



Women's empowerment and use of contraception in India: Macro and micro perspectives emerging from NFHS-4 (2015–16)

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ARTICLE INFO

Keywords:

Women's empowerment
Decision making
Family planning
Unmet need
Contraception

ABSTRACT

Background and objective: Based on the four-corner stone of population and development programmes recognized by ICPD (1994) this paper envisages the relationship between the recent waves of women's empowerment and use of contraceptive methods in India.

Data and methods: Findings are based on two rounds of NFHS (3 & 4). Liberson's Diversity Index has been used to assess the inequality in women's empowerment. Multiple regression analysis is used to portray the relationship and logistic regression is used to access the adjusted effects of various dimensions of women's empowerment on use of contraception.

Results: Varying degrees of equity in women's empowerment across different states of India builds a combative relationship with uptake of contraceptive methods. Results portray a positive association between inequality in household decision making, engaged in paid work in last 12 months and having 10 years of schooling with use of any modern method. Women who participated in household decision making (OR = 1.17 $p < 0.005$), using mobile phone (OR = 1.23 $p < 0.005$) and working and were paid in cash in last 12 months (OR = 1.37 $p < 0.005$) are significantly more likely to use any method of contraception.

Conclusions: Status of women in India has improved in different dimensions, yet the patriarchal norms influence the decision of using contraception. The current women-centric bottom-top approach in implementation of family planning programme should focus at the women's right to decision on their own life and health. Such efforts should hinge at strengthening inter personal counseling and capacity building sessions by outreach workers, which may empower women with enhanced knowledge about their health and bodily rights.

Introduction

Women's empowerment is a complex issue to be explained and hence there are variations in its conceptualization and definition. The United Nations Development Fund for Women (UNIFEM) has defined women's empowerment as "having access to and control over the means to make a living on a sustainable and long-term basis and receiving the material benefits of this access and control" [1]. This definition, however, is limited in its scope of covering other dimensions of women's empowerment. The World Bank defines empowerment as the "expansion of freedom of choice and action to shape one's life" [2]

Kabeer defines women's empowerment as a "process by which those who have been denied the ability to make strategic life choices acquire such ability" [3]. In South Asia, empowerment is referred to as "the process in which women challenge the existing norms and culture to effectively improve their well-being" [4] Though, a common underlying feature of these definitions is the recognition that household and interfamilial relations are central aspects of measuring women's empowerment, yet the measurement is difficult as it is multidimensional process, which operates at various levels.

India is a country with rich culture and tradition, where women are renowned as Goddess. But at the same time the daily news portrays a

Abbreviations: ICPD, International Conference on Population and Development; NFHS, National Family Health Survey; UNIFEM, United Nations Development Fund for Women; POA, Programme of Action; SDGs, Sustainable Development Goals; IUD, Intra Uterine Devices; RMNCH + A, Reproductive Maternal New Born Child and Adolescent Health; ASHA, Accredited Social Health Activist; PHC, Primary Health Center

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<https://doi.org/10.1016/j.srhc.2018.11.003>

Received 13 September 2017; Received in revised form 24 October 2018; Accepted 19 November 2018

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different picture, where women are being mistreated and abused. The incidence of disrespecting women's rights on humanitarian ground exists not only outside but also inside the house. There are cases where women do not have accessibility or mobility to outside world; the most depressive being when they are not allowed to make a choice for their own health issues, which affects their reproductive health miserably. Approximately 830 women die from preventable causes related to pregnancy and childbirth every day [5]. It was estimated that in 2015, more than three lakh women died during and following pregnancy and childbirth [5]; and almost 99 percent of those maternal deaths occurred in developing countries including India [6]. The risks of maternal death are 1.8 times higher in women without contraceptive use [7]. Almost all of these deaths occurred in low-resource settings as they are at greater risk due to contraceptive nonuse and for contraceptive failure, consequently leading to unintended conceptions. There are many interventions to prevent maternal deaths and contraceptive use is the most cost-effective way to reduce it. The adverse effect on women's health due to the inferior status of women in the household is not unknown. The existing social and cultural norms especially designated as the role of women penetrates the overall well-being of women in these societies. It not only affects one region but women all over the world face such problems where there exists a patriarchal norm [8,9]. When it comes to women in South Asia, they are more in a peculiar situation because they are nurtured in such a way that the husband and in-laws interest and choice supersedes the individual choice. The marked gender discrimination in South Asia has led to the second-class status of women in society [10]. It is suggested that in many instances gender-based controls in relationships are usually associated with poor sexual and reproductive-health outcomes [11]. Therefore, improvement in women's role is coupled with a reduction in their vulnerability towards health seeking behavior [12].

While discussing about empowerment of women and its linkages with the utilization of contraceptive methods, it can be seen that in India the empowerment of women has been highlighted under National Mission for Empowerment of Women launched recently in 2010. On the other hand, the health perspective of women in terms of Reproductive Rights has been highlighted since International Conference on Population and Development (ICPD) 1994. The Programme of Action (POA) of International Conference on Population and Development (1994) was remarkable in its recognition that use of contraceptives, reproductive health and rights as well as women's empowerment and gender equality are the corner stone of population and development programmes having bearing on women's right to life and health. The fourth goal of ICPD providing access to reproductive and sexual health including family planning to all the women is not yet reached even after two decades. Though there are various other remarkable achievements such as achieving replacement level fertility as 2.2 out of 29 states in India have already achieved the TFR below 2.1. The use of contraceptive methods has undoubtedly improved since 1994, but what lead to the utilization is not specified in any study. It may be due to numerous government initiatives going on for the uptake of family planning programmes in every nook and corner of the country. Further, family planning has been recognized not only as a means of birth control but also a means of economic development of nation. But only advertising does not lead to acceptance of the method, the right to choice of health on the grounds of equity on both genders is also very important, which is rarely mentioned in literatures. Further, one of sustainable development goals (SDGs) is that all women irrespective of their country should have access to lifesaving contraceptives by 2020, which is a critical milestone to ensuring universal access to sexual and reproductive health services and rights by 2030. It is against this backdrop, the major research question to be addressed in this paper is how the recent swing of women's empowerment has influenced the uptake of contraceptive method, as a means to improve health and wellbeing of women ensuring women's right to life and health, the concept which was focused ICPD 1994. Accordingly, we hypothesize

