

Utilisation of maternal and child Health care services: An initiation to Contraceptive use

Introduction

Contraception and Maternal and Child Care Services (MCH) are the two most essential components to avoid infant and maternal mortality with which the country is continuously grappling. The government has made many efforts to improve MMR and IMR, and the IMR has dropped to 41 per 1000 live births(IIPS & ICF, 2017) from 57 per 1000 live births, but still, India is far from what it should achieve, according to National Health Policy, 2017. India was the first country in 1952 to ever launch its first family planning programme and population policy, the primary concern of the plan was health rationale on family planning (Chaurasia, 2014). In 1971, the interest shifted to population control, and mass sterilization took place in the country (Williams, 2014). Still, after that period, hardly any effort has been forced by the government to promote the spacing method of contraceptives to control the population.

According to the National Family health surveys (NFHS) in India, the modern contraceptive method has increased substantially, but from last one decade it remained unchanged to 50%(IIPS & ICF, 2017; IIPS & Macro International, 2007), and use of the permanent method of sterilization has just decreased to 1% in NFHS-4, from 37% to 36%. There has been a two percent decline in the contraceptive prevalence rate among currently married women 15-49 years from NFHS-3 to NFHS-4, but the use of pills and condoms has increased over the decade(Pradhan & Dwivedi, 2019). So it is essential to study the pattern of contraceptive use among currently married women after the delivery, i.e., postpartum contraceptive use. The postpartum is defined as the 12 months after the birth (Blazer & Prata, 2016).

Postpartum Contraceptive is of relative importance as it reduces maternal and infant mortality because of appropriate birth spacing (Barber, 2007). Proper birth spacing reduces the risk factors associated with maternal and infant mortality like anemia, third trimester bleeding, etc.(Dixit, Dwivedi, & Gupta, 2017). Also, if the birth span between the two subsequent births is longer, women may allocate more time for their health and their child for breastfeeding and proper nutrition. The influence of Maternal and child health (MCH) services on subsequent contraceptive use hold vital importance for the policymakers (Seiber, Hotchkiss, Rous, & Berruti, 2005). According to a study in India, 84% of women at least once visited the MCH center to receive at least one of the services (Dixit et al., 2017). This opportunity can educate and motivate women to initiate contraception use just after the delivery, as providing all the information in the same place first proves to be cost-effective (Foreman, 2011). Another pro is that, during MCH services, women come in contact with the service providers, which instils trust in the healthcare system. Studies in the developing world and developed world have proved that the use of MCH services could be a 'gateway' to subsequent contraceptive use (Ahmed & Mosley, 2002; Dixit et al., 2017; Seiber et al., 2005), but the only handful of studies have analyzed its impact on the timing of contraception initiation. A study from India found that an increase in the utilization of MCH services will possibly increase the use of family planning which eventually improves safe motherhood and child survival (Sinha, 1997). Another study along similar lines found that integrating postpartum services with MCH services like antenatal and postnatal visits proved to be an opportunity for initiating contraceptive use (Mumah, Machiyama, Mutua, Kabiru, & Cleland, 2015).

The study's main aim is to critically examine whether different indicators of MCH care play a significant factor in initiating contraceptive use after birth. As timely intervention could reduce the

unmet need for family planning and thereby avert an unwanted pregnancy. In this study, we hypothesized that exposure to MCH services would increase the likelihood of early initiation of contraceptive use among currently married women aged 15-49. The study intends to understand if MCH services impact the subsequent contraceptive use within 12 months after the last child is born, using the reproductive calendar. The study period is restricted to 12 post-pregnancy periods because a mother and child hold a higher risk of mortality during the latter period (Hounton, Winfrey, Barros, & Askew, 2015).

Description of Variables

Outcome Variable: The outcome of interest for the analysis is the initiation of the first use of any modern method following the delivery of the last child within 12 months after the delivery. The modern method includes sterilization, injectable, intrauterine devices, contraceptive pills, implants, condoms, diaphragm, foam/jelly, the standard day's method, the lactational amenorrhoea method, and emergency contraception.

Predictor Variables: The background variables selected for the study are place of residence, geographic regions, caste, religion, Wealth index, age of women, educational status of women, Information of family planning through mass media, and print Media, number of children dead, sex composition of living children, status of wanted another child, Husband Desire for more children. The categorization of all the independent variables can be found in Table 1.

