.3	76.85	
	5	4	9	4	7	5	8	8	3	9	0.4	2.31	1	1										5	6	8	1		
UK	53.	70.	17.	32.5	49.	57.	8.5	17.2	27.	26	-	5.11	7	7	0	0	1.	1.5	-	-6.25	3.2	2.7	0.	-	16.	25.	9.5	59.01	
	4	8	4	8	3	8		4	4		1.4														1	6			
MP	51.	71.	20.	39.4	49.	65.	15.	32.0	42.	51.	9.7	22.9	0.	0.	0.	40	0.	1.1	0.6	120	1.3	1.9	0.	46.1	4.9	8.1	3.2	65.31	
	4	7	3	9	6	5	9	6	2	9			5	7	2									5	5				
AP	69.	71.	1.6	2.3	69.	70.	1.4	2.02	3	6	68.	1.3	1.9	0.	0.	-	0.	0.2	0	0	0.2	0.1	0.	-	50	0.2	0.5	0.3	150
	5	1			4	8							6	4	2														
CG	57.	67.	10.	17.5	54.	61.	7.2	13.2	46.	47.	1.3	2.81	0.	0.	0.	14.2	1.	2.8	1.2	75	1.7	2.4	0.	41.1	3.9	4.1	0.2	5.13	
	7	8	1		5	7		1	2	5			7	8	1									8					
OD	57.	74.	16.	29.3	45.	48.	3.4	7.49	2	28.	0.2	0.71	2	3	1	50	1.	2.6	1.5	136.3	12	8	10.	-	10	3.4	5.5	2.1	61.76
	3	1	8	2	4	8																							
TM	53.	68.	15.	28.9	52.	65.	13	24.7	49.	57.	8.4	17	0	0.	0.	NC	9	4.8	2.9	152.6	0.2	0.3	0.	50	0.8	1.8	1	125	
	2	6	4	5	6	6		1	4	8																			
TL	57.	68.	10.	19.0	57	7	9.7	17.0	54.	61.	7.7	14.2	1.	2	4	25	1.	0.5	-	64.29	0.3	0.8	5	166.	0.5	0.8	0.3	60	
	2	1	9	6	6	7		2	2	9			6											7					
A&N	50.	65.	15	29.5	48.	57.	9.4	19.4	39.	39.	-	-	0	0.	0.	NC	2.	3.9	1.8	85.71	2.2	3.6	1.	63.6	4.2	9.8	5.6	133.3	
	8	8		3	7	7		6	9	2	0.7	1.75												4					
CDG	74	77.	3.4	4.59	2	6	2.6	4.47	6	6	1.6	7.77	3	3	3	2	5.	4.2	1.2	22.22	3.6	0.5	3.	86.1	3	1	3.8	13.92	
	4				2	6																							
PC	62.	66	3.5	5.6	61.	62.	0.3	0.49	58	8	4.2	7.24	0	0.	0.	NC	2.	1.9	-	-2.4	0.4	0.5	1	25	0.8	5	4.2	525	
	5				8	1																							
NCT	54.	76.	21.	39.1	48.	57.	9.1	18.7	19.	18	-	-	0.	0.	0	5.	6.7	1.3	24.07	2.9	2.7	0.	-	6.9	20	28.	8.3	41.5	
	9	4	5	6	6	7		2	8		1.8	9.09	2	2										0.					
LSK	29.	52.	22.	77.1	15.	30.	14.	91.7	10.	20.	10	93.4	0	0	0	NC	0.	1	0.3	42.86	0	1.2	2	1.	NC	4.1	4.1	0	0
	7	6	9		7	1	4	2	7	7		6																	

NOTE (indicators): HR- Haryana; PB- Punjab; RJ- Rajasthan; GJ-Gujrat; GA-Goa; KT- Karnataka; KL- Kerala; MH- Maharashtra; WB-West Bengal; MPR- Manipur- Meghalaya; MZR- Mizoram; NL-Nagaland; AP- Arunachal Pradesh; AS- Assam; BH- Bihar; SK- Sikkim; TP- Tripura; HP- Himachal Pradesh; UP- Uttar Pradesh; UK- Uttarakhand; JK- Jharkhand; MP- Madhya Pradesh; AP- Andhra Pradesh; CG- Chhattisgarh; OD- Odisha; TM- Tamil Nadu; TL-Telangana; A&N- Andaman & Nicobar Island; CDG- Chandigarh; PC- Puducherry; NCTD- NCT Delhi; LSKD- Lakshadweep; AC- Absolute Change; RC- Relative Change; UTs- Union Territories; IUD- Intra Uterine Devices; PPIUCD-Post-Partum Intra-Uterine Contraceptive Devices; NC- Not Calculated