that women who have better autonomy and empowerment are more likely to use contraceptive methods, compared with other women. In order to address the research question and test the hypothesis, this paper aims to have a macro as well as micro level assessment of the association between women's empowerment and utilization of contraceptive methods and its major correlated using the most recent evidence base from the National Family Health Survey-4 completed in 2015–16.

Data and methods

The basic data used in this paper has been taken from two rounds of National Family Health Survey (NFHS), conducted in 2005–2006 and 2015–2016. Both these surveys have been conducted under the stewardship of Ministry of Health and Family Welfare: Government of India. The International Institute for Population Sciences, Mumbai has been designated as the nodal agency for different rounds of NFHS and ICF International, Maryland, USA, has been providing the technical support in different rounds of NFHS. The information on different dimensions of women's empowerment have been collected from approximately 6,49,775 women age 15–49, living across 29 States and 7 Union Territories of India. The framework we have used to assess empowerment of women consists of six dimensions of woman's empowerment.

Variable description

Women's empowerment in the study has been conceptualized on the basis of six dimensions namely: women owning house/land, women owning a bank account and mobile phone which they use on their own, women who participate in household decision making, women whose educational attainment is 10 years and above and women who worked in last twelve months and were paid in cash.

The use of contraceptive methods was encountered through four methods such as use of any method, use of the modern method, use of female sterilization and use of the modern spacing methods namely condom, pills and IUD and. Further, the impact of women's empowerment on the uptake of contraceptive methods has been analyzed through unmet need of contraception.

Methods

The inequality in women's empowerment is computed by using Lieberman's Diversity Index. This index defines the homogeneity and heterogeneity in certain characteristics across different sub-population. The index is defined as follows: If C_i ($i = 1, 2, 3, \dots, n$) denotes the proportion of individuals in the i^{th} sub-class such that $\sum C_i = 1$, then Lieberman's index of Diversity (D) is defined as

$$D = 1 - \sum_{i=1}^n C_i^2$$

Theoretically, the diversity index varies from 0 to 1. Zero in the case of perfect homogeneity when the inequality is almost nil and one in the case of perfect heterogeneity, a case where there is maximum inequality.

The other method that has been used in the study to analyze the relationship between diversity in woman's empowerment and use of contraceptives is multiple regression analysis, which shows the relation between predictor and response variables by using the formula:

$$Y = B_0 + B_1X_1 + \dots + B_pX_p$$

In the above equation, Y is the dependent variable and X_1 is the independent or the predictor variable. The equation portrays B_1 equals the mean increase in Y per unit increase in X_1 , while other X_i 's are kept fixed.

Further, logistic regression model have been used to analyze the

adjusted effect of various socio-economic and women's empowerment related characteristics of women on their current use of contraceptive methods by using the following formula:

$$\text{logit } p = \ln\left(\frac{p}{1-p}\right)$$

$$= b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_ix_i + e$$

where $b_1, b_2, b_3 \dots b_i$ represents the coefficient of each predictor variables included in the model and 'e' is the error term.

Results

Level, trend and intra state diversity in different dimensions of women empowerment

Empowerment of women has been widely acknowledged as a major factor that contributes to better demographic outcomes [15]. In order to assess the women's empowerment, few important dimensions like household decision making, ownership of a house or land, having own bank account, having a mobile, 10 or more years of schooling and working in last 12 months and were paid in cash, have been considered. Their participation in household decision making shows a status and role of women in important decisions in family matters. Around 84 percent women in India reported to participate in household decision-making (Table 1). Almost in nine states, the participation of women in household decision-making is around 90 percent and it is highest in Manipur (96%) followed by Goa (94%), Tripura (92%) and Meghalaya

(91%). Only in Bihar and Haryana, the proportion of women participating in household decision making is less than 80 percent.

Women own only one to two percent of land in the world [16,17]. This gender gap in property rights has received attention from development practitioners and activists too [18]. Women who own property or have control on assets are better positioned to improve their lives and cope when they experience crisis. At the national level, 38 percent women own house or land either alone or jointly. In states like Manipur (70%) and Odisha (64%), it is more than 60 percent whereas, there are six states with less than 30 percent women having ownership of house or land in which West Bengal and Rajasthan (24%) showed the lowest level of land ownership followed by Sikkim (25%). Having a bank account can open up economic opportunities for women and can be a gateway to the use of additional financial services. More than half of the women in India own a bank account in 2015–16. Only in Goa (83%), Tamil Nadu (77%) and Kerala (71%), more than 70 percent of women have bank account in their name. Whereas, states like Bihar (26%) shows the lowest percentage of women having bank account followed by Manipur (35%) and Madhya Pradesh (37%).