To observe the association of utilization of MCH care with the contraception initiation we have constructed an MCH index using the factor score of the following MCH care variables

1. Number of Antenatal care (ANC) visits (At least 2).
2. Postnatal care (PNC) of mother (within 41 days after the delivery).
3. Number of Tetanus injections received during pregnancy (at least 2).

4. DPT-3 immunization received.
5. Institutional delivery by trained professionals.
6. 100+ Iron Folic Tablets.

Data Source and Methodology

The data used for the analysis is the fourth round of the NFHS-4 (2015-2016). NFHS is a nationally representative cross-sectional survey which includes representatives' samples of the household throughout India. The survey provides state, national and district level estimates of demographic and health parameters as well as data on various socio-economic and program dimensions, which are critical for implementing the desired changes in demographic and health parameters. Stratified, multistage cluster sampling method is mostly used in all DHS surveys to obtain a representative sample of households. Probability proportional to size (PPS) was used to select the households from all states and Union Territories. Two-Stage PPS has been used to select households in urban areas and rural areas. The survey for the first time in 2015-2016 provided district-level estimates on the various key indicators associated with the demographic and health parameter for the country.

The study used the contraceptive calendar for exploring the time to initiate the first modern contraceptive use after the delivery of the last child. The question of contraceptive behaviour and fertility are asked to every woman, or her husband, at the time of the survey in the contraceptive calendar on a month-by-month basis. NFHS also collects Maternal and Child Care related issues, like complete antenatal care, postnatal care, delivery care-institutional and who performed it, immunization of child, etc. The outcome variable will be the timing of initiating contraceptive use just following the birth of a child versus non-use of contraceptives with the possibility of censoring. Censoring is a condition where the value of the unit of analysis is only partially known. In our

research, we are not interested in studying the cases which are left-censored, occurred before the start of the calendar, so such cases were dropped from the analysis.

We have used a discrete-time approach as the period in the recent survey is recorded in the nearest completed months. A tie situation can sometimes be found in the calendar, where two women can start using the contraceptives simultaneously, which could result in bias if the partial likelihood estimation is used (Steele, Diamond, & Amin, 1996). The use of hazard rate would be inappropriate in this case as it is bounded by 0 and 1, so it is essential to convert into an appropriate scale that is bound free and is a function of independent variables.

A complementary log-log link function has been used after adopting the discrete-time approach. The complementary log-log model is preferred over the logit model because of the proportional hazard assumption. The advantage of the complementary model is that when the data is symmetrical in [0,1] interval, the logit and probit model are not appropriate.

Sample size inclusion criteria

In the first stage, there were 4,99,627 currently married women in the individual file, and then who had delivered live birth during five years before the survey were filtered out—retaining only the recent birth given by the women. After filtering, we obtained a sample size of 1,38,068 currently married women in 15-49.

Results

Trends in the contraceptive use of women after recent birth

Figure 1 depicts the use of contraception after the delivery of the recent child; it can be seen that within 12 months, 56% of currently married women are not using any contraception method, 35% are using any modern approach, but still, 9% are depending on the traditional way of contraception. Figure 2 shows the percentage of women by the type of contraception being used after delivering

the last child. It can be seen that sterilization is the most dominant method, followed by condoms and pills. The percentage of those adopting rhythm and withdrawal methods is also not low, i.e. 10% and 11% respectively.

Contraception initiation among currently married women w.r.t different socioeconomic variables and MCH care

Table 2 shows the percentage distribution of currently married women aged 15-49 by their contraceptive use after the birth of the last child by different socioeconomic demographic variables and MCH indicators. The analysis includes 1,38,068 women, out of which only 38% of women initiate modern contraceptive methods within 12 months after their recent child. 46% belong to the Northern region, 49% of the Southern region, 34% of the Eastern region. The lowest adoption of modern contraceptives was in eastern India, where only 29% of women initiated contraceptives within 12 months after the delivery. Around 35% of rural residents, 36% of Muslim women and 37% of Schedule Caste/Tribe women are initiating contraceptive use within 12 months after the birth of the last child.

