

Original Research Article

Socio-economic determinants of modern contraceptive use among married women in Kerala, Bihar and North-East India: a comparative analysis

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ABSTRACT

Background: The various effective ways to use contraceptive methods taken divergent steps toward attaining the SDG target of universal access to sexual and reproductive health care services by 2030. However, due to the lack of widespread use of contraceptive methods by married women due to the misconceptions about female contraceptive methods and lack of proper information, women are often reluctant to family planning, and men have to tolerate the problem. So, it is essential to study the significant determinants of modern contraceptive methods. The present research aimed to examine the trend of use of modern contraceptive methods among currently married women using data from latest three rounds of NFHS in Kerala, Bihar, and North-East India. Also, to identify the significant covariates that influence the use of modern contraceptives.

Methods: A multivariate logistic regression to estimate the odds ratio (OR) for various covariates that are found to be significantly associated with modern contraceptive use.

Results: There is a decline in modern contraceptive use from NFHS-3 to NFHS-4 but increases in NFHS-5. Kerala shows the highest prevalence among the three regions. Age of women, educational level, religion, ethnicity, place of residence, desire for more children, number of living children, ideal number of children, wealth index, and media exposure are important covariates that significantly influence the use of modern contraceptive methods.

Conclusions: However, the educational level of women, except for higher education and ethnic groups belonging to OBC, does not affect the behavior of using modern contraceptives significantly.

Keywords: Logistic regression, Modern contraceptive use, NFHS

INTRODUCTION

The use of contraceptives and the level of unmet need for family planning are essential measures for assessing progress in reproductive health access, as outlined in target 3.7.1 of the 2030 Agenda for Sustainable Development.¹ It aims to ensure universal access to sexual and reproductive healthcare services by 2030, including family planning, education, and integration into national strategies. This indicator helps assess coverage for family planning programs and services, enabling

women and their partners to make informed decisions about the number and spacing of their children.¹

Globally, the number of women of reproductive age (aged 15-49 years) increased by 46% from 1.3 billion in 1990 to 1.9 billion in 2021.¹ There was an even larger rise in the number of women of reproductive age who need family planning: this includes those who are fecund, married, in a relationship, single, and plan to postpone or forego having children. Specifically, the number of women with a need for family planning increased by 62% from 0.7

billion in 1990 to 1.1 billion in 2021. This need is increasingly satisfied by the use of modern contraceptive methods.¹

India became the first nation in the world to implement a family planning program supported by the government in 1952. Family planning remained a vital component of the nation's population strategy, and on occasion, initiatives for child and reproductive health were approved and put into action.² Several programs were implemented after the 1950s to increase the use of family planning services. The usage of contraceptive methods has increased fivefold in India over the past 50 years as a result of determined efforts; in 1970, the rate climbed by around 11%, and in 2016, it increased by approximately 54%.³

Human rights, poverty, education, gender equality, the spread of STDs, women's and children's health, and reproductive health are all profoundly interconnected. Therefore, improving access to reproductive health is essential to development, as evidenced by the FP 2020 Initiative.⁴ In order to coordinate widespread efforts to increase access to family planning services, the FP2020 Initiative was established in 2012. To effectively address the most significant problems related to reproductive health, partnerships between countries, development organisations, donors, and researchers must work together. Donors have pledged to advance fairness, safeguard human rights, and increase access to family planning services that are both safe and effective. Much work has been done to create a conceptual framework and indicators to track future goals and support national programs to track their success and create performance improvement plans.⁴

These studies relating to the trends and patterns of contraceptive methods at the national level may not be able to capture the regional diversities. Northeast India is the land of hundreds of different tribal communities, which is quite different from the rest of the country, and that is why northeast India does not follow the overall Indian pattern. There has been hardly any study carried out relating to contraceptive use in northeast India.⁵ In North East India, the acceptance of the family planning method is meagre, and it varies across states and within the states.⁶