Currently, increased access to mobile has provided many benefits to marginalized women with information and services to improve their well-being [19]. Mobile technologies are being used to improve the quality of care and to monitor and evaluate maternal and child health activities in developing countries [20]. The table indicates that 46 percent of women in India own and use mobile phone. Further, in Kerala and Goa, 81 percent of women own mobile phone followed by Sikkim (80%) On the other hand, use of mobile phone among women

Table 1

Percent of women by different dimensions of autonomy and empowerment across different states of India (2015–16).

States	Owning House or Land	Owning a Bank Account	Owning Mobile	HH Decision making	Women who worked in the last 12 months who were paid in cash	Women with 10 or more years of schooling
<i>Northern States</i>						
Haryana	35.8	45.6	50.5	76.7	45.8	17.6
Himachal Pradesh	11.3	68.8	73.9	90.8	17.0	59.4
Jammu and Kashmir	33.3	60.3	54.2	84	12.4	37.2
Punjab	32.1	58.8	57.2	90.2	55.1	18.5
Rajasthan	24.1	58.2	41.4	81.7	25.1	18.6
Uttarakhand	29.2	58.5	55.4	89.8	15.5	44.6
Uttar Pradesh	34.2	54.6	37.1	81.7	32.9	16.6
<i>Western States</i>						
Goa	33.9	82.8	80.9	93.8	24	23.6
Gujarat	27.2	48.6	47.9	85.4	33	30.2
Maharashtra	34.3	45.3	45.6	89.3	42	28.9
<i>Central States</i>						
Chhattisgarh	26.4	51.3	31	90.5	26.5	36.8
Madhya Pradesh	43.5	37.3	28.7	82.8	23.2	29.9
<i>Eastern States</i>						
Bihar	58.8	26.4	40.9	75.2	22.8	12.5
Jharkhand	49.7	45.1	35.2	86.6	24.8	28.7
Odisha	63.5	56.2	39.2	81.8	26.7	22.5
West Bengal	23.8	43.5	41.9	89.9	26.5	22.8
<i>Southern States</i>						
Andhra Pradesh	44.7	66.3	36.2	79.9	34.3	42.1
Karnataka	51.8	59.4	47.1	80.4	45.5	29.1
Kerala	34.9	70.6	81.2	92.1	20.4	72.2
Tamil Nadu	36.2	77	62	84	50.9	30.5
Telangana	50.5	59.7	47.8	81.1	43.3	45.2
<i>North-Eastern States</i>						
Arunachal Pradesh	59.7	56.6	59.8	89.1	17.1	31
Assam	52.3	45.4	46	87.4	26.2	17
Manipur	69.9	34.8	63.1	96.2	45.9	40.9
Meghalaya	57.3	54.4	64.3	91.4	33.6	35.9
Mizoram	19.7	57.4	77.3	96	29.3	40.2
Nagaland	34.7	38.9	70.5	97.4	22.3	33.3
Sikkim	24.8	63.5	79.8	95.3	40.7	19.9
Tripura	57.3	59.2	43.9	91.7	23.4	26.3
India	38.4	53	45.9	84	24.6	35.7

Table 2
Lieberson's Diversity Index on different dimension of women empowerment across different states in India (2015–16).

States	Owning House or Land	Owning a Bank Account	Owning Mobile	Household decision making	Working in last 12 months who were paid in cash	Women who have 10 or more years of schooling
<i>Northern States</i>						
Haryana	0.936	0.948	0.95	0.95	0.944	0.947
Himachal Pradesh	0.903	0.915	0.916	0.915	0.909	0.912
Jammu and Kashmir	0.917	0.952	0.954	0.95	0.939	0.949
Punjab	0.921	0.949	0.949	0.949	0.947	0.948
Rajasthan	0.947	0.965	0.962	0.965	0.966	0.952
Uttarakhand	0.909	0.916	0.915	0.923	0.274	0.536
Uttar Pradesh	0.982	0.984	0.983	0.984	0.983	0.98
<i>Western States</i>						
Goa	0.499	0.499	0.497	0.495	0.483	0.497
Gujarat	0.930	0.961	0.960	0.960	0.959	0.954
Maharashtra	0.962	0.969	0.969	0.97	0.968	0.967
<i>Central States</i>						
Chhattisgarh	0.931	0.937	0.928	0.935	0.942	0.903
Madhya Pradesh	0.971	0.975	0.973	0.975	0.977	0.966
<i>Eastern States</i>						
Bihar	0.966	0.969	0.972	0.971	0.971	0.959
Jharkhand	0.949	0.949	0.948	0.948	0.952	0.925
Odisha	0.964	0.963	0.957	0.962	0.96	0.942
West Bengal	0.928	0.945	0.944	0.946	0.726	0.936
<i>Southern States</i>						
Andhra Pradesh	0.915	0.922	0.922	0.920	0.919	0.917
Karnataka	0.960	0.965	0.962	0.963	0.964	0.961
Kerala	0.914	0.927	0.927	0.925	0.921	0.925
Tamil Nadu	0.960	0.968	0.968	0.967	0.967	0.967
Telangana	0.885	0.897	0.892	0.892	0.896	0.886
<i>North-Eastern States</i>						
Arunachal Pradesh	0.921	0.932	0.928	0.934	0.933	0.900
Assam	0.954	0.962	0.962	0.96	0.954	0.953
Manipur	0.843	0.867	0.866	0.865	0.87	0.832
Meghalaya	0.825	0.84	0.835	0.842	0.843	0.843
Mizoram	0.836	0.86	0.862	0.863	0.861	0.854
Nagaland	0.869	0.861	0.883	0.884	0.901	0.801
Sikkim	0.590	0.660	0.670	0.672	0.673	0.669
Tripura	0.722	0.692	0.66	0.697	0.726	0.579

was the lowest in Madhya Pradesh (29%) followed by Chhattisgarh (31%).

