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Author manuscript

Int Perspect Sex Reprod Health. Author manuscript; available in PMC 2017 December 01.

Published in final edited form as:

Int Perspect Sex Reprod Health. 2016 December ; 42(4): 167–178. doi:10.1363/42e2816.

Counseling during Maternal and Infant Health Visits and Postpartum Contraceptive use in Uttar Pradesh, India

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Abstract

Context—Postpartum family planning is a compelling concern of global significance due to its salience to unplanned pregnancies, and to maternal and infant health in developing countries. Yet, women face the highest level of unmet need for contraception in the year following a birth. A cost-effective way to inform women about their risk of becoming pregnant after the birth of a child is to integrate family planning counseling and services with maternal and infant health services.

Methods—We use recently collected survey data from 2733 women from six cities in Uttar Pradesh, India who had a recent birth (since 2011) to examine the role of exposure to family planning information at maternal and infant health visits on (1) any contraceptive use in the postpartum period, and (2) choice of modern method in the postpartum period. We use discrete-time event history multinomial logit models to examine the duration to contraceptive use, and choice of modern method, in the 12 months following the last birth since 2011.

Results—We find that receiving counseling in an institution at the time of delivery has the strongest influence on women's subsequent uptake of modern contraception (female sterilization and IUD). Being visited by a CHW in the extended postpartum period was also strongly associated with subsequent uptake of modern contraception (IUD, condom and hormonal contraception).

Conclusion—Providing postpartum family planning counseling at key junctures during maternal health visits has the potential to increase uptake of modern contraceptive method in urban Uttar Pradesh.

Introduction

The benefits of family planning for the health and wellbeing of mothers and children, mainly through longer birth intervals, are well-established [1,2]. Longer birth intervals are associated with a range of positive outcomes such as lower risk of neonatal, infant and child mortality, low birth weight [1,3,4], maternal mortality and morbidity [1,5], and unwanted and unplanned pregnancies [6]. In their influential article, Cleland et al. note that spacing

pregnancies at least two years apart could reduce global maternal mortality and morbidity by 20%, and global childhood mortality by nearly 10% [1]. Use of family planning in the first year following a birth can help women achieve their spacing goals. Due to its salience to unplanned pregnancies, and to maternal and infant health in developing countries, postpartum family planning has emerged as a compelling concern of global significance. Yet, women face a substantially high level of unmet need for contraception in the one year following a birth, a period referred to as the extended postpartum period in the literatureⁱ [7,8].

In this article, we examine the role of family planning counseling by community health workers (CHWs) and health professionals in the maternal and infant healthcare system on subsequent contraceptive use in six cities in Uttar Pradesh. Specifically, we investigate use or nonuse of modern and traditional methods, as well as method choice among modern method users, as a function of family planning counseling provided at different points during maternal and infant health visits. We use data from the Measurement, Learning & Evaluation Project that has information on family planning counseling both during women's visits to the health facility for antenatal, intrapartum and postpartum care, and in house visits made by CHWs in the antenatal and postnatal periods. In particular, the postnatal health visits provide an opportunity for health workers and professionals to provide information and counseling not only on newborn care, but also on the appropriate adoption and use of family planning during this period.

A study of 27 countries in Asia, Africa and Latin America in the early 1990s found that nearly two-thirds of postpartum women had an unmet need for contraception [7]. More recently, in 2012, a similar study of 21 countries showed that unmet need among postpartum women was practically unchanged at 61% [9]. Other studies suggest that postpartum women prefer longer intervals between births, and would use contraception sooner if they had better information on their risk of getting pregnant after a birth, or were offered more options to achieve their desired birth interval [10-12].

For various reasons, postpartum women are different from other women at risk of experiencing an unintended pregnancy. First, most breastfeeding women believe that they are not at risk of conceiving [13,14]. However, their risk of conceiving, and therefore, need for contraception is very similar to non-breastfeeding women. Second, regardless of their breastfeeding status, postpartum women are amenorrheic for an unpredictable duration, making them uncertain of their fecundity at any given time [14]. Third, the duration of postpartum abstinence varies widely and is influenced by social norms [14]. Thus, many postpartum women do not use contraception soon after birth [7]. A cost-effective way to inform women about their risk of becoming pregnant after the birth of a child is to integrate family planning counseling during maternal and infant health services, such as antenatal, intrapartum, postnatal and infant health care [15]. To date, the extent to which maternal and infant health programs have incorporated postpartum family planning into their constellation of services remains rather limited [16].

ⁱThroughout this article, we refer to the 12 months following a birth or the extended postpartum period as the postpartum period, and the use of contraception in this period as postpartum family planning (PPFP).

Empirical evidence is inconclusive on whether family planning counseling received during antenatal visits is associated with contraceptive use in the subsequent postpartum period. Barber (2007) and Zerai and Tsui (2001) find that integrating family planning counseling at antenatal visits is associated with uptake of contraception in the postpartum period in Mexico, Bolivia, Egypt and Thailand [17, 18]. However, across other settings such as Shanghai in China, Cape Town in South Africa, and Edinburgh in Scotland, Smith and colleagues (2002) find that family planning counseling provided in the antenatal period had no significant effect on postpartum contraceptive use [19]. Current evidence shows a strong positive association between family planning counseling provided to women during the intrapartum period in a facility and postpartum contraceptive use. [20]. Family planning counseling in the postpartum period is also associated with higher postpartum contraceptive use [20-21].

