



The paradox of declining fertility and declining contraceptive use in India: An artefact of survey design?

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1. Introduction

National Family Health Survey round 4 of 2015–2016 (IIPS & ICF, 2017) bring important data for planning and policy evaluation but they also present some puzzles. Total fertility rate declined substantially between 2005–06 when NFHS-3 (IIPS & Macro International, 2007) was conducted and 2015–16 from 2.68 (95% Confidence Interval (CI): 2.62–2.74) to 2.18 (95% CI 2.16–2.20) and is currently just above the replacement level of fertility of 2.1 children per women. However, over the same period, current contraceptive use declined from 56.3% (95% CI: 55.7%–57.0%) to 53.5% (95% CI: 53.3%–53.8%).

Worldwide, family planning is considered the main reason for the dramatic drop in fertility during the second half of the past century (Cleland et al., 2006; Robey, Shea, & Morris, 1993; UN, 2020), along with other important determinants of reproduction such as marriage patterns, sexual customs, frequency of sexual activity, length of post-partum amenorrhea, and abortion (Bbaale & Paul, 2011). The negative relationship between the level of fertility and contraceptive use in a population is well established. In this context, the declining trends in both total fertility rate (TFR) and contraceptive prevalence rate (CPR), as observed from NFHS-4, is quite puzzling. What is even more puzzling is the heterogeneity in the relationship between the two across states. We discuss state level trends in changes in fertility and contraceptive use and the pattern of contraceptive use by women's education in more detail in Section 3.

Two explanations seem plausible: (1) Changing methods mix in

contraception resulting in greater noise in reported use, particularly in interviews conducted in semi-public setting; (2) Deterioration in data quality between NFHS-3 and NFHS-4 because of the survey design changes between the two rounds, including massive expansion in sample size between NFHS-3 (~110,000 households) and NFHS-4 (~600,000 households) reducing the ability to supervise and monitor quality.

In this paper, we test the two above-mentioned hypotheses in explaining the inconsistencies in the relationship between contraceptive use and fertility in NFHS-4 data. Our first hypothesis rests on a reluctance to reveal covert contraceptive use in semi-public interviews and the second is related to interviewer error possibly due to inadequate supervision.

2. Data and methods

The 2015–16 National Family Health Survey (NFHS-4) is a nationally representative survey with a sample of 6,01,509 households being interviewed. In all the sampled households, all women aged 15–49 were eligible to be interviewed in the survey. In about 15 percent of the sampled households, all men aged 15–54 were eligible for the interview. Eligible women and men include those who were usual members of the selected households or who spent the night before the survey in the selected households (IIPS & ICF, 2017).

NFHS-4 was designed to provide most of the key indicators for the country as a whole, for urban and rural areas separately, for each of the 29 states, for each of the seven union territories (UTs), for each of the

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640 districts in the country at the time of the 2011 Census, and for urban and rural areas separately within districts where 30 to 70 percent of households live in urban or rural areas. Moreover, NFHS-4 was designed to provide information on sexual behaviour; HIV/AIDS knowledge, attitudes, and behaviour; and domestic violence only at the state level, while the HIV prevalence estimates for adult women and men are designed to be provided at the national level and for 11 groups of states/UTs. Details on NFHS-4 sampling design can be found elsewhere (IIPS & ICF, 2017).

Four survey questionnaires (Household Questionnaire, Woman's Questionnaire, Man's Questionnaire, and Biomarker Questionnaire) were canvassed in 17 local languages using Computer Assisted Personal Interviewing (CAPI) mode of data collection. About 14% of the sampled households was randomly selected to administer questions about gender and domestic violence against women. In accordance with the World Health Organization's guidelines (WHO, 2001), only one eligible woman per household was randomly selected for the module, and the module was not implemented if privacy could not be obtained. Out of total, 83,397 women selected for the domestic violence questions, for 4% women the module could not be successfully interviewed because of privacy concerns.