Cash paid employment of women, is seen as the fundamental component of their economic empowerment. Having access to resources, a woman can improve her bargaining power within family and society, thereby allowing for greater control over decisions and life choices. If a woman has income of her own, she presumably has a greater ability to take care of herself and is, therefore, less dependent on her husband or others for survival [21]. Nearly one fourth of the women reported working in last 12 months and are paid in cash. In Punjab 55 percent of women worked in last 12 months and were paid in cash, which is highest in the country followed by Tamil Nadu (51%). We can see the inverse situation in few states, where less than 20 percent women are engaged in paid work such as Jammu and Kashmir (12%), Uttarakhand (16%), Himachal Pradesh (17%) and Arunachal Pradesh (17%).

Table 2 portrays that Uttar Pradesh which consists maximum number of districts in the country shows the highest diversity in all six domains of women's empowerment, Household decision making (0.984), Owning a House and land (0.982), Bank Account (0.984), Mobile (0.983), working in the past 12 months who were paid in cash (0.983), and 10 or more years of education (0.980). Bihar, Madhya Pradesh, Maharashtra and Tamil Nadu also show a greater diversity (more than 0.960) in the entire selected dimension as compared to other states of the country. Few other state such as Rajasthan and Odisha has higher diversity (more than 0.960) in Household decision making, bank account, Mobile, and cash paid worker in last 12 months; whereas Bihar and Gujarat in decision making owning house or land

and Mobile. These all are bigger states with large number of districts. On contrary, smaller states show less inter-district diversity such as Goa (< 0.500) in all aspects followed by Tripura and Sikkim. Apart from these three, the other northeastern states, Meghalaya, Mizoram, Manipur, and Nagaland also present homogeneity in all the domain of empowerment, which is less than 0.900. In southern region, only in Telangana, the value of diversity index is less than 0.900 in each of the six dimensions of empowerment. This may be primarily due to gradual diffusion of social change, values and norms, which originates from the state capitals and moving to peripheral regions with a time lag.

Changes in use of any modern method of contraception and unmet need of contraception during one decade

Contraceptive use helps in reducing unintended pregnancies and abortions and facilitates family planning/spacing of births, which provides both health and social benefits to mothers and their children. Figs. 1a and 1b present the variation in use of any modern method of contraceptives and unmet need of contraception across different states of India during 2005–06 and 2015–16. Analysis of changes in contraceptive prevalence over the last one decade portrays that the use of any modern method of contraception has remains almost unchanged in India. Infact, use of any modern method is highest in Andhra Pradesh (69%), followed by Punjab (66%) and Maharashtra (63%). Level of education among women is one of the highest in Andhra Pradesh, which might have initiated the use of modern method among them. Almost half of the women are working and are paid in cash in Punjab, which might have allowed them to decide upon the method of

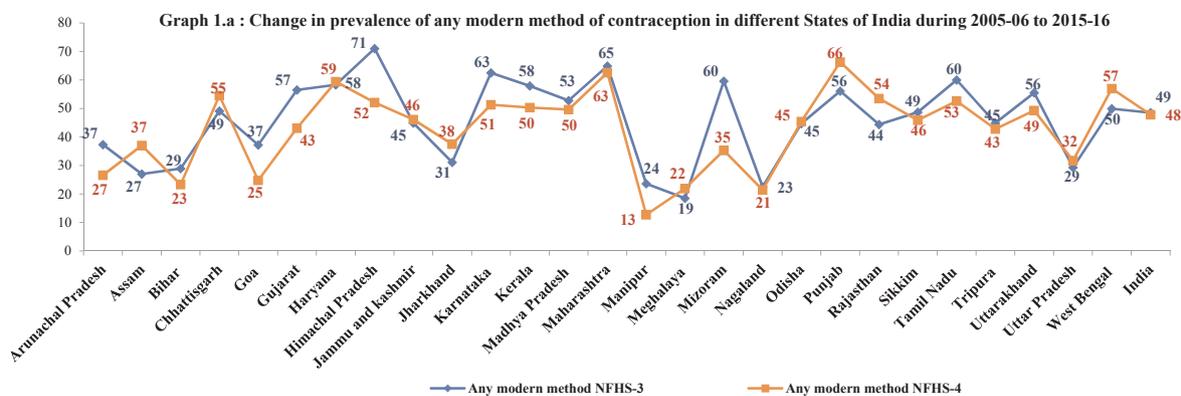


Fig. 1a. Change in prevalence of any modern method of contraception in different States of India during 2005–06 to 2015–16.

contraception. A reverse pattern can be seen in the three northeastern states, Manipur (13%), Nagaland (21%) and Meghalaya (22%), where the use of any modern method of contraception is the lowest in comparison to other states. It is visible from table that use of modern methods has declined in 16 states and maximum change can be seen in Mizoram (24 percent points) and Himachal Pradesh (19 percent points). The diversity in empowerment is also very less along with the fact that they are enriched with culture and tradition where natural methods are preferred more. In contrast, the use of modern methods has increased in 11 states and the maximum increase has taken place in Punjab and Assam with 10 percent points followed by Rajasthan (9 percent points).