### *Female Sterilization/Male Sterilization*

The prevalence of sterilization practices is higher among female (36 vs 37.9) than man (0.3 vs 0.3) in both rounds of NFHS. There are only 13 states and 3 UTs that showed the higher prevalence of female sterilization methods than national prevalence in 2021. The proportion of male sterilization does not account of even one fourth of female sterilization. States that shows the higher difference between the male and female literacy rate i.e., Rajasthan (28.9%), MP (22.4%) and BH (28.2%) are also the states that showed least or zero proportion of male sterilization when compared with female sterilization (20.7 vs 34.8 FS for 4<sup>th</sup> vs 5<sup>th</sup> round / 0 vs 0.1 MS for 4<sup>th</sup> and 5<sup>th</sup> round in Bihar; 40.7 vs 42.4 FS for 4<sup>th</sup> vs 5<sup>th</sup> round / 0.2 vs 0.3 MS for 4<sup>th</sup> vs 5<sup>th</sup> round Rajasthan; 42.2 vs 51.9 FS for 4<sup>th</sup> vs 5<sup>th</sup> round / 0.5 vs 0.7 MS for 4<sup>th</sup> vs 5<sup>th</sup> round in MP). Sikkim was the only state that showed the highest prevalence of male sterilization in both 4<sup>th</sup> and 5<sup>th</sup> round (3.7 vs 1.7) though the rate has decreased in 5<sup>th</sup> round by -1.7. Sikkim was also the among those states along with Kerala (97.9 vs 97.4 Women LR in 4<sup>th</sup> vs 5<sup>th</sup> round / 98.7 vs 97.1 men's LR in 4<sup>th</sup> vs 5<sup>th</sup> round) and Meghalaya (80.3 vs 82.3 / 90.8 vs 92.8) where least difference between male and female literacy rate is observed. More than half of the Indian states and UTs shows (17 states & 4 UTs vs 20 states & 2 UTs) had the lower than the national proportion of male and female sterilization in both rounds of NFHS (Table 1).

### *Intra Uterine Devices (IUDs & PPIUCDs)*

Among the hormonal contraceptive methods, the national prevalence of use of IUDs had 1.5% and 2.10% in 2015 and 2021 respectively. More than half of the Indian states/UTs (12/2) had the low proportion in the use of IUDs as method of contraception less than national prevalence (2.1%). Sikkim (6.20% vs 6.30%) and Nagaland (6.70% vs 19.80%) were among the top five states who had highest prevalence of use of IUDs in both 4<sup>th</sup> and 5<sup>th</sup> round of NFHS while Punjab (3.10% vs 6.8%) who topped in in NFHS 4<sup>th</sup> round moved at 10<sup>th</sup> position with -3.7% relative change. Andhra Pradesh (0.20% vs 0.20), Bihar (0.5% vs 0.8%) and Tripura (0.6% vs 0.4) had lowest proportion and Nagaland (6.7 vs 19.8), Delhi (5.4 vs 6.7), Arunachal

Pradesh (3.4 vs 6.2) and Sikkim (6.3 vs 6.2) had the highest proportion of IUDs use in both rounds of NFHS (Table 1).

### *Oral Contraceptive Pills (OCPs)*

The national prevalence OCPs is 4.1% and 5.1% in 4<sup>th</sup> and 5<sup>th</sup> round of NFHS. More than half of states/UTs (20/5) had low proportion in OCPs use as contraceptive methods below nation prevalence (5.1%). Tripura (26.3% vs 32.8%), Assam (22% vs 27.5%) and West Bengal (20% vs 20.3%) were among the top three states in the proportion of OCPs use in both the rounds of NFHS. On the hand Andhra Pradesh (0.2% vs 0.1%), Tamil Nadu (0.2% vs 0.3%), Kerala (0.2% vs 0.4%), Telangana (0.3% vs 0.8), Goa (0.3% vs 2.7 %) and Lakshadweep (0% vs 1.2%) had the lowest proportions of OCPs users. Tripura and Sikkim had highest absolute improvement of 6.6% and 6.5% respectively (Table 1).