NFHS-4 fieldwork was conducted by 14 Field Agencies (FAs), and 7 laboratories conducted the HIV testing. Data collection was conducted in two phases (from 20 January 2015 to 4 December 2016) by 789 field teams. Each team consisted of one field supervisor, three female interviewers, one male interviewer, two health investigators, and a driver. The number of interviewing teams in each state varied according to the sample size. Female and male interviewers were assigned to interview respondents of the same sex.

For this paper, we primarily considered the NFHS-4 women data file which includes 6,99,686 women in the age group of 15–49. Only currently married women were included in the analysis, leading to a sample of 4,99,627 women in the age group of 15–49. For comparison purpose, we have also used NFHS-3 women data file having 1,24,385 eligible women. The analytical sample from NFHS-3 includes 87,925 currently married women in the age group of 15–49.

2.1. Dependent and independent variable of interest

Our key outcome of interest is contraceptive use. This is a binary variable which takes on value 1 if the currently married woman is currently using any contraceptive method; 0 otherwise. Contraceptive method includes all modern and traditional method of contraception.

The primary independent variable is whether the contraceptive use information was collected in a private interview setting. This variable is not readily available, so we used a proxy variable based on a similar variable relevant in the context of administration of domestic violence (DV) module. It is a categorical variable having three categories: (1) DV module was administered with privacy, (2) Privacy status of interview is unknown as the women were not selected for DV module interview and (3) DV module could not be administered because of lack of privacy. We can assume that in cases when DV module was administered with complete privacy, the contraceptive use interviews were carried out in greater privacy and with greater opportunity to develop rapport between interviewers and women respondents. To study the association between contraceptive use and private interview setting, we control for other covariates which are known to be associated with contraceptive use. These includes women's age (7 categories of interval 5 years), belongs to Scheduled Tribe or not, religion (dummy variables for Muslim and Sikh), highest level of education (4 categories-no education, primary, secondary, higher secondary or above), total number of children (0, 1, 2, 3, 4 or more), having at least one son or not, household wealth quintile, place of residence (urban or rural), state of residence (36 states/UTs). In any usual analysis, one would consider 36 state dummies to account for state fixed effects. Since one of our hypotheses is linked to data quality and data quality is related to the agency effort and

competence in collecting data, we wanted to incorporate the agency effect where multiple agencies collected data from one state. This happened only for two states. Two agencies collected data in Madhya Pradesh (MP East, MP West) and three agencies were involved in Uttar Pradesh (UP East, UP Central, and UP West). For the remaining states, the whole state was covered by one agency. In order to avoid agency confounding effect, we considered a total of 39 state dummies which include 34 state dummies along with dummies for MP East, MP West, UP East, UP Central, and UP West.

Another independent variable of interest is data quality as measured by interviewer effect while collecting information on contraceptive use. We have defined unique interviewer ID by combining state id and interviewer id which led to a total of 2734 unique interviewers for NFHS-4.

3. Contours of the anomaly and possible explanations

3.1. Disjunction between changes in fertility and contraceptive use

As we noted in the introduction (Section 1), TFR fell from 2.68 to 2.18 between NFHS-3 (2005-6) and NFHS-4 (2015-16), while contraceptive use, instead of increasing, declined from 56.3% to 53.5% over the same period. While this anomaly is striking at the national level, disaggregated changes at the state show even more striking disjunction. In Fig. 1, we have arranged the states in decreasing order of change in contraceptive use prevalence between NFHS-4 and NFHS-3. It presents estimates from 29 states which are covered in both rounds of NFHS. While TFR has uniformly declined in every state (blue points are below the blue-dotted zero line) with the exception of Andhra Pradesh,¹ the percentage of women (currently married or in union) in the age group of 15–49 currently using any method of contraception has increased in NFHS-4 only for 10 states (Punjab to Meghalaya as shown in Fig. 1) and declined for the remaining 19 states (West Bengal to Manipur) as the points fall below the red-dotted zero line.