Unmet need of contraception is defined as percentage of all fecund women who are married or living in union and thus presumed to be sexually active but are not using any method of contraception, either do not want to have more children or want to postpone their next birth for atleast two more years or do not know when or if they want another child [22]. The overall unmet need in India reveals that out of 29 states, 21 states portray a declining trend in the unmet need of contraception (Fig. 1b). States like Gujarat, Himachal Pradesh, and Manipur have experienced a substantial increase in unmet need of contraception in NFHS-4 as compared to NFHS-3. On the other hand, states like Jammu and Kashmir, Jharkhand, Rajasthan and Uttar Pradesh have seen a decline in the prevalence of unmet need during the last one decade.

Multiple regression analysis on use of any modern method of contraception and unmet need of contraception

Multivariate regression analysis has been done for two outcome variables i.e. use of any modern method of contraception and unmet need of contraception, which are core for a macro level analysis of

association between the inequality in women’s empowerment and uptake of contraceptive methods in 29 states of India (Table 3). The results portray a positive association between inequality in household decision making, working status (worked and paid in cash last 12 months) and proportion of women having at least 10 years of schooling and use of any modern method. This may be primarily due to neighborhood effect influencing increasing aspirations of women to have an improved quality of life. However, negative association has been seen with inequality in owning house/land, bank account and mobile phone. An increasing inequality in the access to mobile phone has significantly negative association with the use of modern contraception. In other words, homogeneity in access to mobile may have a positive association with the increasing use of modern contraception in India. In case of the unmet need of contraception, inequality in HH decision making, owing house/land, having a bank account and having atleast 10 years of schooling portray a negative association. Diversity in proportion of women having atleast 10 years of schooling is significantly associated with increasing use of any modern method of contraception and negatively associated with the unmet need of contraception. A similar directional association is also evident with inequality in participation in household decision making. Furthermore, in the regression model, adjusted R² is 0.409 for any modern method, which shows that inequalities in six dimensions of women’s empowerment included in the regression model have potential to explain 41 percent variation in use of any modern method of contraception. However, for the inequality in the same set of indicators of women’s empowerment have the potential to explain only 18 percent variation in the, unmet need of contraception (adjusted R² = 0.184).

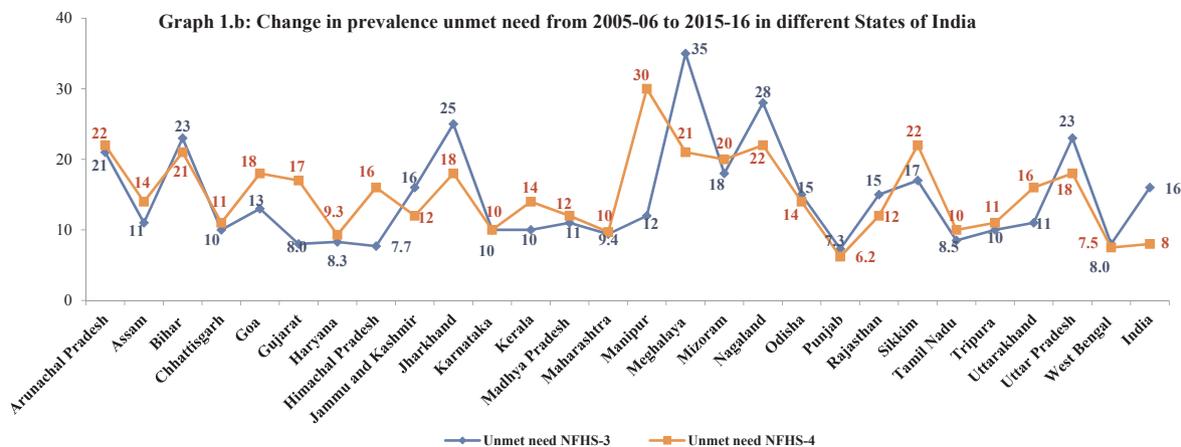


Fig. 1b. Change in prevalence unmet need from 2005–06 to 2015–16 in different States of India.

Table 3
Multiple regression analysis on use of any modern method of contraception and unmet need of contraception, India (2015–16).

Diversity in different dimensions of women's empowerment	Use of any modern method of contraception Coefficients	Unmet need of contraception Coefficients
HH decision making	5.95	– 1.48
Owning House/Land	– 0.63	– 0.74
Having Bank Account	– 0.02	– 0.96
Having Mobile	– 7.52***	3.50
Worked and paid in cash last 12 months	1.61	0.40
Having at least 10 years of schooling	2.52***	– 0.85**
Adjusted R Square	0.409	0.185

Socio-economic and cultural correlates providing micro perspectives in current use of contraceptives

A strong patriarchal society with deep-rooted socio-culture values continues to affect gender equity and women's empowerment consequently affecting the dependency of women decisions regarding their own health including the number of children to be given birth [23]. Most of the studies in family planning also highlight strong religious norms, sexual self-control and modesty, family pressures, and a set of myths and misconceptions limiting the use of modern methods of contraception [24]. On contrary due to the advancement in information communication and technology, women in some of the communities have started using contraceptives without informing their husbands and mother-in-law. That is why this section highlights the current scenario of socio-economic and cultural factors including women's status on their decision in using contraception.

