USAID
FROM THE AMERICAN PEOPLE

DHS WORKING PAPERS

Continuum of Maternal Health Care and the Use of Postpartum Family Planning in Nepal

Ramesh Babu Kafle
Komal Prasad Dulal
Krishna Prasad Pandey

2017 No. 133

DEMOGRAPHIC AND HEALTH SURVEYS

July 2017

Continuum of Maternal Health Care and the Use of Postpartum Family Planning in Nepal

Ramesh B. Kafle[1]

Komal P. Dulal[1]

Krishna P. Pandey[1]

ICF

Rockville, Maryland, USA

July 2017

[1]Centre for Population and Development (CPAD), Purbanchal University, Biratnagar, Nepal

Corresponding author: Ramesh B. Kafle, Centre for Population and Development (CPAD), Purbanchal University, Biratnagar, Nepal; email: rbkafle@gmail.com

Acknowledgments

We appreciate the suggestions and comments provided by our two facilitators, Wenjuan Wang and Shireen Assaf, during the preparation of this paper since the first workshop held in Bangkok. Their suggestions obviously deepened our understanding of the issues and prompted us to make the analysis more precise and comprehensive. We also thank two other co-facilitators, Bwalya Bupe Bwalya and Mulenga C. Mulenga, for their kind cooperation during the workshop. We acknowledge Sarah Staveteig for comments and suggestions on this paper. We also thank all the participants of the 2017 DHS Fellows Workshop for their suggestions during the presentations in Bangkok and Bali. We are thankful to USAID for providing us modest financial support and ICF for providing technical assistance in preparation of this paper.

We did not encounter any conflict of interest while preparing this paper.

Editor: Bryant Robey

Document Production: Joan Wardell

The DHS Working Papers series is a prepublication series of papers reporting on research in progress that is based on Demographic and Health Surveys (DHS) data. This research is carried out with support provided by the United States Agency for International Development (USAID) through The DHS Program (#AID-OAA-C-13-00095). The views expressed are those of the authors and do not necessarily reflect the views of USAID or the United States Government.

The DHS Program assists countries worldwide in the collection and use of data to monitor and evaluate population, health, and nutrition programs. For additional information about The DHS Program, contact DHS Program, ICF, 530 Gaither Road, Suite 500, Rockville, MD 20850, USA. Phone: +1 301-407-6500; Fax: +1 301-407-6501; Email: reports@dhsprogram.com; Internet: www.dhsprogram.com.

Recommended citation:

Kafle, Ramesh B., Komal P. Dulal, and Krishna P. Pandey. 2017. *Continuum of Maternal Health Care and the Use of Postpartum Family Planning in Nepal*. DHS Working Paper No. 133. Rockville, Maryland, USA: ICF.

Abstract

Continuum of maternal health care is crucial for women's reproductive health. Initiation of family planning use during the postpartum period also is crucial for both maternal and child health. Nepal has emphasized the continuity of maternal health care as well as the use of modern contraception postpartum. In this context, the paper examines the role of the continuum of maternal care on subsequent use of postpartum family planning. For the analysis, the study uses information obtained in the 2011 Nepal Demographic and Health Survey (NDHS) from women of reproductive age who reported at least one birth in the 5 years before the survey.

Results show that within 12 months following the last birth, 37% of women started using a modern family planning method. Continuity in the use of maternal health care is significantly associated with contraceptive use postpartum after controlling for other socioeconomic and demographic factors. The results imply that providing a continuum of maternal health care—antenatal, delivery, and postnatal—and ensuring that all women receive this care can increase the use of postpartum contraception. It is time to consider the importance of the continuum of maternal health care and to establish responsible institutions to implement and monitor the integrated maternal child health and family planning program during the process of state restructuring and power devolution in the new federal structure in Nepal.