While some of the state level changes make intuitive sense, e.g., Rajasthan documenting substantial decline of 0.81 in TFR along with increase in proportion of women using contraception by 12.5 percentage points (one of the largest in the country), other state-level changes are quite puzzling. Gujarat, for example, documented a decline of 0.39 in its TFR, but it also shows a sharp decline in prevalence of contraceptive use (19.7 percentage points) while neighbouring Maharashtra documents TFR decline of 0.22 with only a slight decrease in proportion of women using contraception (2.2 percentage points). Along with Gujarat, states like Kerala, Himachal Pradesh, Goa, Mizoram and Manipur also show more than 15 percentage points decline in contraception use in NFHS-4 relative to NFHS-3 estimates, whereas for all these states TFR has also declined during the same period. Thus, at a state level fertility decline and decrease in contraceptive use show little correlation. Based on NFHS-3 state-level estimates, the correlation between TFR and contraceptive use prevalence was negative 0.82 which is only moderate during NFHS-4 (negative 0.59).

This puzzle is even more striking when we look at the pattern of contraceptive use by women's education. As Fig. 2 indicates, between NFHS-4 and NFHS-3, TFR declined significantly for the no schooling category whereas contraceptive use has increased only marginally (slightly above the red-dotted zero line) for this category of women. For the remaining five education categories, reduction in TFR is not as drastic as for the no schooling category women, perhaps because the TFR was on the lower end to begin with. For women belonging to these five education categories, prevalence of contraceptive use has declined

¹ Andhra Pradesh is a newly defined geographical region during NFHS-4 compared to the undivided state Andhra Pradesh in 2005–06 which included Telangana at that time. So the estimates of AP are not comparable across the two rounds.

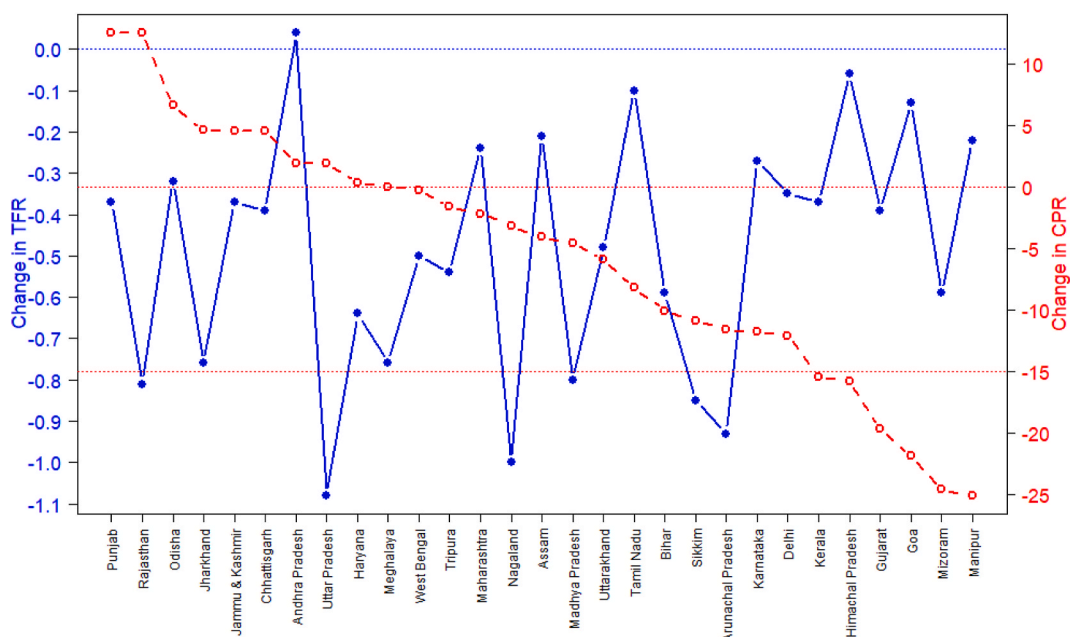


Fig. 1. Change in TFR (in blue, left axis) and change in prevalence of contraceptive use (in red, right axis) between NFHS-4 (2015–16) and NFHS-3 (2005–06) across 29 states in India which are common in both rounds. States are arranged in decreasing order of change in contraceptive use. Change is defined as NFHS-4 estimates minus NFHS-3 estimates. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