It is important to understand postpartum family planning in urban settings. With more than 54% of the world's population living in dense urban areas [22], policymakers have a unique opportunity to provide cost-effective access to health, education and other services to large numbers of people. However, as urban populations continue to grow in many less developed countries, the health systems available to them have grown at a slower rate [23, 25]. As a result, although urban areas have better access to health facilities compared to rural areas, the capacity of health systems and workers to provide services and counseling remains rather limited [17]. Therefore, disadvantaged urban populations have limited access to high-quality health facilities, and are constrained to use health services provided by providers that are overcrowded, and of lower quality [26]. For these reasons, marginalized urban populations are less likely to avail of family planning services, because of misperceptions, and lack of information, and more likely to have unintended and unwanted pregnancies [23-25]. Reducing these inequities in the face of continued population growth calls for better access to reproductive health services as well as improved service delivery including during the postpartum period, especially for poor urban populations.

The site of this study is urban Uttar Pradesh, India's most populous state with over 200 million residents, constituting over 16% of India's total population [26]. More than a fifth of the state's population live in urban areas [26]. The healthcare system in India has a wide network of providers both in the public and private sectors. Healthcare in the public sector consists of primary, secondary and tertiary health facilities, run by individual State Governments with financing and oversight provided by the national social and economic development programs [28]. The private sector also has extensive providers ranging from small clinics, to large and specialty hospitals [28]. Following the slow progress in many maternal and child health indicators in Bihar, Jharkhand, Madhya Pradesh and Uttar Pradesh even in recent decades, the Indian government established national health delivery programs at the community level, devolving responsibility to local units in order to both engage communities and make them accountable [28]. A main step towards involving the community was the introduction of trained voluntary community health workers (CHW).ⁱⁱ Working with Auxiliary Nurses Midwives, CHWs are trained to address the needs of women

ⁱⁱThis group of trained health workers from the community are called Accredited Social Health Activists (ASHAs) by the government. For clarity and ease of understanding, throughout this article, we refer to ASHAs as CHWs.

and children who face challenges in accessing the mainstream health system. Community health workers visit women in the community, identify and register pregnant women with the local health centers, and establish and monitor antenatal and postnatal care schedules. They also counsel women to deliver at a facility, failing which they ensure the presence of a nurse or midwife at the home during and after delivery. Additionally, they are trained to advise women on newborn and infant care, as well as postpartum contraception. Last, they provide oral contraceptives and male condoms during house visits, and accompany women who prefer other methods to the health center.

Our study differs from existing research on this topic in several ways. First, we use calendar data on the timing of respondents' subsequent use of contraception in the 12 months following birth. Second, we focus on urban Uttar Pradesh (UP), one of the least developed state in India in many social, health and economic indicators [26]. Particularly, over 30% of the urban residents of UP live below the poverty line, and face inequities in maternal and child health access and quality [26]. Therefore, understanding the role of CHWs and the maternal and infant healthcare system in this setting can provide crucial insights on improving poor urban women's reproductive health and wellbeing.

Data and Methods

i. Data

In 2009, the Bill & Melinda Gates Foundation launched the Urban Health Initiative in six cities in Uttar Pradesh – Agra, Aligarh, Allahabad, Gorakhpur, Moradabad and Varanasi. The objective of the Initiative was to improve contraceptive use and reproductive health services in these cities, with a particular focus on the urban poor. Subsequently, the Measurement, Learning & Evaluation (MLE) Project, led by the Carolina Population Center at the University of North Carolina at Chapel Hill, was funded to perform the impact evaluation of the Initiative.

In 2010, the MLE Project collected baseline data from currently married women ages 15-49, households and service delivery points. Among the topics covered in the women's survey were basic sociodemographic characteristics, reproductive preferences and behavior, use of maternal and child health services, and contraceptive knowledge and use. In each city, slums were purposively oversampled to study the urban poor using a combination of registered slums, high resolution spatial imagery and field checks to verify the list [30]. After slums were appropriately identified, the slum and non-slum domains were divided into smaller areas that could serve as primary sampling units (PSUs) comprising about 100-150 households. Within each city, 128 PSUs were selected (64 slum and 64 non-slum). Following PSU selection, all households in selected PSUs were mapped and listed to identify those eligible for household selection. From the list of eligible households, 30 households were randomly chosen from each PSU. Thus, women from slums constitute half the sample in the unweighted data because of oversampling. To account for the complex sampling design, we use weights to make the sample representative of the selected cities for descriptive analyses. Therefore, in the weighted data that is truly representative of the cities, women from slums constitute about 20% of the sample. More sampling details of the original survey have been described previously [27,30]. Our descriptive and multivariate

analyses account for the correlated errors caused by the clustering of women within primary sampling units.

The endline survey was fielded in 2014, in which the tracking teams sought to find all women who were usual residents at baseline, including those that were no longer married and were outside of the age range of 15-49 years, and still residing in a study city in order to measure program exposure and changes in contraceptive use and fertility behaviors. The tracking teams also interviewed women who moved from one study city to another study city. The response rate of the endline survey was 83.6%. The endline surveys and study procedures were approved by the Institutional Review Board Committees of the University of North Carolina at Chapel Hill, ICRW and MAMTA-Health Institute for Mother and Child in India. This study uses longitudinal data from the 14,043 women with complete interviews at baseline and endline, particularly relying on the birth and contraceptive histories recorded in the contraceptive calendar for the 60 months preceding the endline interview.

The analytical sample is restricted to women who had a birth between 2011 and the endline interview. Analyses only include the last birth since January 2011, because questions on maternal and newborn healthcare and exposure to CHWs were asked for the last birth since January 2011.ⁱⁱⁱ The final analytic sample has 2,733 women (See Table 1).

ii. Measures

We analyze two outcomes in this study: (1) any contraceptive use in the 12 months following last birth since 2011 among all women in the study sample (N=2733) categorized as modern method, traditional method and no use; and (2) choice of modern method with the categories, female sterilization, IUD, hormonal methods,^{iv} and condom among modern method users (N=1308). Traditional methods account for 18% of contraceptive use in the sample. Although we are most interested in modern method use, understanding the role of counseling at different points of contact on traditional methods is also important, since these methods account for a non-trivial proportion of use. Therefore, we treat it as a separate category instead of grouping it with non-use in the first outcome. (See Table 2).