The use of contraceptives in Manipur and Punjab that extends beyond the empowerment and education of women. The result of this study shows also that Manipur (13%) uses the least modern method, compared to Punjab (66%). Also, Manipur's family planning program coverage is significantly lower than Punjab's, with only 18% of frontline workers' outreach and 11% of public health facilities offering clinical family planning approaches.⁷

In Northeast India, for determining the modern contraceptive use and reproductive intention among currently men, such as social category, religion, place of

residence, media exposure, wealth index, fertility status, number of living children, and region were significant in determining contraceptive use. It shows that Sikkim (38%) has the highest modern contraceptive use, and Manipur (8.9%) is the lowest.⁸

The primary objectives of the present study was to examine the trend of use of modern contraceptives among currently married women using data from the latest three rounds of the National Family Health Survey (NFHS) in the states of Kerala, Bihar, and the North-East Indian states. To identify the significant covariates that influence the use of modern contraceptives from the latest round of NFHS-5(2019-21).

METHODS

Source of data

The secondary dataset from the National Family Health Survey (NFHS) conducted by the Ministry of Health and Family Welfare in India, the International Institute for Population Sciences being the nodal agency in three rounds of surveys, i.e., NFHS-3 (2005-06), NFHS-4 (2015-16) and NFHS-5 (2019-21). From the NFHS-5 provides information for 707 districts, 28 states and 8 union territories, is nationally representative cross-sectional survey that employed a two-stage stratified probability proportional to size sampling design. In the first stage, primary sampling units (PSUs) were selected-villages in rural areas and Census Enumeration Blocks (CEBs) in urban area. It 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. The data were collected from 636,699 households, 724,115 women, and 101,839 men in NFHS-5. The study population comprised women of reproductive age (15-49) residing in the states of Kerala, Bihar, and North-East India. Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Sikkim, and Tripura.

In this present study, it focused on respondents from Kerala, Bihar and the selected North-eastern states of India to examine regional and temporal variations in the use of modern contraceptive methods. Women with available information on contraceptive use and other relevant demographic and socio-economic characteristics were included in the analysis. The analytical sample was selected from the respective NFHS datasets according to the objectives and requirements of the study. Whereas the exclusion data is that the respondents outside the specified age range of 15-49 years and those residing outside the geographical area selected for the study are excluded. Records with missing or incomplete information on the use of modern contraceptive or other essential study variables were also excluded from the analysis where such information were required. These data are also considered only for married women respondents, and other women are not considered, such as

those who have never married, widowed, divorced, separated/ no longer living together, etc. Table 1 presents

the number of sample selection of women aged 15-49 years among these three regions.

Table 1: Sample selection in this study only for married women in three states/regions, i.e., Kerala, Bihar, And north-east India.

States/ region	NFHS-3		NFHS-4		NFHS-5	
	No. of married women	% of married women	No. of married women	% of married women	No. of married women	% of married women
Kerala	2261	13.5	7394	7.9	7552	8.2
Bihar	2816	16.8	31171	33.5	29819	32.3
North-east India	11706	69.7	54446	58.6	54984	59.5
Total	16783		93011		92355	

Descriptive of study variable

Outcome variable: The outcome variable of interest in the study was "currently used a modern contraceptive. The response categories for the primary variable "currently used any method" were 0-"never used," 1-"used only folkloric method," 2-"used traditional methods," and 3-"used modern method," were used to derive it. In this variable, we should be transformed into a dichotomous variable, i.e., 0- "never used of contraceptive methods or used of the traditional methods" and 1-"used of the modern contraceptive method." Women who responded that they/ their husbands were using contraceptive devices such as condoms, oral contraceptive pills, female sterilization, male sterilization, intrauterine contraceptive devices (IUCD), injectable, or diaphragm, etc., were considered as using any method of contraceptive.

Predictor variable: The predictor variables of this study are socio-economic and demographic variables, such as the age of women's respondents, educational level, ethnicity, religion, place of residence, wealth index, media exposure, desire for more children, number of living children/parity, ideal number of children, and among the three regions. The selection of these few variables was informed by the evidence on literacy rate and fertility rate in the literature. The dataset of these variables was available in this study.