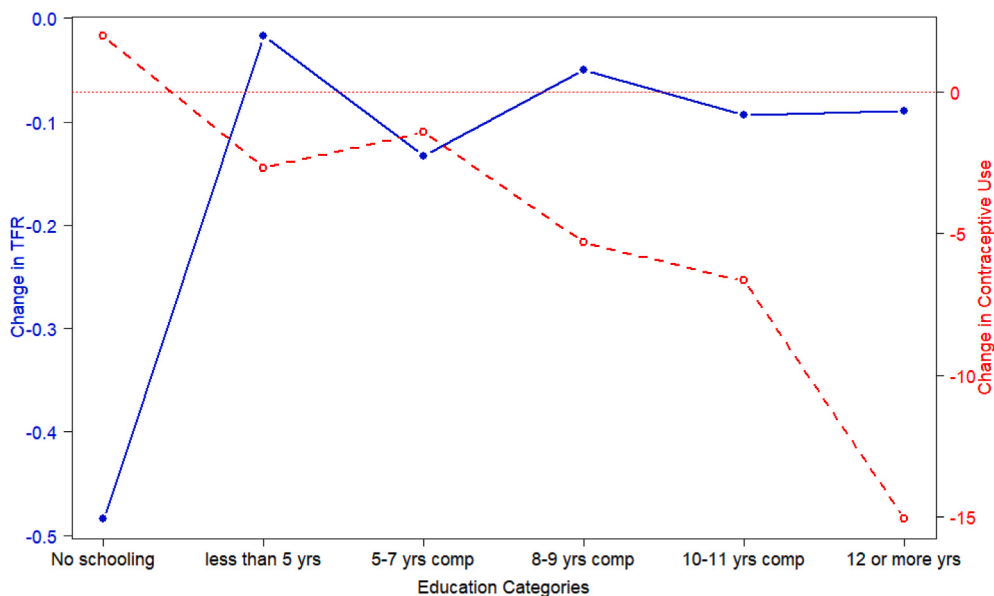


Fig. 2. Change in TFR (in blue, left axis) and change in prevalence of contraceptive use (in red, right axis) between NFHS-4 (2015–16) and NFHS-3 (2005–06) across women's education categories in India. Change is defined as NFHS-4 estimates minus NFHS-3 estimates. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

steadily. Interestingly, much of the decline in contraceptive use seems to have occurred among women with 12 or more years of education.

Below we offer two potential explanations for this paradox.

3.2. Has Women's willingness to disclose contraceptive use changed?

It is possible that social conditions surrounding contraceptive use have changed which may affect women's willingness to disclose contraceptive use. Research in other contexts have documented that willingness to report contraceptive use is subject to tremendous social desirability bias (Horiuchi et al., 2021; Stuart & Grimes, 2009). Perhaps the most striking example of unwillingness to reveal contraception

comes from research in Zambia (Biddlecom & Fapohunda, 1998) and in Kenya (Rutenberg & Watkins, 1997). While these studies documented covert contraceptive use without their partners' consent, a similar possibility exists in India when it comes to parents-in-law and other family members.

In recent years, use of reversible contraception in India has risen. Emergency Contraception Pill (ECP) was made available over the counter in 2005 and consumer research documented a striking increase in its sale from 5 to 15 million pills between 2008 and 2010 (Appleton, 2022; Dixit et al., 2015). One systematic review of ECP use in India shows the pooled proportion of women who ever used ECPs was 6% (95% confidence interval, 0.03–0.10). The proportion of repeat use

ranged from 12% to 69% (Mehta, Shrinivas, & Parchure, 2020). However, large household surveys show relatively low use of ECP, e.g., NFHS-4 only records less than 1% women as having ever used ECP (IIPS & ICF, 2017). This suggests that perhaps women are less willing to reveal use of temporary method of contraception in semi-public setting of an interview.

Decisions about sterilization are made by the family as a whole and may be easy to disclose in an interview setting where other household members or neighbors may be present. Use of emergency contraception, pills or condoms, on the other hand, may be hidden from the rest of the family and may not be disclosed without considerable privacy (Char et al., 2010; Hall, Kirkconnell, Stephenson, & Juvekar, 2008).