Key predictor variables are exposure to family planning counseling at different points of contact with the maternal and newborn health system: during antenatal visits to a health facility and house visits by CHW, at the time of delivery in a facility, and during postnatal visits to a facility and house visits by CHW (See Table 3). To elaborate, in the antenatal period, we measure whether a CHW visited the respondent during the last trimester of her last pregnancy since 2011, and if the respondent received any family planning counseling during these interactions. We classify this variable as: did not meet CHW; met CHW and received family planning counseling; and met CHW and did not receive family planning counseling. Similarly, for postnatal house visits in the 12 months following the last birth since 2011, the independent variable has the following categories: did not meet CHW; met CHW and received family planning counseling; met CHW and did not receive family

ⁱⁱⁱTable A.1 in the Appendix shows the questions used to construct the exposure variables.

^{iv}19 women used Lactational Amenorrhea (LAM) as postpartum contraception, and are grouped under hormonal methods because (1) it is recognized as a highly effective contraceptive if used correctly [40]; (2) it controls the reproduction function naturally through the physiology of lactation [40]; and (3) in this sample, it constitutes a very small number to be analyzed independently.

planning counseling. The second point of contact in the antenatal and postnatal period is at the facility. For the last birth since 2011, women were asked if they received family planning counseling from any health professionals in the last trimester of their pregnancy. We coded the response to this question as a binary variable: received family planning counseling, and did not receive family planning counseling. For the same birth, women were also asked if they went to a health facility for postnatal care within 6 weeks of giving birth, and whether they received any family planning counseling at this visit. We coded the response to these questions as a categorical variable with 3 categories: did not visit facility; visited facility, received family planning counseling; and visited facility, did not receive family planning counseling.

During the intrapartum period, women were asked where the delivery took place, and whether they received any family planning counseling at/after delivery. We classify responses to this question as: home delivery (no counseling); delivery at a facility, and received family planning counseling at/after delivery; and delivery at a facility, and did not receive family planning counseling at/after delivery. In the case of home deliveries, the survey did not specifically ask about counseling received at home from the health worker or midwife. Therefore, we are not able to include counseling received during home deliveries in our analyses.

The analysis also controls for baseline values of sociodemographic measures associated with contraceptive use such as age, age squared, age at marriage, parity, level of education (none, primary, secondary and higher than secondary), religion (Hindu and other religion), caste (scheduled caste/ tribe, other backward caste, and general caste), household wealth, city (Agra, Aligarh, Allahabad, Gorakhpur, Moradabad, and Varanasi), and slum residence (See Table 3). Last, we include the log of duration to contraceptive use up to 12 months to account for duration dependence.

iii. Analytical Methods

We used discrete-time event history multinomial logit models to examine the duration to contraceptive use within the 12 months following the last birth since 2011. For the first outcome, each woman entered the analysis the month of her last birth since 2011, and was followed until the first month of postpartum contraceptive use. For the second outcome examining modern method choice, the respondent entered the month of her last birth and was followed until the first month of modern method use. Because only women with births since 2011 were included, there was no left censoring; but not all women used contraception, and so those that did not use FP in the analysis period were right-censored at 12 months. For the two outcomes, we estimated multinomial logistic regressions with the following categories. We present the results as relative risk ratios: (1) no contraceptive method, use of a modern method or use of a traditional method in the 12 months following last birth since 2011; and (2) female sterilization, IUD, hormonal methods, and male condom among modern method users.

Results

Descriptive Results

Table 1 shows the distribution of baseline sociodemographic characteristics of the 2,733 women who had a birth since 2011. Over two-fifths of women who had a birth since 2011 were 20-24 years, and a third were 25-29 years. At baseline, over two-fifths of women who had a birth since 2011 had two living children. Close to 60% of women had at least a secondary school education, and just under a third had no education. Wealth was fairly evenly distributed. The weighted sample was predominantly Hindu, and about 20% resided in slums.

Table 2 displays the postpartum use and nonuse of contraceptives, and method choice in the 12 months following a birth. Over 45% of the women used modern methods within 12 months of delivery, and a substantial proportion of women used male condoms in the postpartum period. Fourteen percent of women chose a long-acting or permanent method (female sterilization or IUD) as their postpartum contraceptive. Nineteen percent of women used traditional methods, but more than a third did not use any contraception following their last birth since 2011.

Table 3 shows the bivariate association between exposure to family planning counseling during maternal health visits for antenatal, intrapartum, and postnatal care and contraceptive use. Only 17% of the women received counseling from health professionals at the health facility they visited for antenatal care in the last trimester of their pregnancy. Among those who received counseling, 57% used a modern method in the postpartum period. Among those who did not receive counseling, 44% used a modern method in the postpartum period. Only a fifth of the women were visited by a CHW during the last trimester of their pregnancy, and only 14% received counseling on postpartum contraception during the antenatal visit from a CHW. Among those who were visited by a CHW and received counseling, 51% used a modern method, and among those who were not visited by a CHW, 46% used a modern method. Forty-one percent of those who were visited by a CHW but did not receive counseling used modern contraception in the postpartum period.