Table 4 portrays that 48 percent of currently married women age 15–49 in India reported to use any modern method of contraception, whereas among them 36 percent reported to use female sterilization and only 11 percent reported that they use modern spacing method. More than half of middle and older age group women use any modern method but not even 15 percent of the same age women reported using modern spacing method. Substantially larger proportion of younger women age 25–29 reported using modern spacing method of contraception, while women using female sterilization have larger concentration in 40–49 years. The existing method mix in current use of contraception by their educational attainment portrays that, higher educated women reported to use modern spacing method whereas women with no education and primary education reported to use female sterilization. While considering place of residence, table reveals that higher proportion of women in urban areas use modern spacing method, while, significantly larger proportion of women in rural areas reported to use female sterilization. This might be attributed to the fact that non-educated or less educated women living in rural areas have limited avenues to explore about various modern contraceptives. They are well informed about the methods which government hospitals provide and hence opt for the same. More than half of the women from other religious groups used any modern method, followed by almost half of the women from Hindu religion and a little less than two-fifths of women from Muslim religion reported to use any modern method. Some of the religious beliefs are considered greatest barriers for using family planning methods. It is supported by our finding that the prevalence of using sterilization is the lowest among Muslims. Women who belong to richest wealth quintile are maximum in proportion to report using modern spacing method and women who belong to poorest wealth quintile are least to report using any method, any modern method, female sterilization as well as modern spacing method. More than half of the women who participating in HH decision, having house/land, bank account, mobile phone and working are using any method. Sixty one percent of women are using any modern method who worked and were paid in cash in last 12 months however about 52 percent of women using any modern method who have access to participate in HH decision and have bank account. Further 51 percent of

Table 4

Percentage of currently married women age 15–49 using different methods of contraception by some selected background characteristics including different dimensions of women's empowerment, India (2015–16).

Background characteristics	Any method	Any modern method	Female sterilization	Modern spacing
<i>Age groups</i>				
15–19	14.9	10.0	0.9	8.8
20–24	28.9	23.6	9.1	13.9
25–29	48.0	41.2	25.7	15.5
30–34	62.2	55.7	40.6	14.4
35–39	67.2	60.4	49.3	10.5
40–44	66.0	60.3	53.0	6.7
45–49	60.5	56.8	53.6	2.8
<i>Education</i>				
No education	54.1	49.0	42.8	5.8
Primary	58.3	52.8	42.6	9.6
Secondary	53.1	46.9	32.6	13.7
Higher	47.1	40.5	19.0	20.8
<i>Residence</i>				
Urban	57.2	51.3	35.7	14.9
Rural	51.7	46.0	36.1	9.3
<i>Caste</i>				
SC	54.9	49.2	38.5	10.0
ST	49.4	45.1	36.6	7.6
OBC	51.6	46.5	37.3	8.7
Others	57.8	50.6	33.2	16.7
<i>Religion</i>				
Hindu	54.5	48.9	38.3	10.0
Muslims	45.3	37.9	20.9	16.6
Others	60.2	55.2	39.1	15.5
<i>Wealth Index</i>				
Poorest	42.1	36.4	29.1	6.8
Poorer	51.9	45.8	35.4	9.8
Middle	55.8	50.3	40.2	9.5
Richer	57.2	51.9	39.7	11.5
Richest	59.2	53.1	34.7	17.7
<i>House hold decision making</i>				
No	48.3	42.9	31.9	10.3
Yes	57.1	50.8	38.5	11.7
<i>Owning of house and land</i>				
No	56.3	49.4	36.3	12.6
Yes	52.5	47.7	37.4	9.7
<i>Owning of Bank account</i>				
No	50.7	44.8	33.8	10.4
Yes	58.4	52.2	39.3	12.2
<i>Mobile use</i>				
No	56.5	50.5	41.0	8.9
Yes	52.9	46.8	32.3	13.9
<i>Working in last 12 month and paid in cash</i>				
No	51.6	45.2	32.7	12.0
Yes	65.8	60.8	50.9	9.2
Total	53.5	47.8	36.0	11.2

Table 5

Logistic regression odds ratios portraying adjusted effects of various predictors including different dimensions of women's empowerment on current use of contraception, India (2015–16).

Background characteristics	Any method		Any modern method		Female sterilization		Modern spacing	
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
<i>Age groups</i>								
15–24								
25–34	3.02***	2.95***	3.15***	3.00***	5.72***	5.51***	1.13***	1.10***
35–49	3.67***	3.47***	3.95***	3.65***	10.61***	10.00***	0.49***	0.48***
<i>Education</i>								
No education								
Primary	1.13***	1.18***	1.10***	1.16***	1.03***	1.07***	1.36***	1.38***
Secondary	0.93***	0.98***	0.86***	0.89***	0.68***	0.73***	1.75***	1.67***
Higher	0.61***	0.63***	0.54***	0.56***	0.26***	0.27***	2.35***	2.29***
<i>Residence</i>								
Urban								
Rural	1.05***	1.10***	1.06***	1.11***	1.12***	1.14***	0.88***	0.92***
<i>Caste</i>								
SC								
ST	0.69***	0.72***	0.74***	0.76***	0.72***	0.70***	0.93***	0.99
OBC	0.88***	0.89***	0.90***	0.91***	0.98*	1.04*	0.82***	0.76***
Others	0.99	1.02	0.94***	0.97	0.81***	0.85***	1.24***	1.19***
<i>Religion</i>								
Hindu								
Muslims	0.58***	0.63***	0.53***	0.59***	0.33***	0.35***	1.59***	1.73***
Others	0.64***	0.66***	0.67***	0.69***	0.14***	0.52***	1.49***	1.39***
<i>Wealth Index</i>								
Poorest								
Poorer	1.40***	1.37***	1.41***	1.39***	1.31***	1.30***	1.38***	1.36***
Middle	1.65***	1.62***	1.72***	1.73***	1.62***	1.62***	1.42***	1.39***
Richer	1.79***	1.81***	1.91***	1.97***	1.76***	1.87***	1.53***	1.44***
Richest	2.23***	2.08***	2.37***	2.28***	1.73***	1.74***	2.28***	2.09***
<i>Household decision making</i>								
No								
Yes		1.17***		1.14***		1.10***		1.10***
<i>Owning of the House or land</i>								
No								
Yes		0.78***		0.83***		0.86***		0.91***
<i>Bank Account</i>								
No								
Yes		0.76***		1.19***		1.14***		1.11***
<i>Mobile phone use</i>								
No								
Yes		1.23***		0.79***		0.72***		1.09***
<i>Working in last 12 months and paid in cash</i>								
No								
Yes		1.37***		1.41***		1.59***		0.83***
-2 Log Likelihood	-291286.0	-49832.4	-291395.9	-50269.0	-253779.1	-43597.1	-157164.7	-27907.8