However, there are some anomalies in data that are not consistent with this explanation. According to NFHS-4 estimates, use of female sterilization has declined by 1.3 percentage points relative to NFHS-3 estimates but use of pills and condoms has increased. Moreover, as Fig. 3 shows, the decline in contraceptive use seems to be located among women at higher parities, those with 3 and 4 or more children, with at least one son. We would expect these groups to be more likely to use sterilization rather than abortion and their reported contraceptive use is likely to be less affected by changing method mix than that of women at lower parities.

3.3. Can poor data quality explain this?

Alternatively, it is also possible that the survey data quality deteriorated between NFHS-3 and NFHS-4, resulting in greater measurement error in collection of contraceptive use information. The nature of the National Family Health Survey in India changed drastically between rounds 3 and 4. The following major changes are particularly relevant:

1. The mode of data collection has changed from paper and pencil interviewing to computer assisted personal interviewing (CAPI). This may have changed the type of interviewers deemed suitable for the role. A focus on computerized data entry during the interview process may have skewed interviewer recruitment towards more educated and younger candidates who may feel shy about posing questions regarding sexual behaviour and contraceptive use.
2. In order to obtain district level estimates for most of the survey indicators, the sample size was expanded from about 125,000 women

in the age group of 15–49 to over 700,000 women. Moreover, the number of parameters on which information was being collected, particularly biomarkers, also expanded substantially. However, the number of data collection agencies capable of undertaking these complex surveys remains limited. As a result, tremendous supervision responsibility was placed on data collection agencies and supervisors from International Institute of Population Science (IIPS). This may have led to inadequate level of supervision and scrutiny than previous rounds of NFHS.

3. While personal supervision was augmented via 42 field check tables for completeness of reporting, age heaping and age displacement, sex ratios for children, patterns of height/length and contraceptive prevalence rates. The field check tables were based on contemporaneous tabulation of data being uploaded by the supervisors and any discrepancies were flagged and addressed. However, for variables for which no standardized data exist (e.g., contraceptive prevalence rates), field check tables may not be as useful in maintaining quality control as for variables in which discrepancies are easier to determine.

While it is not easy to distinguish between the relative importance of two potential explanations, first resting on a reluctance to reveal covert contraceptive use in semi-public interviews and the second, interviewer error and possibly inadequate supervision, we test for each of these explanations using NFHS-4 data.

4. Statistical analyses

We have examined differences in current use of contraception among currently married women by a number of covariates (as discussed in Section 2.1) to explore how contraceptive use differs between different groups. To investigate the impact of interview privacy on reported contraceptive use, we fit a multivariate logistic regression model with contraceptive use status as the dependent variable and interview privacy, as defined in Section 2.1, as the key exposure variable. To estimate the impact of the key exposure variable, we have adjusted for state and place of residence, and basic socioeconomic and individual characteristics including the age of the respondent, number of living children, whether she has any son, her education level, caste, religion, and household wealth quintile.