With regard to the intrapartum period, more than three fourths of the women in the study sample delivered at a health facility, but only 21% received family planning counseling at the time of delivery. The remaining women who delivered at a facility (57%) did not receive any postpartum counseling, highlighting a major gap in service provision. Further, 63% of the women who received counseling at delivery in a health facility used a modern method in the postpartum period. In contrast, only 44% of the women who delivered in a facility but did not receive counseling at delivery used a modern method subsequently.

About 40% of the women visited a health facility within 6 weeks of giving birth, but only 12% received family planning counseling at the facility. Of those who visited a health facility within 6 weeks of a birth and received counseling, 58% used a modern method in the postpartum period. Among those who visited a health facility within 6 weeks but did not receive counseling, less than half used a modern method in the postpartum period.

Community health workers (CHW) also visit women in the postpartum period to guide them with infant care and feeding as well as provide information on postpartum contraceptive use. Although 44% of the women in this sample were visited by a CHW during the postpartum period, only half of them (22% overall) received counseling. Fifty-one percent of those who were visited by a CHW and received counseling in the postpartum period reported modern method use, while 42% of the women who were visited by a CHW but did not receive counseling used a modern method.

Analytical Results

1. Exposure to family planning counseling and contraceptive use in the postpartum period—Model 1 shows no significant association between counseling received during the last trimester of pregnancy from health professionals at the facility and subsequent modern method use. There was also no significant association between women who received counseling at a CHW house visit and those who did not receive that information. Women who were not visited by a CHW however, were significantly more likely to use a modern method than be a non-user. Additional analyses not shown here revealed that women who were better educated (more than secondary school education) and from wealthier households were less likely to be visited by CHWs in the last trimester of pregnancy, presumably because they were more likely to use modern methods.

Women who had an institutional delivery and received family planning counseling at the time of delivery were two times more likely to use a modern method. Modern method use however, did not differ significantly between women who delivered at home and those that delivered at a facility but did not receive any counseling. Women who received counseling in their visit to the health facility within 6 weeks of a birth and those who did not receive counseling also did not significantly differ in their use of modern methods. However, women who did not visit a health facility within 6 weeks of a birth were significantly less likely to use a modern method. Women who were visited in their houses by a CHW in the postpartum period (within 12 months of giving a birth) and received counseling were significantly more likely to use a modern method. We also found no difference between women visited by a CHW but did not receive counseling and those who were not visited by a CHW in the postpartum period.

Model 2 shows no significant association between exposure to family planning counseling and traditional method use relative to nonuse. Model 3 also shows no significant association between counseling in the antenatal period and use of modern method relative to traditional method. Counseling received at a health facility during the intrapartum period however, is associated with more than a two-fold increase in use of modern methods relative to traditional methods. Women who were visited by CHW in the postpartum period and also received counseling were more likely to use a modern method (significant at $p < 0.10$). All the models in Table 4 showed that the associations between key sociodemographic characteristics and contraceptive use were in the expected direction. An additional point relates to the strong positive associations between logged duration and modern and traditional method use in Models 1 and 2 respectively. These findings show that relative to nonusers, the likelihood of using any method increases with duration since birth. However,

Model 3 shows that the likelihood of using modern methods relative to traditional methods decreases with duration since birth.

2. Exposure to family planning counseling and choice of modern method—

Table 5 shows the relative risk ratios of method choice among users of modern methods. We found no evidence of any association between exposure to counseling in the antenatal period and choice of modern method in the postpartum period. Model 1 shows that women who delivered at a facility and received counseling during the intrapartum period were significantly less likely to use IUD compared to female sterilization. Women who did not visit a health facility within 6 weeks of birth however, were over two times more likely to use IUD relative to sterilization. Similarly, women who were visited by a CHW in the postpartum period and received FP counseling had a significantly higher likelihood of using IUD compared to female sterilization. Contrary to expectation, those who were not visited by a CHW in the postpartum period were also substantially more likely to use IUD than sterilization. In the Discussion, we shed light on these unexpected findings.

Both Models 2 and 3 show that women who delivered at an institution and received family planning counseling were significantly less likely to use hormonal contraceptives or male condoms, relative to female sterilization. In the postnatal period, however, relative to women who visited a facility within 6 weeks of a birth, but did not receive counseling, those who did not visit a health facility were two times more likely to use hormonal methods over sterilization (Model 2). Further, those who were visited by a CHW within 12 months of a birth, and received counseling were significantly more likely to use hormonal methods or condoms relative to sterilization (Models 2 and 3).

Women who delivered at a facility and received PFP information were significantly less likely to use modern temporary methods such as pills, injectables and condoms than IUD, relative to women who delivered at a facility and did not receive PFP information (Models 4 and 5). In Model 5, women who did not visit a health facility were significantly less likely to use condoms than IUD, relative to women who visited a health facility within 6 weeks of a birth but did not receive counseling. There was no association between exposure to counseling and use of condoms relative to hormonal methods in Model 6. As in Table 4, we find that the associations between key sociodemographic characteristics and choice of modern method in Table 5 were in the expected direction.

Discussion

Our multivariate analysis confirms the importance of providing family planning information and counseling at maternal and infant health visits on the use of a modern method and choice of modern method in the 12 months following a birth among women in urban Uttar Pradesh, India. We find that receiving intrapartum counseling in an institution has the strongest influence on women's postpartum uptake of modern contraception. More specifically, intrapartum counseling in an institution is strongly related to the adoption of female sterilization and to a lesser extent, to IUD use. As Gaffield and colleagues (2014) noted, providing intrapartum family planning counseling and services, particularly long-acting methods such as IUDs and female sterilization provides a cost-effective way to

integrate family planning services with maternal health services [16]. Further, female sterilization and insertion of IUDs after delivery at a facility are convenient options for contraception for women who want to reduce their risk of future unintended pregnancies.