Statistical methods

The SPSS statistical software version 21 was used to enter, code, and clean the data before analysis and then analyse the results. The socio-economic and demographic characteristics of the use of contraceptives among the study respondents in regions such as Kerala, Bihar, and the North-East states of India are examined in each successive study using descriptive statistics, such as frequencies, percentages, and bar charts and each variable's frequencies and percentages are cross-tabulated. A Chi-square test for association was also used to conclude the statistical significance of the association between background characteristics and the use of contraceptive methods. The method of multivariate

logistic regression¹⁰ was also conducted to identify the significant covariates that influence the use of modern contraceptive methods. The accuracy of the model fit to the data has been evaluated using Hosmer Lemeshow's statistic and Nagelkerke R-squared¹¹. The adjusted odds ratio (adjusted OR) with a 95 % confidence interval (CI) was used to calculate the numerical relationship between the outcome variable and various predictor variables. The mathematical expression of logistic regression is given by

$$\text{Logit} [\pi (X)] = \log [(\pi(x))/(1- \pi(x))] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \dots \dots \dots \{1\}$$

Where; β_0 = the constant of the equation, and $\beta_i = \beta_1, \beta_2, \beta_3, \dots, \beta_k$ = parameters (regression coefficients).

RESULTS

Figure 1 shows the trends in modern contraceptive methods of married women among three regions, i.e., Kerala, Bihar, and North East India, from NFHS-3 (2005-06) to NFHS-5. (2019-21). There is a decline in modern contraceptive use from NFHS-3 to NFHS-4, but an increase in NFHS-5.

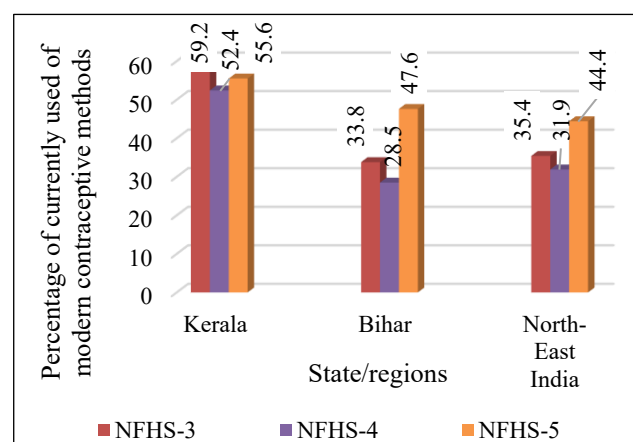


Figure 1: Trends of using modern contraceptives among married women in three regions in three rounds of NFHS (NFHS-3 to NFHS-5).

The percentage of contraceptive use among married women in selected regions, i.e., Kerala, Bihar, and North-East Indian states, in the ages of 15-49 years for NFHS-3 to NFHS-5, is presented in Table 2. Additionally, the trend of modern contraceptive methods among married women in three regions is also shown in Figure 2. Kerala, Bihar, Arunachal Pradesh, Meghalaya, Nagaland, Sikkim, and Tripura initially declined modern methods

from NFHS-3 to NFHS-4, followed by significant increases by NFHS-5. Assam steadily enhanced its use of modern contraceptive methods across all three surveys, indicating steady improvement. Manipur and Mizoram experienced notable declines, with Manipur showing only a slight recovery by NFHS-5, demonstrating substantial improvement after a decline in NFHS-4.

Table 2: Percentage distribution of married women's use of contraceptive methods in three rounds of NFHS in Kerala, Bihar, and North-East India.