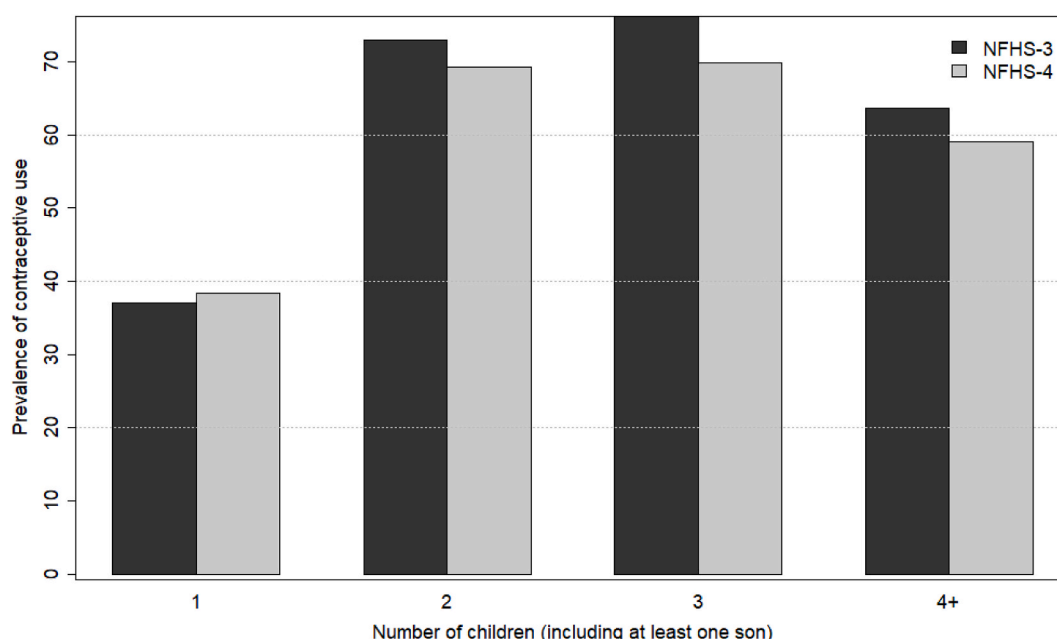


Fig. 3. Percentage of married women with at least one son using contraceptive methods during NFHS-3 (2005–06) and NFHS-4 (2015–16) across parity.

We have used multilevel techniques to partition the variation in contraceptive use between the interviewer levels and individual levels, after accounting for the primary sampling unit (PSU) level random effect. We fit a cross-classified multilevel logistic regression models with a random intercept attributable to PSU (P) and interviewer performance (I). The random intercept is assumed to be independently and identically distributed with variance σ_p^2 and σ_i^2 , respectively. In the multilevel model, we include all other covariates from the logistic regression model as the fixed part of the regression. The variance parameter σ_i^2 quantifies heterogeneity in contraceptive use information due to interviewer performances, after taking into account PSU-level clustering effect, geographical location effect, socioeconomic and individual characteristics of women. We express the between-interviewer variance, σ_i^2 , as a percentage of its contribution to the total variance. We have assumed an underlying standard logistic distribution for the binary dependent variable at the individual level, that allowed us to fix the total variance at $\sigma_p^2 + \sigma_i^2 + \frac{\pi^2}{3}$ (Snijders & Bosker, 1999). We conduct the descriptive analyses in R v.3.1.111 and used MLwiN (version 2.32) for fitting the multilevel models.

5. Results

5.1. Interview privacy and contraceptive use reporting

In Table 1, we present descriptive estimates of our outcome variable contraceptive prevalence rate (CPR) by key exposure variable, viz., interview privacy status. The weighted estimates show significant difference in CPR across privacy status in NFHS-4 (45% among women without privacy vs 56.4% among women with privacy), but not so much pronounced in NFHS-3 (52.7% vs 57.5%). The estimates from both the rounds suggest that reporting of temporary method of contraception are higher when women are interviewed in privacy. Temporary methods include all temporary modern methods as well as traditional methods, i. e., anything other than female and male sterilization.

Table 2 presents odds ratios and 95% confidence intervals (CI) from logistic regression with contraceptive use as the dependent variable. In the regression model, we have used state fixed effects in order to account for the supply side determinants of contraceptive use. In order to avoid agency confounding effect, we considered a total of 39 state dummies as discussed in Section 2.1. The odds ratios and the lower and upper confidence intervals show that as one might expect, contraceptive use increases with age, wealth, number of children and presence of a son. It is higher in urban areas than in rural areas. Tribal women and women from Muslim community are less likely to use contraceptive. In general, educated women are more likely to use contraception than uneducated women but this relationship is not consistently monotonic.

Most interesting result in this table is that women who were administered the domestic violence module in a private interview setting are 1.54 times (95% CI: 1.41–1.68) as likely to use contraception as those who were not administered the domestic violence module because of lack of privacy. Since selection of women for domestic violence questions was random, both segments should have similar levels of contraceptive use. The fact that domestic violence questions were administered under conditions of greater privacy, also seems to be associated with higher contraceptive use suggests that lack of privacy

Table 1

Contraceptive prevalence rate (CPR) across type of methods and privacy status: comparison between NFHS-3 (2005–06) and NFHS-4 (2015–16).