women, who worked and were paid in cash in last 12 months used female sterilization. Modern spacing is utilized minimum (9%) by working women and women who were paid in cash in last 12 months however; maximum use of modern spacing was among women who have access to mobile phone. About 12 percent utilization of modern spacing has been found among those women who have participated in HH decision and are possessing bank account.

Table 5 shows the results of logistic regression analysis of current use of contraceptive methods in India. Model 1a shows that use of any method increases with increasing women's age, rural areas as place of residence and increasing household economic status, when empowerment indicators have not been adjusted in the model. This relationship holds true even after controlling all empowerment indicators in the model 1b. Further, women who participated in HH decision (OR = 1.17p < 0.005), using mobile phone (OR = 1.23p < 0.005) and working and were paid in cash in last 12 months (OR = 1.37p < 0.005) are significantly more likely to use any method of

contraception.

Like wise to any method, odds of use of any modern method (model 2a) and female sterilization (model 3a) is higher among the women in age-group 35–49 (OR = 3.95, p < 0.05; OR = 10.61, p < 0.005 respectively). Further in model 2a and model 3a, where empowerment variable has not been considered, study found that the women with higher education are 46 percent less likely to use any modern method (OR = 0.54, p < 0.005) and 74 percent less likely to use female sterilization (OR = 0.26, p < 0.005) respectively. Same association between any modern method and female sterilization with exposures variable exists after controlling the empowerment indicators which have been shown in model 2b and 2c. Respondents participation in HH decision increases 14 percent chance of use of any modern method (OR = 1.14, p < 0.005) and 10 percent chance of female sterilization (OR = 1.10, p < 0.005) in model 2b and 3b respectively.

In model 4a, unlike to earlier methods of contraceptives, use of modern spacing method decreases with increasing women's age. Model

4a further reveals that women belongs to rural residence are 22 percent less likely to use modern spacing method (OR = 0.88, $p < 0.005$). From the same model, it has been clear that use of modern spacing method increases with increasing educational attainment and economic status of women without controlling empowerment variables. However, model 4b confirms the same relationship between women's age, education, place of residence and economic status with modern spacing method after controlling empowerment indicators. Model 4b also shows that participation in HH decision (OR = 1.10, $p < 0.005$), possession of bank account (OR = 1.11, $p < 0.005$) and mobile phone (OR = 1.09, $p < 0.005$) increases the use of modern spacing method however ownership of land/HH (OR = 0.91, $p < 0.005$) and working status of women (who worked and were paid in cash in last 12 months) (OR = 0.83, $p < 0.005$) decreases the use of modern spacing method.

Discussion

Our study envisages six dimensions of women's empowerment and identifies associations between these dimensions and uptake of contraceptive use. Although the women's empowerment has improved from what has been in the past but the level of empowerment is not uniform in all the states of India. The associations between the different dimensions of empowerment and current use of any contraceptive method varies across states, yet some findings were consistent across states. Considering the variations at macro level, the southern states like Andhra Pradesh and Telangana, where the women's empowerment is high in terms of decision making and ownership of the asset together with high use of any modern method of contraception; but, the utilization of modern spacing method is very low in these states which can be attributed to the fact that the family planning scenario in this region is dominated by the use of female sterilization and in most of the state's birth spacing is preferred by traditional method over modern spacing methods [25]. Northern states like Punjab has high diversity in women's empowerment also show profound use of contraceptive methods; despite the less number of years of schooling, women have high decision making power at the household level as well as a substantial proportion of them reported to work in the past 12 months and are paid in cash. Women who have fewer children have more opportunities to become wage earners, boosting family income levels [26]. Moreover, use of contraceptive methods (modern spacing method) in last one decade has increased. The effect of Government Programmes such as RMNCH + A has been found working tremendously as per the state report of Punjab [27]. While in Himachal Pradesh, the 20 percent decline in the use of contraceptive methods might be a case of the preferred method not being available, as some Front Line Services –accredited social health activists (ASHA), medical stores, and primary health centers (PHC) –may not have more than one or two government-promoted brands, particularly in rural areas.

States in Eastern India such as Bihar and Odisha behave in a heterogeneous manner in their level of women's empowerment. Though women have high decision making power and their ownership of assets is also high but the use of contraceptive method has been declining from last one decade. Higher decision-making power may be attributed to the cultural norm whereby a newly-married woman is expected to perform household duties under the supervision of her husband, or even mother-in-law, who is the primary decision-maker [28]. The right to the decision may not be in concern of their health. Education of women has been very low in these states and use of modern spacing method is almost negligible. This shows the reason behind high TFR in these states among all other states in the country.