Information received during house visits by CHW in the 12 months following birth also has a strong association with subsequent use of IUDs, condoms and hormonal contraception, compared to sterilization. This outcome is likely related to the practice of training CHWs to provide condoms and pills to postpartum women. Not all our findings are consistent with expectations, particularly those that relate to postpartum exposure to counseling. Women who did not visit a facility within 6 weeks of giving birth were much more likely to use IUDs and hormonal contraception, compared to sterilization. Our additional analyses revealed that over two-thirds of the women who used IUDs and hormonal methods but did not go to a facility for the postnatal visit at 6 weeks desired another child. We believe that although these women did not visit a facility soon after birth, they may have done so later in order to get a modern spacing contraceptive method (seen in their substantially higher odds ratios of using these methods compared to sterilization). While these women seem to be motivated to get a temporary method, health professionals must find appropriate ways of reaching this particularly high-need subset of women who desire to space but do not go to the postnatal visit at 6 weeks. We also found that women who were not visited by CHW in the extended postpartum period were much more likely to use IUDs and condoms, compared to sterilization. This particular finding is possibly capturing the wealth effects of those women who are better educated and belong to wealthier households. Additional analyses show that CHWs were less likely to visit women from higher social classes who prefer IUD to female sterilization. Since CHWs target women from the poorer households, they do not visit women from wealthier households. Our study suggests that CHWs who visit (poorer) women in the postpartum period play a positive and influential role in their adoption of modern temporary methods.

Several studies have found that women's low levels of engagement with the healthcare system and providers' limited counseling on family planning are major obstacles to effective integration of maternal and infant healthcare with family planning services in other settings as well [6]. For instance, women in Guatemala were least likely to go to a health facility for postnatal care, which was a big barrier to the provision of postpartum family planning services. Similarly, in Egypt, only a low proportion of women who visit a facility for antenatal care are provided counseling on postpartum family planning [6]. Similar to these findings, bivariate analysis from our study shows that engagement with the healthcare system for antenatal, intrapartum and postnatal care remains low among this sample of women. Our multivariate analyses also show that among women who go to a health facility or are visited by a CHW in their house, not all of them are provided family planning information. This results in a missed opportunity to provide critical family planning information and services to women who are at an increased risk of an unintended pregnancy.

Lastly, our study finds little support for the influence of CHW house visits or visits to a health facility in the last trimester of pregnancy on subsequent contraceptive use. This finding is consistent with studies in other settings that find that family planning counseling provided in the antenatal period does not influence subsequent contraceptive use or

subsequent pregnancy rates in the 12 months after birth [19]. Do and Hotchkiss showed that the association between antenatal care and uptake of postpartum contraception is explained by observed and unobserved characteristics that may have predisposed women to avail of both antenatal care and family planning services in Tanzania and Bolivia [31]. Nonetheless, given the repeated contacts with the health system during antenatal visits, it presents a valuable opportunity for providers to both build trust with pregnant women over an extended period and engage with them about postpartum family planning [31].

This study has a number of strengths and limitations. One limitation is that only a small proportion of women engaged with the healthcare system for antenatal services. It is possible that because of this lack of variation during the antenatal period, we did not find any statistical association between family planning counseling in the antenatal period and subsequent contraceptive use. Second, information on the content and quality of family planning counseling are not available in this study. Relatedly, we also do not know who provided family planning counseling and services in the intrapartum period in the home or institution. Previous studies have measured quality by the extent to which providers or CHW adhere to a set of standard clinical guidelines or quality index, or by respondents' perceived quality of care received [17,32]. Data on the content and quality of care could provide insights on the aspects of counseling that are most useful in women's decisions to use contraception in the postpartum period. Third, the data for this analysis is based on the most recent birth (since 2011) which means that the information reported is retrospective up to 3 ½ years before the survey. Thus the timing of events (such as the month of postpartum contraceptive use) may not be completely accurate. Therefore, it is possible that postpartum adoption happened prior to the postnatal visit (to health center or by CHW). Last, this study did not include information on breastfeeding in the postpartum period. This information is relevant for understanding which methods are the most appropriate for use and whether health workers are addressing the joint breastfeeding and family planning needs of postpartum women.

Among strengths, first, we have calendar data that permit us to examine the timing of adoption of a method in the postpartum period. In addition, we have a large urban sample of women who had a birth since 2011. This provides rich information on postpartum contraceptive use and exposure to the various maternal health visits where FP use should or could be discussed with clients.

Recently, there is increased attention on the provision of family planning services during infant immunization visits as a promising "high impact practice in family planning" [33]. Recognizing the need to improve maternal and infant health in Uttar Pradesh (along with other high-priority states), the USAID-funded Maternal and Child Health Integrated Program (MCHIP) has recommended that postpartum family planning is a "maternal and child health intervention" [35-36]. Among the various focus areas of MCHIP are: (1) increasing postpartum contraceptive use through IUD insertion immediately after a birth, and (2) strengthening routine immunization services and delivery [35-36]. Integration of these different programs – postpartum family planning counseling during antenatal visits, insertion of IUDs soon after delivery, along with routine immunization visits, could open a

valuable opportunity to provide a continuum of care to pregnant and postpartum women [34].

Another program that seeks to motivate women to use institutional facilities for delivery is the Janani Suraksha Yojana (JSY). The JSY is a landmark conditional cash transfer program that the Government of India introduced in 2005 to reduce maternal and neonatal mortality by promoting institutional delivery among poor women. In the community, CHWs lead JSY by identifying pregnant women, counseling them to receive at least 3 antenatal care visits and helping them to go to a health facility for delivery. Both the CHW and the participating woman receive cash benefits for their adherence to JSY. Initial evaluation of JSY shows encouraging results: pregnant women's use of health facilities for antenatal care and delivery has increased substantially since the introduction of JSY [37,38]. The JSY provides the perfect platform for the maternal health system to reach out to women during their pregnancy and motivate them to deliver at a facility, both of which are critical junctures for women to receive appropriate postpartum family planning counseling and services.