Regarding the age of the women, most contraceptives are in the age group between 25-29, while in the women aged 40 and above, it is only 19%. Wealth and education play an essential role in early contraception use; only 26% of women from the lowest wealth quintile against 47% of the wealthiest quintile adopt the contraceptive early. For educational status, only 29% of illiterate women, as compared to 43% of those who completed higher education, use family planning methods.

The composition of the living child also significantly impacts contraceptive use. While 43% of women having male and female children used contraceptives, the uptake is relatively lower among women who have no male child. The study hypothesized that using MCH indicators could be

pivotal in increasing the uptake of contraceptive use. The percentage distribution of MCH indicators could potentially explain the association. Among the women using various contraception method, 45% of women received 4+ ANC visits, 42% women received PNC within 41 days after the delivery, 41% women took IFA tablets for at least 100 days, 42% women received DPT3 immunization for their child and 39% women received at least 2 TT injections.

Within the first three months, the use of limiting methods is more prevalent among all the methods. Implying that women rely more on limiting methods just after the birth of the last child to stop childbearing. Another noteworthy observation is the decline in the uptake of limiting methods among the respondents with time. The use of traditional methods is also prevalent among 1/3rd-1/4th of the respondents across periods and is a matter of concern, as it leads to unwanted childbearing. Within three months postpartum, 55% of women are going for the limiting method, while 14% use traditional methods and only 32% used the spacing method. The prevalence of spacing methods increases with the increase in the time interval after the last birth; the prevalence of traditional methods also increases. This shows that the use of traditional methods is still high among women; this can lead to unintended pregnancies.

Multivariate complementary log-log regression analysis

Among all the regions in India, the early adopters of contraceptive methods are highest in Southern India. Women residing in urban areas have higher odds of early initiation of modern contraception uptake than their rural counterparts after an index birth (AOR=1.08; S.E- 0.02). Those respondents of the Hindu religion had lesser odds of early adoption the modern contraception than those of Muslim or other religion when controlled for socioeconomic characteristics (AOR=1.03; S.E- 0.021). Also, non-SC/ST caste are 3% less likely to adopt early contraception than SC/ST. Middle-aged women (25-34 years) are more likely to use modern contraceptives than older and younger

age groups (AOR=1.03; S.E-0.02). Wealth quintile of the household to which a woman belongs also has a significant association. The odds of adoption increase with the wealth quintile, with the highest uptake in the richest quintile. Though the respondent's education was not found to be significantly associated, the odds of adopting modern contraception vary with the child composition. The odds were relatively lower among women who had only one male child (AOR=0.89; S.E-0.02). Those women who suffered one or more child loss have lower odds of adopting modern contraception than those who never suffered a child loss (AOR=0.93; S.E-0.96). The failure to access or adopt the contraception timely has resulted in the loss prompting them to learn and adopt the methods actively. The respondents who didn't want their last child had lower odds of adopting modern contraception than those who wanted the last child. The odds of adopting modern contraception were significantly associated with the print media or the mass media. An index comprising six key indicators was adopted to measure the MCH care component. And MCH indicator was found to be significantly associated with the early initiation of contraception, where 13% women are more likely to adopt early contraception after delivery when availed MCH services (Table 3). A plausible explanation for this association could be that women utilizing health services are more likely to contact health workers and, in turn, more likely to gain knowledge on different family planning methods. This could encourage and equip in adopting various contraceptive methods.

Discussion

There has been no significant improvement in the unmet need for family planning in the last decades (IIPS & ICF, 2017; IIPS & Macro International, 2007). Also, a reduction in contraceptive use has been observed, which is a matter of concern since the country is still grappling with the consequences of overpopulation and maternal deaths (Singh, Singh, Singh, & Pandey, 2020). The

risk of maternal deaths could be 1.8 times higher than those who don't use contraceptives (Ahmed et al., 2019). Several studies on trends, patterns, awareness differentials of contraceptive use in India (Chaurasia, 2014; Singh et al., 2020). Also, some studies tried to explore the determinants of utilization and non-utilization of contraceptives (Dixit, Ram, & Dwivedi, 2012; Sedgh, Singh, & Hussain, 2014; Thulaseedharan, 2018). Since there has been considerable improvement in uptake of MCH as reported by the recent NFHS-4 (2015-16) survey. This study explores if the recent increase in MCH services uptake, as evident from NFHS-4 (2014-16), also leads to the increased uptake of early adoption of contraceptives as found in the study Dixit, Dwivedi and Gupta (2017). Therefore, In this study, we hypothesized that exposure to MCH services would increase the likelihood of early initiation of contraceptive use among currently married women aged 15-49 as this question holds vital importance for the policymaker.