States/regions	NFHS-3 (%)		NFHS-4 (%)		NFHS-5 (%)	
	Never use or use the traditional method	Using a modern method	Never use or use the traditional method	Using a modern method	Never use or use the traditional method	Using a modern method
Kerala	40.0	60.0	46.7	53.3	44.4	55.6
Bihar	66.2	33.8	71.4	28.6	52.4	47.6
Arunachal Pradesh	61.7	38.5	71.6	28.4	48.3	51.7
Assam	69.5	30.5	62.4	37.6	54.7	45.3
Manipur	75.1	24.9	86.5	13.5	79.9	20.1
Meghalaya	73.4	26.6	77.7	22.3	50.3	49.7
Mizoram	38.8	61.2	62.5	37.5	61.3	38.7
Nagaland	73.8	26.2	75.6	24.4	49.2	50.8
Sikkim	49.7	50.3	50.8	49.2	36.1	63.9
Tripura	51.5	48.5	55.2	44.8	50.3	49.7

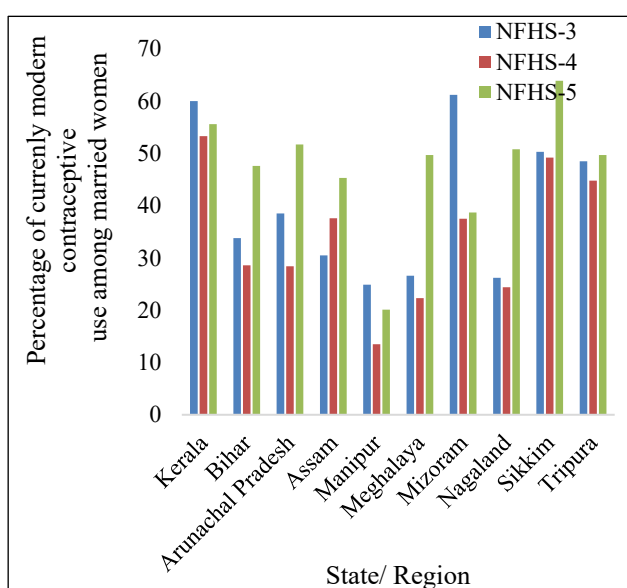


Figure 2: Trends of using modern contraceptives in Kerala, Bihar, and North-East Indian states among married women in three rounds of NFHS.

Table 3 presents the percentage distribution of current contraceptive methods among married women by background characteristics of the three regions, Kerala, Bihar, and the North-East Indian states. The data is divided into two categories: women who either never use contraception or use traditional methods, and those who use modern contraceptive methods. Additionally, p values

indicate the statistical significance of the observed differences within each characteristic.

The percentage of women aged 15-24 years in all three regions is the least likely to use modern contraceptives. However, modern contraceptive use increases with the age of women, also increasing up to 49 years, as indicated by the highly significant p-value (<0.001). There is a strong relationship between the age of women (in years) and the use of contraceptive methods. Educational attainment also plays a crucial role, with uneducated women in Kerala showing unexpectedly high modern contraceptive use (79.7%), whereas in Bihar and Northeast India, education does not lead to a considerable increase in modern contraceptive methods. The p-value ($p<0.001$) confirms a strong statistical association between education level and contraceptive use across all three regions.

Women belonging to the Scheduled Castes (SC) and Other Backwards Classes (OBC) affect contraceptive methods in all three regions, showing lower rates in modern contraceptives. Scheduled Tribe (ST) women, particularly in Bihar and North-East India, also exhibit lower modern contraceptive use. A significant p value (<0.001) also confirms the strong association between ethnicity and contraceptive methods. Likewise, place of residence affects contraceptive use, with rural women in Kerala having slightly higher modern contraceptive use (58.3%) than their urban area counterparts, while in Bihar and Northeast India, urban women show slightly higher

acceptance. Place of residence and contraceptive methods are strongly associated.

Women belonging to the Hindu religion have more chances to use contraceptive methods than Muslims and Christians, particularly in Bihar, where only 26.7% of Muslim women adopt modern methods compared to 50.6% of Hindus. The p value (<0.001) confirms a strong statistical association between religion and contraceptive use. The preferences strongly influence contraceptives used, with women who do not desire more children having the most chances to use modern methods, while women who are undecided about having more children exhibit much lower use of contraceptive methods. The p value (<0.001) confirms a significant association.