This study begins to inform these programs by demonstrating that in our urban Uttar Pradesh samples, (1) providing family planning information at the time of an institutional delivery is associated with use of a modern method in the postpartum period, and most of this use is female sterilization, followed by a small percentage adopting IUD; (2) providing family planning information by CHW in the postpartum period is associated with use of any modern temporary method (IUD, hormonal methods and male condoms). Programs seeking to increase modern contraceptive use should consider these key maternal and infant health visits as ways to improve method use in the postpartum period. In the future, we need research to inform how the content of information and services provided by health workers during maternal and immunization visits can be integrated so that women receive timely and accurate information to meet their postpartum family planning needs in a critical period.

Acknowledgments

This research was made possible by support from the Bill & Melinda Gates Foundation (BMGF) under terms of the Measurement, Learning & Evaluation for the Urban Reproductive Health Initiative Project (MLE). The authors' views expressed in this publication do not necessarily reflect the views of BMGF. This research received support from the Population Research Infrastructure Program awarded to the Carolina Population center (P2C HD050924) at The University of North Carolina at Chapel Hill by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development.

APPENDIX

Table A1

Questions used from the endline survey to construct exposure variables

Antenatal exposure to PFP	During the last trimester of your pregnancy with (name of child), did you meet with a community health worker, such as AWW, ASHA, RMP or NGO worker?	Yes No
	During these visits with a community health worker, did you receive any information or counseling on using a family planning method postpartum?	Yes No
	During the last trimester of your pregnancy with (name of child), did you receive any information or advice about contraceptive methods from any health professionals?	Yes No

PPFP Exposure at the time of delivery	When you came to the facility for delivery, did anyone give you information or counsel you on family planning before you delivered?	Yes No
	After you had delivered, did anyone talk to you about using a family planning method postpartum before you left the health facility?	Yes No
Postnatal exposure to PPFP	After the birth of (name of last born), did you go to a health facility for a postnatal care visit within 6 weeks of giving birth?	Yes No
	Did you receive any information or counseling on FP during the postnatal care visits?	Yes No
	After the birth of (name of child), did you meet with a community health worker, such as AWW, ASHA, RMP or NGO worker within 12 months of delivery?	Yes No
	During this visit/ these visits with a community health worker, did you receive any information or counseling on family planning?	Yes No

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Table 1

Baseline Sociodemographic Characteristics of Women who had a Birth Since January 2011

Characteristic	Percent	N (Total=2733)
<i>Age</i>		
15-19	9.2	250
20-24	41.8	1142
25-29	33.1	904
30-34	12.5	341
over 35	3.5	96
<i>Number of children</i>		
1	10.9	298
2	42.7	1166
3	23.0	629
4+	23.4	640
<i>Education</i>		
None	31.2	853
Primary	9.2	251
Secondary	38.7	1058
Higher than secondary	20.9	571
<i>Wealth quintile</i>		
Lowest	19.4	530
Second	21.2	579
Middle	19.7	538
Fourth	22.2	607
Highest	17.5	479
<i>Religion</i>		
Hindu	71.8	1962
Other religion	28.2	771
<i>Caste</i>		
Scheduled caste/ tribe	19.7	539
Other backward caste	51.9	1418
General Caste	28.4	776
<i>Residence</i>		
Slum	20.1	549
Non-slum	79.9	2184
<i>City</i>		
Agra	26.7	729
Aligarh	13.3	363
Allahabad	14.3	391
Gorakhpur	15.3	417
Moradabad	10.9	298
Varanasi	19.6	535

Note: Data are weighted using endline weights

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Table 2

Weighted Postpartum Contraceptive Use in 12 Months Among Women Who Had A Birth Since January 2011

Method	Percent	N (Total=2733)
<i>Modern</i>	46.4	1269
Female sterilization	7.8	213
IUD	5.9	160
Male Condom	26.1	714
Hormonal (Injectable + Pill)		
Injectables	2.2	59
Pill	3.8	103
Lactational amenorrhea	0.7	19
<i>Traditional</i>	17.8	487
<i>No method</i>	35.7	977
Total	100.0	2733

Note: Data are weighted using endline weights.

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Table 3
 Exposure to CHW/ FP Information By Postpartum Contraceptive Use Among Women Who Had A Birth Since January 2011

Exposure	Total	Did not use	Modern Method	Traditional Method	N
<i>Received FP info from health professionals in last trimester of pregnancy</i>					
Yes, received FP info	17.3	30.7	57.5	11.7	473
No, did not receive FP info	82.7	36.8	44.0	19.2	2260
Total	100.0				2733
<i>Visited by CHW in last trimester of pregnancy & received FP information</i>					
Visited by CHW, received FP info	14.3	36.2	51.0	12.8	436
Visited by CHW, did not receive FP info	5.8	44.4	41.0	14.6	171
Not visited by CHW	80.0	35.1	45.9	19.0	2126
Total	100.0				2733
<i>Place of delivery & received FP information at/ after delivery</i>					
Facility delivery, received FP info	20.6	25.8	62.8	11.4	539
Facility delivery, did not receive FP info	57.2	35.8	44.1	20.1	770
Home delivery, no FP info	22.2	44.9	37.0	18.1	1424
Total	100.0				2733
<i>Visited health facility within 6 weeks of birth & received FP information</i>					
Visited health facility, received FP info	12.0	29.3	57.9	12.7	328
Visited health facility, did not receive FP info	27.6	32.1	48.9	18.9	753
Did not visit health facility	60.4	38.7	42.9	18.4	1652
Total	100.0				2733
<i>Visited by CHW within 12 months of delivery & received FP information</i>					
Visited by CHW, received FP info	22.8	35.0	51.3	13.7	696
Visited by CHW, did not receive FP info	21.4	38.4	42.4	19.3	585
Not visited by CHW	55.8	35.0	45.9	19.0	1452
Total	100.0				2733

Note: Data are weighted using endline weights.