### *Barrier Methods*

The national prevalence of condom's use was 5.6% and 9.5% in 4<sup>th</sup> and 5<sup>th</sup> round of NFHS respectively. More than half of states/UTs (20/2) had below than nation proportion in the use of condoms as methods of contraception. Tamil Nadu (0.8% vs 1.8 %), Telangana (0.5% vs 0.8%), Andhra Pradesh (0.2 % vs 0.5%) had the lowest prevalence of population using condoms and Uttarakhand (16.1% vs 25.6%), Punjab (18.9% vs 22.2%), Himachal Pradesh, Goa (7.1% vs 23.2%), Chandigarh (27.3% vs 31.1%) and Delhi (20% vs 28.3%) had the highest prevalence of using barrier methods. (Table 1).

## DISCUSSION

The present study highlights a trend of improvement in the proportion of the use of any methods of contraception from 53.5% in the 4<sup>th</sup> round to 66.7% in the 5<sup>th</sup> round of NFHS is a significant positive trend. This rise indicates that more Indian couples may be utilizing contraception to manage their family size and schedule pregnancies. A trend towards the higher proportion reported among 13 states in 2015 to 2021, Goa (26.3 vs 67.9), Manipur (23.6 vs 61.3) and Arunachal Pradesh (31.7 vs 59.1) were among states those the highest proportion of growth. In 2015, after a significant share in CP however by 2021, this

growth stagnated, as Punjab's proportion showed limited change while west Bengal consistently was among top states and also exhibited substantial growth from 70.90% in 2015 to 74.4% in 2021. This positive trend reflects an upward trajectory in the state's performance, suggesting successful policy measures or economic developments during this period.

The proportion of modern contraceptive use among states/UTs is consistent with the higher prevalence as has been observed in other studies 71.8% was higher in comparison other methods (Ewerling *et al.*, 2021). There was a significant variation in modern contraceptive use across states, with highest prevalence in Andhra Pradesh and lowest prevalence in Manipur (12.7%). Which highlights the facts despite an overall increase in modern contraceptive use in India, there are still a number of states with low prevalence rates. This is particularly concerning in states such as Bihar, Jharkhand, and Uttar Pradesh, which have high populations and high fertility rates. Literacy rates are also strongly correlated with modern contraceptive use in India. According to the 2019-2021 National Family Health Survey, the prevalence of modern contraceptive use among married women with no education was 33.3%, compared to 69.2% among married women with secondary or higher education. This suggests that efforts to increase literacy rates among women could also help to increase modern contraceptive use and improve reproductive health outcomes in India (Ram *et al.*, 2014).

In India, there is strong correlation between the gender gap in literacy rate and gender gap in sterilization. Which suggests that gender inequality may be major barrier to male sterilization in India. As observed in recent rounds of NFHS the prevalence of female sterilization (36% vs 37.9%) is significantly higher than male sterilization (0.3% vs 0.3%) in 2019-2021. There are only 13 states and 3 UTs that showed the higher prevalence of female sterilization methods than national prevalence in 2021. The proportion of male sterilization does not account of even one fourth of female sterilization. States that shows the higher difference between the male and female literacy rate i.e., Rajasthan (28.9%), MP (22.4%) and BH (28.2%) are also the states that showed least or zero proportion