The number of living children also impacts contraceptive use, as women with more children are more likely to use

methods. No children living together with women have the lowest use of contraceptive methods, whereas three or more children have the highest rate of contraceptive methods. So, the p value (<0.001) confirms a significant association between the number of living children and the use of contraceptive methods.

Economic status also influences contraceptive methods, with women belonging to the poor using modern contraception more than the rich across all three regions. Media exposure, however, has a mixed effect. In Kerala, it does not significantly impact contraceptive use ($p=0.177$), whereas in Bihar and Northeast India, regular media exposure correlates with higher use of modern methods ($p<0.001$), suggesting the role of awareness campaigns in influencing contraceptive methods used.

Table 3: Percentage distribution of contraceptive methods among married women by background characteristics in NFHS-5 (2019-21) and its p value for the test of association.

Background characteristics	Kerala (%)			Bihar (%)			North-East India (%)		
	Never use or use the traditional method	Using a modern method	P value	Never use or use the traditional method	Using a modern method	P value	Never use or use the traditional method	Using a modern method	P value
Age of women (in years)									
15-24	85.1	14.9	<0.001	81.6	18.4	<0.001	67.5	32.5	<0.001
25-34	59.7	40.3		49.7	50.3		55.9	44.1	
35-44	33.2	66.8		33.8	66.2		49.4	50.6	
45-49	20.5	79.5		34.3	65.7		56.4	43.6	
Educational level									
No education	20.3	79.7	<0.001	46.6	53.4	<0.001	53.9	46.1	<0.001
Primary	23.7	76.6		51.6	48.5		52.6	47.4	
Secondary	39.0	61.0		59.6	40.8		55.9	44.1	
Higher level	58.7	41.3		60.7	39.3		65.1	34.9	
Ethnicity									
Schedule caste	42.3	57.7	0.045	52.9	47.1	<0.001	51.6	48.4	<0.001
Schedule tribe	45.3	54.7		57.1	42.9		57.0	43.0	
OBC	45.6	54.4		51.4	48.6		55.8	44.2	
Others	42.3	57.7		54.3	45.7		54.1	45.2	
Place of residence									
Urban	48.0	52.0	<0.001	50.5	49.5	0.027	56.5	43.5	0.038
Rural	41.7	58.3		52.6	47.4		55.5	44.5	
Religion									
Hindu	41.5	58.5	<0.001	49.4	50.6	<0.001	54.5	45.5	<0.001
Muslim	53.0	47.0		73.3	26.7		50.8	49.2	
Christian	39.9	60.1		70.8	29.2		60.2	39.8	
Others	0	100		68.0	32.0		51.5	48.5	
Desire for more children									
No	22.6	77.4	<0.001	37.7	62.3	<0.001	47.5	52.5	<0.001
Undecided	87.1	12.9		88.0	12.0		67.6	32.4	
Yes	88.9	11.1		86.3	13.7		68.7	31.3	
Number of living children									
Zero child	72.0	28.0	<0.001	81.7	18.3	<0.001	71.4	28.6	<0.001
One child	47.9	52.1		61.2	38.8		54.1	45.3	
Two children	28.7	71.3		38.8	61.2		50.1	49.9	
Three or more children	29.2	70.8		43.6	56.4		55.8	44.2	

Continued.

Background characteristics	Kerala (%)			Bihar (%)			North-East India (%)		
	Never use or use the traditional method	Using a modern method	P value	Never use or use the traditional method	Using a modern method	P value	Never use or use the traditional method	Using a modern method	P value
Ideal Number of children									
Up to two children	43.5	56.5	0.019	57.8	42.2	<0.001	54.5	45.5	<0.001
Three or more children	46.6	53.4		47.7	52.3		57.2	42.8	
Wealth index									
Poor	40.1	59.9	<0.001	53.9	46.1	<0.001	55.9	44.1	<0.001
Middle	39.7	60.3		50.0	50.0		54.3	45.7	
Rich	45.8	54.2		47.7	52.3		56.5	43.5	
Media exposure									
No	47.9	52.1	0.177	53.4	46.6	<0.001	57.2	42.8	<0.001
Expose but rarely	46.7	53.3		53.3	46.7		57.3	42.7	
Expose regularly	43.9	56.1		49.8	50.2		55.5	44.5	