Table 4

Relative risk ratios (and standard errors) from multinomial models of the estimated effect of exposure to PPF information on women's contraceptive use in the 12 month period following last birth since 2011

Variable	Model 1 Modern method v. No use RRR (SE)	Model 2 Traditional method v. No use RRR (SE)	Model 3 Modern v. Traditional method RRR (SE)
<i>Received FP info from health professionals in last trimester of pregnancy</i>			
No, did not receive FP info (ref)			
Yes, received FP info	1.13 (0.09)	0.92 (.15)	1.22 (.21)
<i>Visited by CHW in last trimester of pregnancy & received FP information</i>			
Visited by CHW, did not receive FP info (ref)			
Visited by CHW, received FP info	1.16 (.19)	1.04 (.27)	1.11 (.33)
Not visited by CHW	1.39* (.20)	1.13 (.25)	1.23 (.31)
<i>Exposure to FP information at labor and delivery</i>			
Institutional delivery and did not receive FP counseling (ref)			
Institutional delivery and received FP counseling	2.02*** (.18)	.87 (.14)	2.30*** (.42)
Home delivery, did not receive FP counseling	.96 (.07)	.89 (.12)	1.07 (.16)
<i>Visited health facility within 6 weeks of birth & received FP information</i>			
Visited health facility, did not receive FP info (ref)			
Visited health facility, received FP info	0.91 (.10)	0.95 (.21)	0.96 (.23)
Did not visit health facility	0.77** (.06)	.90 (.11)	0.85 (.12)
<i>Visited by CHW within 12 months of delivery & received FP information</i>			
Visited by CHW, did not receive FP info (ref)			
Visited by CHW, received FP info	1.28* (.14)	.89 (.15)	1.44 [†] (.27)
Not visited by CHW	.94 (.08)	.98 (.14)	.96 (.15)
<i>Control Variables</i>			
Age	1.23** (.08)	0.92 (.09)	1.33* (.15)
Age squared	0.99*** (.00)	1.00 (.00)	0.99** (.00)
Age at marriage	1.03** (.01)	1.02 (.02)	1.01 (.02)
<i>Education</i>			
No education (ref)			
Primary	1.28* (.13)	1.40* (.23)	0.91 (.16)
Secondary	1.35*** (.11)	1.01 (.14)	1.34 [†] (.21)
Higher than secondary	1.57*** (.19)	0.96 (.21)	1.62 [†] (.40)
<i>Religion</i>			
Hindu (ref)			
Other religion	1.24** (.09)	0.94 (.12)	1.31 [†] (.19)
<i>Caste</i>			
Scheduled caste/ scheduled tribe (ref)			
Other backward caste	1.07 (.09)	1.11 (.16)	0.96 (.16)

Variable	Model 1 Modern method v. No use RRR (SE)	Model 2 Traditional method v. No use RRR (SE)	Model 3 Modern v. Traditional method RRR (SE)
General caste	0.92 (.09)	0.80 (.14)	1.15 (.23)
Wealth index	1.07* (.03)	1.04 (.05)	1.03 (.05)
Number of children	1.14*** (.03)	1.03 (.04)	1.11* (.05)
<i>City</i>			
Agra (ref)			
Aligarh	1.02 (.11)	0.56** (.10)	1.80** (.38)
Allahabad	1.10 (.13)	1.26 (.23)	0.87 (.19)
Gorakhpur	0.83 (.10)	0.98 (.17)	0.84 (.17)
Moradabad	1.35** (.15)	0.61* (.12)	2.21*** (.46)
Varanasi	0.92 (.10)	1.12 (.18)	0.81 (.15)
<i>Residence</i>			
Non slum (ref)			
Slum	1.05 (.07)	0.70*** (.07)	1.48*** (.18)
Duration	1.04*** (.01)	1.08*** (.01)	0.96*** (.04)
Constant	0.00*** (.00)	0.01*** (.01)	0.04* (.05)

 $p < 0.001$,

**
 $p < 0.01$,

*
 $p < 0.05$,

[†]
 $p < 0.10$

All models included 2733 women and 19491 person-months.

Table 5

Relative risk ratios (and standard errors) from multinomial models of the estimated effect of exposure to family planning counseling on women's modern method use in the 12 month postpartum period following last birth since 2011