Privacy status	Sample size n (%)		Overall CPR		Using Permanent Method		Using Temporary Method	
	NFHS-3	NFHS-4	NFHS-3	NFHS-4	NFHS-3	NFHS-4	NFHS-3	NFHS-4
No privacy	415 (0.5%)	2821 (0.6%)	52.7	45.0	41.4	30.7	11.4	14.3
Not selected	21,900 (24.9%)	434,090 (86.9%)	52.9	53.2	36.6	36.1	16.3	17.1
Privacy	65,610 (74.6%)	62,716 (12.5%)	57.5	56.4	38.9	37.8	18.6	18.6
Total	87,925	499,627	56.3	53.5	38.3	36.3	18.0	17.3

Table 2

Results from a logistic regression model based on 499,627 currently married women at the time of the interview: NFHS-4 (2015–16).

Individual and household level characteristics	Odds ratio	95% LCI	95% UCI
(Intercept)	0.03	0.02	0.03
State by agency fixed effect (results not presented in the Table)			
Area of residence (Ref: Rural)			
Urban	1.04	1.02	1.06
Age category (ref: 15–19 years)			
20-24	0.91	0.86	0.96
25-29	1.25	1.18	1.32
30-34	1.76	1.67	1.86
35-39	1.99	1.88	2.1
40-44	1.7	1.61	1.8
45-49	1.25	1.18	1.32
Tribal	0.78	0.76	0.8
Muslim	0.55	0.54	0.56
Sikh	1.12	1.05	1.2
Highest educational category (Ref: No education)			
Primary	1.09	1.06	1.11
Secondary	1.08	1.06	1.1
Higher Secondary or more	1.09	1.06	1.12
Household wealth quintile (Ref: Poorest)			
Poorer	1.31	1.28	1.34
Middle	1.52	1.49	1.55
Richer	1.59	1.55	1.63
Richest	1.7	1.65	1.75
Number of living children (Ref: no children)			
One	4	3.84	4.16
Two	10.49	10.08	10.93
Three	13.24	12.69	13.82
Four or more	11.23	10.75	11.74
Having at least one son	1.86	1.82	1.89
Interview privacy status (Ref: No privacy)			
Not selected for DV module (privacy status unknown)	1.33	1.22	1.45
Privacy	1.54	1.41	1.68

may be responsible for low reported contraceptive use.

5.2. Interviewer effects on contraceptive use reporting

Our second hypothesis relates to the expansion of sample size in NFHS-4 and its impact on interviewer supervision and data quality. We hypothesized that nearly 6 fold expansion of sample size between NFHS-3 and NHFS-4 made it difficult for the survey managers to control data quality, resulting in poor performance on the part of some interviewers.

Table 3 reports results from the multilevel model in which variation in reported contraceptive use between interviewers is estimated for both NFHS-3 and NFHS-4. We argue that if interviewer performance is similar across two surveys, variance component attributable to the interviewer should be similar. The results based on NFHS-4 data show that random coefficients for interviewers explain 14.6% of the variance in use of contraception above and beyond the differences explained by individual characteristics, while the interviewer effect only explained 1% of the variance in NFHS-3. Hypothetically, if all interviewers were equally good at eliciting information, we should see no interviewer effect and most of the explained variance should be associated with individual characteristics or unobserved differences between districts. However, results presented in Table 3 show that this is not the case. A substantial

Table 3

Interviewer variability in contraceptive use: Results from a multilevel logistic regression model using NFHS-3 (2005–06) and NFHS-4 (2015–16) data.

Random effect at the level of	NFHS-4			NFHS-3		
	N	Estimate of the variance component	Contribution to the total variances	N	Estimate of the variance component	Contribution to the total variances
PSU	28,518	0.81	16.8%	3850	0.320	8.9%
Interviewer	2731	0.70	14.6%	878	0.037	1%

proportion of residual variance is explained by interviewers. This suggests that some interviewers are better able to obtain information about contraceptive use than others and lack of supervision in such large scale data collection activities might be responsible behind the significant interviewer variability.