Figure 3 shows that the percentage of married women mainly use modern contraceptives such as female sterilization (48.1%), followed by pills (29.2%), male condoms (9.2%), IUD (8.9%), and other methods including injections, LAM, emergency contraception, and SDM. Male sterilization was less commonly used, while the female condom and diaphragm were almost negligible in usage.

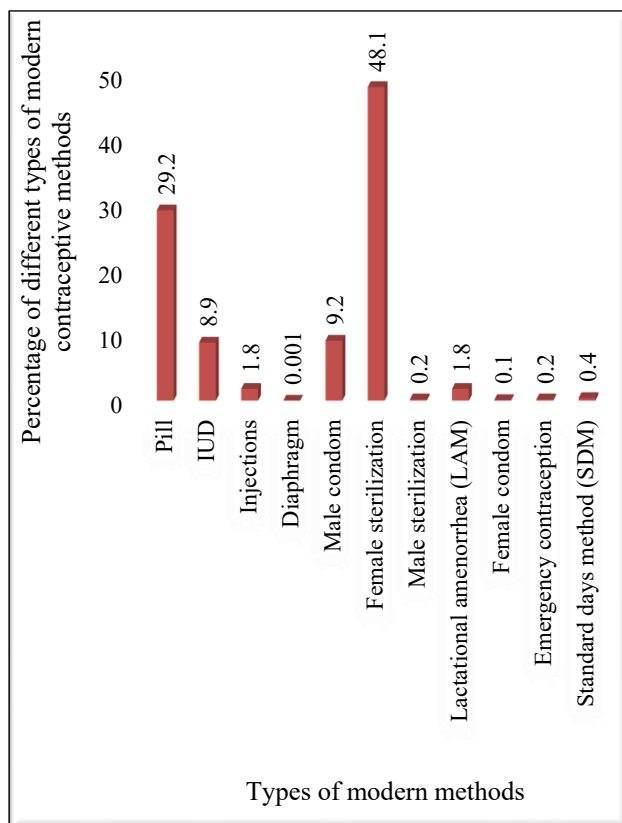


Figure 3: Percentage distribution of use of different types of modern contraceptive methods by married women/their partners in 2019-21.

Table 4 shows the investigation of significant determinants of the current use of modern contraceptive methods among currently married women across Kerala, Bihar, and North-East India in the year 2019-21. The adjusted odds ratio (OR) and its p value for significance along a 95% confidence interval are shown. The odds ratio provides the likelihood of the occurrence of the event in the particular variable category compared to the reference category.

For example, 'age of women (in years)' has four categories. 15-24 years, 25-34 years, 35-44 years, and 44-49 years, for which 15-24 years is a reference category. The OR for the ranges of 25-34 years of married women is 1.628, which means 25-34 years married women have 1.628 times more chance to use modern contraceptive methods as compared to the 15-24 years of age of married women. The range of 34-44 years married women is 1.866 times more likely to use modern contraceptive methods as compared to the reference category and 44-49 years married women; the adjusted OR is 1.576, which means that 44-49 years women have 1.576 times more chance to use modern contraceptive methods as compared to the reference category.

In the educational level variable, no education is the reference category. The p values for 'primary' and 'secondary' education levels are insignificant. And others, the p-value is significant. So, the OR is 0.744 for higher levels of education, indicating that married women belonging to higher education have 25.6% less chance of using modern contraceptive methods as compared to those with no education as the reference category. Ethnic groups of women of variable, the Scheduled caste is the reference category. The p-value of Other Backwards Classes (OBC) is also insignificant, and the other p values are significant. However, the OR for Scheduled tribes is 6.2% and for other categories is 11.2%, which shows that the Scheduled tribes and other categories have less chance to use modern contraceptive methods as compared to the Schedule Caste as the reference category.