Only a quarter of women in the postpartum period have adopted spacing methods, which increases to a little more than half in the next 6-9 months. A considerable proportion(24.5%) of women still use traditional methods, which exposes them to the odds of unwanted pregnancies due to a higher probability of method failure. After adjusting for several socioeconomic and demographic factors in our model, we identified several determinants for the adoption of contraceptives. Out of which, region and place of residence of women, religion, the caste of women, wealth index of the households where women live, women's age, wanted the status of the last child as the most important explanatory factors for contraceptive adoption after having birth were found to be significant. The odds of early adoption of contraceptive were higher in southern India than in Central India. This can be attributed to the demand satisfied with modern contraception, with Andhra Pradesh, topping among all the states (New, Cahill, Stover, Gupta, & Alkema, 2017). On the contrary, other states found that the southern states adopted modern contraceptives relatively

later than other regions as most of the women adopt the non-reversible methods in those states (Dixit et al., 2017). The urban respondents adopt modern contraceptives earlier than their rural counterparts, which is similar to the findings from another study (Dixit et al., 2017). One of the reasons could be that the community health workers tend to focus their counselling on limiting methods. As they find it easier to counsel the young couple about limiting methods than spacing methods. While the women find this counselling futile, she has little or decision-making power to adopt the limiting methods of contraception (Sebastian, Khan, Kumari, & Idnani, 2012). There is a lag in the early adoption of contraceptives among women from other religions than Hindu ones. Simultaneously, according to the caste, non-SC/ST respondents don't adopt contraceptives early. Different religions have different views on fertilization. Among the major religions in the world, Islam and Christianity are prenatal in view. This could be why the lag in early adoption of contraception among non-Hindu women (Iyer, 2002). One of the studies exploring the relationship between religion and contraception use found that under the religious influences from the clerics, the Muslim women were less likely to use contraception than their Hindu counterparts (Chacko, 2001). The odds of early adoption of contraception was higher in women of 25-34 years of age group than older women. As sexual activity and coital frequency are more among young couples to achieve the desired number of children. While the older women are more likely to reach their desired parity, the frequency of coitus decreases, leading to lesser odds of early adoption of contraception (Nath & Leonetti, 1998). Women's education was not found to significantly impact the early adoption of contraceptives, contrary to what was observed in other studies (Dixit et al., 2017). The women belonging to poor households have lesser odds of adopting the contraceptive method than those from the rich households. These findings corroborate those of other studies (Dias & de Oliveira, 2015; Dixit et al., 2017). It is possibly because the inequality in wealth

impacts the socioeconomic status of the individuals, including their access to health care and education (Currie, 2009; Wang, 2012). Modern family planning services at times may involve some financial obligations on the part of the users, especially when such services are not available for free or the location of the services isn't easily accessible to the users (Adebowale, Adedini, Ibisomi, & Palamuleni, 2014). As, a study by Bongaarts et al.(2012) and Tuoane et al. (2003) show that free access to family planning services predisposed people to use of modern contraceptive (Bongaarts, Cleland, Townsend, Bertrand, & Gupta, 2012; Tuoane, Diamond, & Madise, 2003). Child loss also emerged as a significant factor in the early adoption of contraception. Women who had at least one or more than one loss of a child had lower odds of adopting contraception than women who had no child loss. Similar results were evident in a study in Bangladesh and Iran (Islam, 2013). Possibly, the women may desire to replace the dead child and hence the delay in adoption. Our study also finds that the sex composition of the children a woman has significantly influenced early adoption of contraception. Women with more sons are more likely to not wanting more children than those with the only daughter. Our findings are consistent with earlier studies from India that show an association between the sex composition of previous children and reproductive outcomes such as parity progression and contraceptive use. Therefore the number of sons in the offspring influences adopting contraception (Arnold, Choe, & Roy, 1998; Dixit et al., 2017; Jayaraman, Mishra, & Arnold, 2009; Kumar, Singh, Kumar, & Singh, 2021; Rajan, Nanda, Calhoun, & Speizer, 2018). Whether a woman desired the last born child or not or was planning later was asked to the woman who had multiple childbirth in the last five years. So, those who never wanted the last born child had higher odds of early adoption of the contraception, as they would have learned from their experiences and wanted to avoid any unintended pregnancy in the future. These findings align with the findings from other studies (Dixit et al., 2017).