6. Discussion

In this paper we have examined the apparent paradox of declining fertility, measured by TFR, and declining contraceptive use as estimated by round 4 of the National Family Health Survey (NFHS-4). The pattern and trend in TFR seem to be consistent with other estimates, for example, Sample Registration System (SRS) 2016 estimates produced by the Office of the Registrar General & Census Commissioner, India. Hence, our focus here is to understand the pattern and trend in the prevalence of contraceptive use. We have documented several ways in which the observed decline in contraceptive use between NFHS-3 and NFHS-4 seems unbelievable. This observation is bolstered by the fact that Rajasthan the state in which the largest decline in contraceptive use has taken place, shows much higher contraceptive use statistics in surveys undertaken by performance monitoring for action (PMA, 2020). Contraceptive use level in Rajasthan was 40% in NFHS-4 (January–July 2016) while it is recorded to be 55.5% in September 2016 as per PMA 2020 (PMA, 2020). Moreover, as we are about to submit this paper, the latest round of NFHS (NFHS-5, 2019–21) fact sheets show significant improvement in contraceptive use (66.7%) compared to NFHS-4. More than 13 percentage points increase in CPR within a gap of four-five years indicates that the unexpectedly lower estimates in NFHS-4 could be due to measurement error in contraceptive use data.

Results presented in Section 5 show that both lack of privacy and poor quality of fieldwork may be responsible for low reports of contraceptive use. The fact that domestic violence questions were administered under conditions of greater privacy, also seems to be associated with higher contraceptive use (Table 2) suggests that lack of privacy may be at least partially responsible for low reported contraceptive use. However, this finding should be treated cautiously mainly for three reasons. First, our findings in Table 1 although suggest that overall contraceptive use reporting increases with privacy, but similar pattern and trend hold true for both temporary and permanent methods of contraception. Hence, the evidences do not entirely favor the hypothesis of reluctance to reveal covert contraceptive use in semi-public interviews. Secondly, we did not see a similar increase in reporting of other sensitive behaviors based on interview privacy, e.g., reported use of abortion in NFHS-4 data. Thirdly, given the large sample size of NFHS-4, there is a chance of detecting non-significant effect and the reported regression results might be subject to type I error of hypothesis testing.

On the other hand, the striking increase in variance attributable to interviewers, from 1% in NFHS-3 to 14.6% in NFHS-4 suggests that interviewer quality and their supervision played a far greater role in determining reported contraceptive use in NFHS-4 while this factor was only minimally important in NFHS-3 which had a much smaller sample size.

Since data on contraceptive use is vitally important to population policy, what can we learn from these observations? We would like to suggest that massive expansion of sample from about 1 lakh respondents to 6 lakh respondents imposes severe demands on survey supervision

and ability to ensure privacy and may lead to poor measurement of outcomes that are not easy to validate. These challenges must be addressed if future large surveys are to be successful.

Moreover, we need to find innovative ways of data collection in order to ensure proper reporting of sensitive issues like contraception use in semi-public interview settings, often encountered in household surveys in India. Self-reports in the presence of an interviewer and other members of the family are often affected by underreporting due to cultural barriers against talking about sensitive issues openly. A growing body of empirical data collected in the US shows that use of audio computer-assisted self-interviewing (ACASI) method that increases the privacy of the interview setting can dramatically increase reports of sensitive and illegal behaviours (Turner et al., 1998). In a developing country setting, one study found that the majority of Zimbabwean women (86%) preferred ACASI to interviewer mode in the context of a family planning survey. The reasons mentioned were related to increased confidentiality and privacy (Van de Wijgert et al., 2000). However, the ability to use ACASI and user preferences would depend on the level of education and technology literacy.

Ethical statement

No ethics approval was required as the paper involves only secondary data analysis.

CRedit authors statement

Sonalde Desai: Conceptualization; Methodology; Writing- Reviewing and Editing.

Santanu Pramanik: Methodology; Formal analysis; Writing - Original Draft.

Bijay Chouhan: Data Curation; Visualization; Software, Validation.

Declaration of competing interest

None.

Data availability

Data is available in public domain. Code is available on request.

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