Table 4: Binary logistic regression analysis of factors influencing modern contraceptive methods among married women aged 15-49 in 2019-21.

Background characteristics		Kerala		Bihar		North-East India	
		Adjusted Odds Ratio	P value	Adjusted Odds Ratio	P value	Adjusted Odds Ratio	P value
Age of women (in years)	15-24 (Ref.)						
	25-34	1.04	0.760	1.86	<0.001	1.34	<0.001
	35-44	1.21	0.183	2.84	<0.001	1.41	<0.001
	45-49	1.82	<0.001	2.69	<0.001	1.03	0.47
Educational level	No education (Ref.)						
	Primary	0.79	0.521	1.01	0.923	1.04	0.194
	Secondary	0.67	0.233	0.93	0.038	0.98	0.578
	Higher level	0.49	0.041	0.87	<0.051	0.75	<0.001
Ethnicity	Schedule caste (Ref.)						
	Schedule tribe	1.06	0.776	0.89	0.153	1.01	0.82
	OBC	1.11	0.339	1.12	0.001	0.85	<0.001
	Others	0.95	0.656	1.08	0.107	0.69	0.066
Place of residence	Urban (Ref.)						
	Rural	1.34	<0.001	1.00	0.98	1.05	0.066
Religion	Hindu (Ref.)						
	Muslim	0.67	<0.001	0.34	<0.001	1.18	0.002
	Christian	0.95	0.609	0.51	0.167	0.81	<0.001
	Others	239883.1	0.999	0.42	0.08	1.19	<0.001
Desire for more children	No (Ref.)						
	Undecided	0.05	<0.001	0.13	<0.001	0.44	<0.001
	Yes	0.05	<0.001	0.21	<0.001	0.42	<0.001
Number of living children	Zero child (Ref.)						
	One child	1.61	<0.001	1.49	<0.001	1.57	<0.001
	Two children	2.34	<0.001	2.27	<0.001	1.53	<0.001
	three or more children	1.91	<0.001	1.70	<0.001	1.17	<0.001
Ideal Number of children	Up to two children (Ref.)						
	Three or more children	1.36	<0.001	1.14	<0.001	1.01	0.56
Wealth index	Poor (Ref.)						
	Middle	1.25	0.133	1.12	0.007	1.12	<0.001
	Rich	1.29	0.076	1.22	<0.001	1.09	0.002
Mass media exposure	No (Ref.)						
	Expose but rarely	1.43	0.071	1.21	<0.001	1.04	0.094
	Expose regularly	1.49	0.026	1.28	<0.001	1.15	<0.001

Note: Ref=Reference Category

Further, the 'place of residence' variable, 'urban area,' is the reference category. The OR for rural areas of women is 1.111%, which means that rural women are 1.111% times more likely to use modern contraceptive methods as compared to urban women as the reference category. So, they are also significant. In the religious variable, the Hindu religion is also the reference category. The OR is 0.62 for Muslims and 0.813 for Christians, indicating that women belonging to Muslim and Christian groups have 38% and 19% less chance to use modern contraceptive methods compared to others, and the OR is 1.134 for other religious categories, which means that they are 1.134 times more likely to use modern contraceptive methods.

Similarly, the desire for more children is also significantly influenced by currently married women to use modern contraceptive methods. Women who are undecided about having more children and women who want to decide on having more children have less chance to use modern contraceptive methods as compared to the desire for no more children. The 'number of living children' variable is also statistically significant for determining the use of modern contraceptive methods. The currently married women of a family with one or more children show a higher chance of using modern contraceptive methods than the currently married women of a family with no children as the reference categories. In the variable, 'ideal number of children', women respondents in a family want 'up to two children' as the

reference category. The OR is 1.099 for married women with three or more children, which shows that 1.099 times more chance to use modern contraceptive methods as compared to the reference categories.