Exposure to both print and electronic media increases the odds of early initiation of contraception. Our results corroborate with study findings from Pakistan, Bangladesh, Indonesia. Those women who were exposed to either of the media had higher odds of discussing family planning with husbands than those who didn't, found one of the studies Women's odds of discussing family planning with their husbands were increased among those exposed to television or radio programming or family planning messages on either medium. Exposure to media influences a woman's contraceptive behaviour; a study found that women who watched television, listened to the radio or heard family planning announcements on either medium were more likely than those who did not have used a method at some time (Dixit et al., 2017; Olenick, 2000) as the women have more awareness and knowledge about the types of contraceptives and ways to access the services. The most important findings from the programme point of view are that those women who have higher uptake of MCH services have higher odds of early contraceptive adoption. Several studies which have explored the relationship between various maternal and child health services and uptake of contraception have found a positive association (Ahmed & Mosley, 2002). A recent study based on population surveys from Kenya and Zambia concluded that the intensity of ANC and PNC services are positively associated with modern contraception (Barber, 2007; Dixit et al., 2017; Do & Hotchkiss, 2013). The findings from a multicounty study which constructed an index based on several questions on ANC, PNC, delivery care and child vaccination suggested that MCH services could serve as a 'gateway' to family planning use in Guatemala, Morocco and Indonesia (Hotchkiss, Rous, Seiber, & Berruti, 2005). The plausible explanations for this association could be family planning and MCH services in the same context, so the women who are approaching the MCH services are more likely to be exposed to the family planning services. Also, a woman may develop trust over time with the healthcare system overall, which

could encourage her to access several services from the system. A woman's early contact with the health care system could reduce the psychosocial, cognitive and indirect financial barrier (in the form of opportunity cost and time), making the subsequent contact with the system for family planning services easier.

Conclusion

The proportion of women receiving four or more ANC visits has increased from 37% to 51% (NFHS-4), similarly 65% of women received PNC in the first two days after birth from 37% in 2005-06, but the increase in the contraception initiation has not increased that much. This warrants an exploratory study to understand why the adoption of contraceptives didn't increase proportionally with the uptake of MCH services. There has been considerable improvement in all the MCH indicators; however, the postpartum adoption of contraception remains poor. Our study findings support and add to the existing literature on the association of MCH indicators and postpartum contraceptive adoption. And this could be of vital importance for planning programmes targeted at improving contraceptive adoption. As the postpartum contraception initiation is associated with ANC, PNC factors are delivered through the healthcare system. Providing family planning services alongside the MCH services could prove efficient and effective in low resource settings. As evident in the NFHS-4 report, currently, the proportion of women completing at least one or more ANC has increased quite a lot compared to a decade ago. It provides an invaluable window of opportunity to educate and encourage women for early adoption of contraception. In a pilot study conducted in Zambia, focused MCH packages improve clients and providers' experiences and significantly improve the overall quality of care (Birungi & Onyango-Ouma, 2006). So, women will feel more comfortable and are likely to approach the health system more frequently when in need. One of the limitations of the study is that only individual-level factors

were included in the study. However, it is possible that community-level norms or access to family planning practices could influence an individual's behaviour for contraception uptake. Some of these data were not readily available with the DHS survey. However, this opens further opportunities to understand the reasons behind poor postpartum contraception adoption among women in their reproductive ages.