of male sterilization when compared with female sterilization (20.7 vs 34.8 FS for 4<sup>th</sup> vs 5<sup>th</sup> round / 0 vs 0.1 MS for 4<sup>th</sup> and 5<sup>th</sup> round in Bihar; 40.7 vs 42.4 FS for 4<sup>th</sup> vs 5<sup>th</sup> round / 0.2 vs 0.3 MS for 4<sup>th</sup> vs 5<sup>th</sup> round Rajasthan; 42.2 vs 51.9 FS for 4<sup>th</sup> vs 5<sup>th</sup> round / 0.5 vs 0.7 MS for 4<sup>th</sup> vs 5<sup>th</sup> round in MP). Sikkim was the only state that showed the highest prevalence of male sterilization in both 4<sup>th</sup> and 5<sup>th</sup> round (3.7 vs 1.7) though the rate has decreased in 5<sup>th</sup> round by -1.7. Sikkim was also the among those states along with Kerala (97.9 vs 97.4 Women LR in 4<sup>th</sup> vs 5<sup>th</sup> round / 98.7 vs 97.1 men's LR in 4<sup>th</sup> vs 5<sup>th</sup> round) and Meghalaya (80.3 vs 82.3 / 90.8 vs 92.8) where least difference between male and female literacy rate is observed. More than half of the Indian states and UTs shows (17 states & 4 UTs vs 20 states & 2 UTs) had the lower than the national proportion of male and female sterilization in both rounds of NFHS. This suggests that gender inequality may be a major barrier to male sterilization in India (Schubbe and Wald, 2018). There are number of other factors that influence the choices of sterilization method in India, includes gender roles, access to information and services and personal preferences. However, the prevalence of male sterilization, despite its reversibility and minimal side effects, remains significantly lower, highlighting gender disparities in contraceptive decision-making and a strong correlation between the gender gap in literacy and the gender gap in sterilization rates is observed (Prusty and Begum, 2023). which suggests that Educating men and women about the benefits and risks of different sterilization methods. Increasing access to male sterilization services, particularly in rural and underserved areas and addressing gender inequality and promoting gender equality (Salve *et al.*, 2023).

The national prevalence of use of IUDs had 1.5% and 2.10% in 2015 and 2021 respectively. There is a positive correlation between the literacy rate and IUD use in India. Which suggests that states with higher literacy rates e.g., Nagaland with highest literacy rate also have the highest rates of IUD use (19.8%) while on the other hand Andhra Pradesh has the lowest literacy rate in India (65.46%) and the lowest IUD use rate (0.20%). There are a number of reasons for which as a confounding factor e.g., First, literacy can empower women to make informed decisions about

their reproductive health. Second, literate women are more likely to be aware of different contraceptive methods, including IUDs. Third, literate women are more likely to have access to IUD insertion services. However, it is important to note that literacy is not the only factor that influences IUD use. Other factors, such as cultural norms, religious beliefs, and socioeconomic status, also play a role (Kasa *et al.*, 2018; Thakuri *et al.*, 2022).

There was significant variation in OCP use across the states and UTs, with the highest prevalence in Tripura (32.3%) and lowest prevalence in Andhra Pradesh (0.1%). The trend of association of literacy can also be observed with the highest use of OCPs among states with highest education e.g., states like Tripura (26.3% vs 32.8%), Assam (22% vs 27.5%) and West Bengal (20% vs 20.3%) with highest proportion of OCPs use are also among the states with highest literacy rate. Among barrier methods, Uttarakhand has the highest literacy rate in the states with high condom use (78.8%) and the state of Tamil Nadu has the lowest literacy rate in the states with low condom use (80.09%) (*National family Health Survey-5, 2019-2021*). Despite the fact that improvement literacy is most important factor that can contribute for the significant improvement in family planning practices but there are certain other factors, such as cultural norms, religious beliefs, and socioeconomic status also contribute negatively in family planning practices which needs to be considered and many awareness programmes should be implemented by government on root levels for better implementation of policies of family planning (Thulaseedharan, 2018; Thakuri *et al.*, 2022).

### CONCLUSION

The NFHS data sheds light on the patterns and trends in the usage of family planning methods in India. Even while an upward trend has been seen much more could potentially be done. Current analysis comes up with two recommendations. To begin with by improving the women's access to multiple contraceptive methods and empowering them by getting them economic and academic opportunities. Furthermore, increasing men's participation in family planning can all play an important role in improving proper implementation of family planning methods in

India. This can be achieved with robust improvement in health care facilities, well trained healthcare practitioners, dedicated counselling units in hospitals, primary health care units and social campaign program. It can further help India in attaining its population control aims and achieving its population management goals.

### NOTES

- 1 M.S. Srinivasan-Indian sociologist and social anthropologist
- 2 Margaret Sanger - Margaret Sanger was a pioneering birth control activist who helped to legalize contraception in the United States. She is widely regarded as a founder of the modern birth control movement.

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