Lastly, the wealth of the family also significantly influences current married women to use modern contraceptive methods. Middle-class families and richer families have higher chances of using modern contraceptive methods in the regions. Exposure to mass media for women of all ages is also an important covariate that significantly influences the use of modern contraceptive methods. Women who read newspapers or watch TV regularly, as well as those who are rarely exposed, are 1.068 and 1.201 times more likely to use modern contraceptive methods, respectively, than women who do not read newspapers or watch TV at all.

DISCUSSION

From the main finding of the present study, in NFHS-3, the use of modern contraceptive methods comparatively declined in NFHS-4, followed by significant increases in NFHS-5. Mizoram has the highest prevalence rate of using modern contraceptive methods in NFHS-3 among the three regions, i.e., Kerala, Bihar, and North-East Indian states. In NFHS-4, Kerala has the highest use of modern methods among the three regions. Sikkim also has the highest modern contraceptive use in NFHS-5 among the three regions.

In Kerala, the place of residence, desire for more children, number of living children, and the ideal number of children are important covariates that significantly influence the use of modern contraceptive methods. However, the age of married women from 25-34 years and 35-44 years, the educational level of women, i.e., primary and secondary, and Christian and other religious married women and the media exposure rarely significantly influence the behaviour of using modern contraceptives as compared to their respective reference categories. Thus, the age of 45-49 years of women, those with higher educational levels, women belonging to the Muslim community, and regular media exposure significantly influence the use of modern contraceptives than their respective reference categories.¹²

In Bihar, the age of women, desire for more children, number of living children, ideal number of children, wealth quintile and mass media exposure are also covariates that significantly influence the use of modern contraceptive methods. However, the educational level of women, i.e. primary and higher levels of education, women belonging to scheduled tribes and other categories, place of residence, and Christian and other religious married women, does not significantly influence the behaviour of using modern contraceptives as compared to their respective reference categories. Therefore, those secondary educational levels, women belonging to the OBC category and married women of

Muslim groups significantly influence the use of modern contraceptives than their respective reference categories.¹³

Lastly, in the North-East Indian states, the socio-demographic variables such as the age of women in 25-34 years and 35-44 years, higher educational levels, women belonging to OBC groups, religion, desire for more children, number of living children, wealth index, and media exposure regularly are significant influences the use of modern contraceptive methods as compared to their respective reference categories. However, the age of women is 45-49 years, and the educational level, i.e., primary and secondary, women belonging to scheduled tribes and other categories, ideal number of children, and media exposure, rarely do not statistically significantly influence the use of modern contraceptives as compared to their respective reference categories.¹⁵

Several methodological constraints should be considered when interpreting these findings. First, focusing exclusively on Kerala, Bihar, and the North-Eastern states limits the generalizability of the results to regions in India with differing socio-cultural dynamics. Second, reliance on self-reported survey data creates potential exposure to recall and social desirability biases given the sensitive nature of reproductive health choices. Third, while major demographic and socio-economic variables were analyzed, unmeasured factors such as healthcare service availability, religious norms, and partner involvement could also act as confounding variables. Finally, recommending multi-channel media outreach must account for existing disparities in media access and digital literacy across low-income and rural populations.

CONCLUSION

The present study identified the significant influence of the use of modern contraceptive methods in Kerala, Bihar, and North-East Indian states, especially for evidence of some demographic and socio-economic variables. From this finding, we can conclude that the use of modern contraceptive methods increases the prevalence rate all over India, so family planning programs must/be satisfied at this time and also to achieve the Sustainable Development Goals. These modern methods should be used more than the other methods, or never use contraceptive methods; we try to increase knowledge and benefits for the health of mothers and children about the use of contraceptives. We should be more exposed to both social media and mainstream media like newspapers, TV, and radio, using any language such as Hindi, English, and the regional language of India, to raise the use of contraceptive methods for a better future for the family, especially partners. This awareness can also be a communication tool to reach out to all types of married women/partners, including educated and uneducated, poor families, and rural and urban areas.

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