Abbreviations

MMR- Maternal Mortality rate

IMR – Infant Mortality rate

SC/ST- Schedule Caste and Tribe

DPT- Diphtheria-pertussis-tetanus

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Tables and Figures

Table 1: Description of Explanatory factors

Variables	Categories
Age	>25, 25-34,35-44.45+
Geographic Regions	North, South, East, West, Central, North-East
Education	35% illiterate, Primary, Secondary, higher
Caste	SC/ST, Others
Religion	Hindu, Muslim, Others
Residence	9% Urban, Rural
Wealth Index	Richest, Rich, Middle, Poorer, Poor
Information of family planning	Traditional method ■ Traditional method ■ Modern Method
Mass media	Yes, No
Print Media	Yes, No
Characteristics of the Child	
Child dead	No child,1 child,2+male
Sex composition	No male, one male,2+male,both male and female
Wanted child	Wanted, Wanted later, not Wanted

Figure1: Contraception use after the delivery of last child, NFHS (2015-2016)

Figure 2 :Percentage Distribution of currently married women by the type of contraception used after the delivery, NFHS (2015-2016)

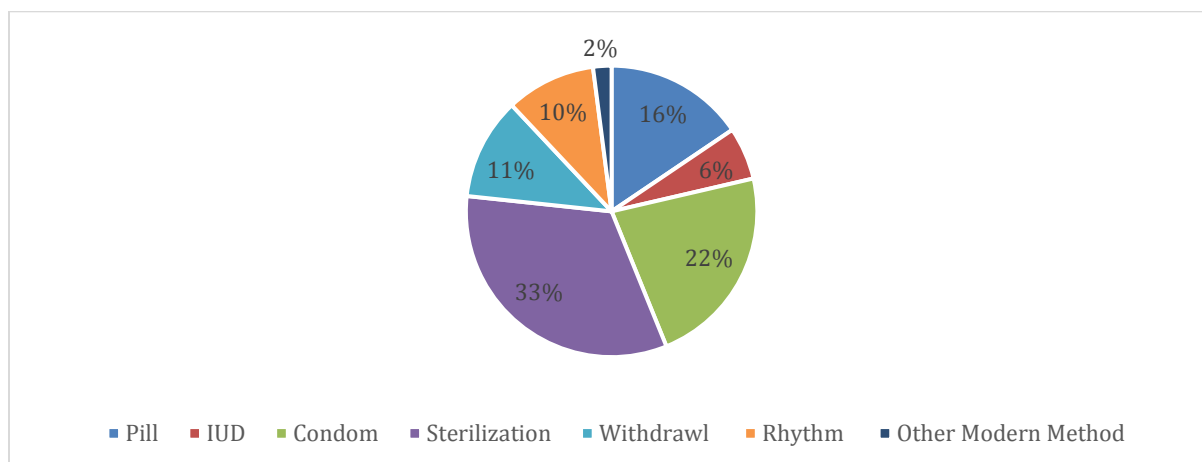


Table 2: Percentage of Contraceptive Use after Having Recent Birth by Postpartum Time Period, India, NFHS-2015-2016.

Time Period	Spacing Method	Limiting Method	Traditional Method
Within 3 months	24.84	63.67	11.49
Within 6 months	53.77	21.68	24.55
Within 12 months	55.6	23.18	21.22
Total	42.68	39.04	18.28

Table 3: Discrete Time complementary log -log model results on Modern contraceptive adoption by selected covariates, NFHS, 2015-2016

Covariate	Odds Ratio	S.E
Place of Residence		
Rural	1.00	-
Urban	1.08	0.02
Region		
North	1.00	-
South	2.25	0.05
East	0.82	0.02
West	1.08	0.03
Central	0.84	0.02
North East	0.67	0.02
Religion		
Hindu	1.00	-
Muslim	1.03	0.02
Others	0.97	0.03
Caste		
SC/St	1.00	-
Others	0.97	0.01
Economic status		
Poorest	1.00	-
Poorer	1.11	0.02
Middle	1.15	0.03
Richer	1.19	0.03

Richest	1.25	0.04
Age Group		
<25	1.00	-
25-34	1.03	0.02
35-44	0.99	0.02
45+	0.73	0.07
Education		
No education	1.00	-
Primary	1.01	0.02
Secondary	0.97	0.02
Higher	0.90	0.03
Child Composition		
No Male	1.00	-
One male	0.89	0.02
Two Male	1.56	0.03
Both Male and Female	1.51	0.03
Child Loss		
No loss	1.00	-
one loss	0.93	0.06
more than 2 loss	0.93	0.06
Family planning knowledge		
Mass media	1.09	0.02
Print Media	1.09	0.02
Maternal and Child care	1.11	0.01
Wanted Last child		
Wanted	1.00	-
Wanted later	0.99	0.03
Never wanted	1.05	0.03