Variable	Model 1 IUD v. Ster. RRR (SE)	Model 2 Hormonal v. Ster. RRR (SE)	Model 3 Condom v. Ster. RRR (SE)	Model 4 Hormonal v. IUD RRR (SE)	Model 5 Condom v. IUD RRR (SE)	Model 6 Condom v. Hormonal RRR (SE)
<i>Received FP info from health professionals in last trimester of pregnancy</i>						
No, did not receive FP info (ref)						
Yes, received FP info	1.05 (.33)	1.12 (.38)	1.08 (.27)	1.06 (.38)	1.02 (.27)	0.96 (.28)
<i>Visited by CHW in last trimester of pregnancy & received FP information</i>						
Visited by CHW, did not receive FP info (ref)						
Visited by CHW, received FP info	0.59 (.39)	1.20 (.62)	0.65 (.26)	2.02 (1.41)	1.10 (.65)	0.54 (.26)
Not visited by CHW	1.07 (.59)	.89 (.40)	0.82 (.27)	0.83 (.50)	0.76 (.38)	0.91 (.37)
<i>Exposure to FP information at labor and delivery</i>						
Institutional delivery and did not receive FP counseling (ref)						
Institutional delivery and received FP counseling	0.45** (.13)	0.17*** (.05)	0.18*** (.04)	0.38** (.13)	0.40** (.10)	1.04 (.27)
Home delivery, did not receive FP counseling	0.65 (.21)	0.71 (.22)	0.76 (.19)	1.09 (.34)	1.17 (.29)	1.08 (.24)
<i>Visited health facility within 6 weeks of birth & received FP information</i>						
Visited health facility, did not receive FP info (ref)						
Visited health facility, received FP info	1.68 (.66)	1.96 ^f (.75)	1.64 ^f (.46)	1.17 (.52)	0.98 (.34)	0.83 (.28)
Did not visit health facility	2.31** (.65)	2.00** (.53)	1.44 ^f (.28)	0.86 (.26)	0.62* (.15)	0.72 (.16)
<i>Visited by CHW within 12 months of delivery & received FP information</i>						
Visited by CHW, did not receive FP info (ref)						
Visited by CHW, received FP info	5.22*** (2.07)	2.39** (.79)	3.45*** (.87)	0.46 ^f (.19)	0.66 (.22)	1.44 (.41)
Not visited by CHW	2.73*** (.83)	1.68 ^f (.47)	2.32*** (.49)	0.61 (.21)	0.85 (.24)	1.38 (.32)
<i>Control Variables</i>						
Age	0.77 (.20)	0.71 (.16)	0.70 ^f (.13)	0.91 (.25)	0.91 (.21)	0.99 (.19)
Age squared	1.00 (.00)	1.00 (.00)	1.00 ^f (.00)	1.00 (.00)	1.00 (.00)	1.00 (.00)
Age at marriage	1.03 (.05)	1.08 ^f (.05)	1.02 (.03)	1.04 (.05)	0.98 (.04)	0.94 (.03)

Variable	Model 1 IUD v. Ster. RRR (SE)	Model 2 Hormonal v. Ster. RRR (SE)	Model 3 Condom v. Ster. RRR (SE)	Model 4 Hormonal v. IUD RRR (SE)	Model 5 Condom v. IUD RRR (SE)	Model 6 Condom v. Hormonal RRR (SE)
<i>Education</i>						
No education (ref)						
Primary	0.92 (.37)	1.45 (.56)	1.32 (.41)	1.56 (.69)	1.42 (.52)	0.91 (.29)
Secondary	1.27 (.36)	1.78 ^f (.55)	1.59* (.36)	1.39 (.43)	1.25 (.29)	0.89 (.22)
Higher than secondary	2.21 ^f (1.04)	3.13* (1.44)	4.00*** (1.41)	1.41 (.64)	1.80 (.66)	1.27 (.45)
<i>Religion</i>						
Hindu (ref)						
Other religion	1.64 ^f (.49)	2.24** (.63)	5.26*** (1.20)	1.36 (.42)	3.20*** (.79)	2.34*** (.55)
<i>Caste</i>						
Scheduled caste/ scheduled tribe (ref)						
Other backward caste	1.00 (.32)	1.17 (.37)	1.17 (.32)	1.15 (.39)	1.15 (.31)	1.00 (.27)
General caste	1.01 (.36)	1.26 (.42)	0.74 (.05)	1.24 (.44)	0.73 (.21)	0.59 ^f (.16)
Wealth index	1.11 (.11)	0.88 (.08)	1.08 (.08)	0.79* (.08)	0.97 (.07)	1.23* (.10)
Number of children	1.01 (.10)	1.06 (.09)	0.77*** (.06)	1.05 (.11)	0.76** (.06)	0.72*** (.05)
<i>City</i>						
Agra (ref)						
Aligarh	5.12*** (2.16)	1.64 (.65)	2.51** (.84)	0.32* (.14)	0.49* (.15)	1.52 (.49)
Allahabad	1.60 (.72)	0.85 (.33)	0.49* (.16)	0.53 (.24)	0.30*** (.10)	0.57 ^f (.18)
Gorakhpur	1.03 (.49)	1.03 (.43)	0.47* (.16)	0.99 (.46)	0.45* (.17)	0.46* (.14)
Moradabad	1.07 (.46)	0.44 (.18)	1.00 (.29)	0.41 ^f (.18)	0.93 (.35)	2.28* (.77)
Varanasi	1.81 (.73)	0.78 (.31)	0.30*** (.09)	0.43* (.18)	0.17*** (.05)	0.39** (.12)
<i>Residence</i>						
Non slum (ref)						
Slum	0.89 (.20)	0.79 (.19)	0.90 (.16)	0.89 (.22)	1.01 (.19)	1.13 (.23)
Duration	1.31*** (.06)	1.42*** (.06)	1.31*** (.05)	1.08* (.04)	1.06 ^f (.03)	0.98 ^f (.02)
Constant	3.22 (11.51)	4.84 (14.57)	30.69 (72.38)	1.50 (5.51)	9.51 (30.04)	6.32 (15.49)

 $p < 0.001$,**
 $p < 0.01$,

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*
 $p < 0.05$,
 f
 $p < 0.10$

All models included 1308 women and 6988 person-months. Controls in all models include age, age-squared, number of children, education, religion, caste, wealth, city, slum residence and log of duration (estimates in Appendix A3).