Western zone states like Maharashtra, Rajasthan, and Gujarat also varies in the level of women's empowerment but the household decision making is high in all the states. Use of any modern contraceptives is high in Rajasthan and Maharashtra whereas use of female sterilization is high in Gujarat. The non-declining reason for female sterilization in some states refers to male ego in the patriarchal belt which takes

dominance over logic and practicality by considering vasectomy as a threat to their masculinity and they prefer woman undergo surgery.

Considering all North-Eastern states, except for the state of Assam, the diversity in the level of women's empowerment is less as compared to other regions of India. Sikkim shows the least heterogeneity among all, along with the highest decision-making power, owning of bank account and mobile phone. But the same level of affinity in the utilization of contraceptive methods is not found. Other northeastern states like Meghalaya and Manipur has very low utilization of contraceptive methods. Further, the TFR is also found high among these states due to the tribal belt which are most of the time unaware of the medical facts due to poor infrastructural resources where information can't reach. The misconception that using contraceptives might hamper their health restricts them from utilization of these methods. Educational lacuna can also be one of the factors in these areas because in all the states not even half of the women have 10 or more years of schooling. Some states like Assam, Sikkim, and Tripura has shown an improvement in utilization of modern spacing method which can be attributed to the fact that the decline in other methods might be because of their shift from old permanent methods to specialized temporary methods.

At the micro level, it is highlighted that though use of modern method is high among women above 40 years of age, the common method used is female sterilization. A report by Open Society Foundation explains that female sterilization may not always be by choice but by force too, and this is practiced almost in every rural part of India [23]. Supporting the statement is that women with no education or primary education are higher to use female sterilization. The reason behind the high use of modern spacing method among women between 20 and 34 years of age group may be because of higher education as well as development of information technology which communicates through mass media to women in India. Study reveals that more proportion of Hindu women are found to use female sterilization than Muslim women. This might be attributed to the fact that in strong Islamic society religious and cultural norms surrounds the contraceptive use and it has a significant influence on service use regardless of an individual's place of residence. Richest women are more likely to use contraceptives specifically modern spacing method as compared to poorest or poor women which may be because rich people are more exposed to various avenues where the method is found. Further, either government or private sector, women who are rich can afford the methods to be used either it be copper (T), condoms or female sterilization. The participation in household decision making and owning of bank account contributes in the decision making of their own health as they are more likely to use contraceptive methods. The ICPD, 1994 also suggests that women who are more empowered have at least a say on their health care, but women who do not have decision making power are more vulnerable [24].

Conclusion and recommendations

This study has highlighted key issues of women's empowerment, its diversified nature and utilization of contraceptive methods in India. First, the level of diversity in women's empowerment is not uniform across the states of India. Smaller states are high in achieving equity in terms of various dimensions of women's empowerment because of its homogeneous nature as against larger states of India. The study elucidates that the uptake of contraceptive methods has remained unchanged despite of increase in the level of empowerment of women. But on the fact that the unmet need of contraception is reducing and people are moving towards modern contraception instead of permanent methods, which in turn accelerates the improvement in women's health. Second, the highlights of the study does not go hand in hand with ICPD ethics that family planning is not only a means of birth control and population stabilization but also a part of women's right to life and health choices. These findings affirms the experiences from other developing countries suggesting a positive link between women's

education, economic development, and household decision making with better use of contraceptive methods. In most of states, a huge gap has been found between women with 10 or more years of schooling and utilization of contraceptive method. Further, participation in household decision making and financial empowerment has made a profound impact on the uptake of contraceptive methods, except for some states. It shows that the government programmes have succeeded in making women aware about their rights as well as upgrading education addressing the gender discrimination, ameliorating women's power on their reproductive rights. The study shows that not every state has been able to empower women on these grounds due to diversified custom and socio-economic structure. Hence, the diversity of empowerment should be reduced and equity should be attained to achieve the sole empowerment. Thereafter, all the government programmes directed to reposition the family planning services should be geared up and centered around various dimensions of women's empowerment specially focusing on their economic existence in society and decision-making power.

Ethics approval and consent to participate

The data used has been collected from two rounds of NFHS (3 and 4) in India and a proper consent form was asked to sign by the respondents before data collection. Before data collection the survey was approved by the relevant Institutional Review Board of IIPS.

Consent of the publication

During the interview the respondents were clearly informed that this data will be solely use for research purpose. It may either be for study or publications. Further, the first author himself was the main coordinator to collect the data, and the consent is taken from him as well as all the authors for publication.

Availability of data and materials

The data which we have used in this paper is taken from the National Family Health Survey and has been collected by Dr. S.K. Singh and his team, International Institute for Population Sciences being the nodal agency. The data for NFHS-3 is publicly available but the data for NFHS-4 is yet to come. In this paper only fact sheet has been used for analysis from NFHS-4, which is already available in public domain. It can be accessed from <http://rchiips.org/NFHS/index.shtml>.

Competing interest

All the authors have declared that they have no competing interest in this paper.

Funding

For the project NFHS, Ministry of Health and Family Welfare and ICF is the funding sources. But for this paper, there is no funding available from any source.

Acknowledgement

We acknowledge all the funding sources for this project. Further we acknowledge all the team members working for NFHS-3 as well as NFHS-4 in all states of India.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://>

doi.org/10.1016/j.srhc.2018.11.003.

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