Key words: continuum of maternal health care, postpartum family planning, husband's absence, Nepal

1. Introduction and Rationale

The government of Nepal introduced the National Family Planning Program as an integral part of the Maternal and Child Health Program from its third 5-year plan period 1965-1970 (NPC 1965). From the beginning, the main objective of the National Family Planning Program of Nepal has been to improve the health status of mothers and children and the overall quality of life for the whole family by increasing access to and use of good-quality family planning services. Therefore, the Family Planning Program has become one of the government's most prioritized programs under the Nepal Health Sector Program II (2010-2015). Effective integration of family planning services with other health services and along with other programs has been implemented at the grass-roots level under the regular program through the Department of Health Services and its institutions (DOHS 2014).

The government of Nepal also emphasizes postpartum family planning (PPFP) counseling for women who use postnatal care (MOHP, New Era, and ICF International 2012; DOHS 2014). A woman who comes for any component of maternal health care services routinely gets an opportunity to interact not only with the maternal health personnel but also with many other people who might have come for family planning services. This context generates two pathways. First, a woman who receives maternal health care learns to take care of her own health and growing fetus until she gives birth to the child, and is better able to overcome the existing barriers to use of health services. Second, after a long exposure to health services and interaction with service providers and others gathered for health seeking, a woman gains knowledge of the time to start using a family planning method after delivery. These are the main pathways through which women can get information to better plan their next births. Therefore, use of maternal health care before and during delivery can play a vital role in improving the use of contraception within a year after delivery.

The program related to PPFP is focused on starting family planning soon after delivery so as to maintain appropriate birth spacing for health benefits to both mother and child. In spite of some improvements in fertility planning in Nepal since 2001, the 2011 Nepal Demographic Health Survey (NDHS) revealed that, 12% of the total births in the 5 years preceding the survey were mistimed and 13% of the total births were unwanted (MOHP, New Era, and ICF International 2012; MOHP, New Era, and Macro International Inc. 2007; MOH, New Era, and ORC Macro 2002). Moreover, half of women (50%) maintained birth spacing of less than 36 months, and about a fifth (20%) spaced births less than 24 months apart (MOHP, New Era, and ICF International 2012). Birth spacing of at least 2 years is considered essential for maintenance of good health of women and their children during and after childbirth or breastfeeding. Ensuring that births are adequately spaced is linked to early use of an effective family planning method. Therefore, use of modern contraception postpartum appears to be one of the most important components of the family planning program.

Despite commitments made during each plan period, maternal health care service utilization in Nepal before 1990 was limited, mainly due to the lack of health facilities in rural areas. The 2011 NDHS revealed a substantial improvement in the use of maternal health care services since 2001. In the 2011 NDHS, about 85% of pregnant women made at least one visit for antenatal care (ANC), which was an increase from 74% in 2001 (MOH, New Era, and Macro International 2002; MOHP, New Era, and ICF International 2012). Similarly, in 2011 about 39% of women had given birth in a health facility, representing an increase of 29 percentage points from 2001. In addition, about 45% of women went for a postnatal care (PNC) check-up within 6 weeks of delivery, which is considered to be the most crucial time for both mother and child to get information on maternal and child health. The PNC check-up is very important for a country like Nepal, where 45% of births still take place with the assistance of relatives/friends, which is considered medically unsafe.

Policies and programs on maternal health care in Nepal are consistently updated in line with international recommendations. The Nepal safe motherhood policy of 1998 stresses use of ANC, facility delivery supported by skilled birth attendants, and use of PNC, with a view to save women from maternal complications and deaths. The transportation allowances program, which was initiated in 2005 to support pregnant women delivering at a health institution (DOHS 2005), and maternity health care services, which have been provided at no cost to users since 2009 (DOHS 2009), are the major elements of the safe motherhood program in Nepal. The revised Safe Motherhood and Neonatal Health Long Term Plan (SMNHLTP 2006-2017) includes skilled attendants, safe abortion, and equity and access efforts under the umbrella of safe motherhood (DOHS 2014).

The government's effort to provide maternity services to all pregnant women in Nepal and to improve access to health facilities in the last decade may have further encouraged women to seek care at a health facility. Uptake of services—ANC, delivery at a health facility, and PNC—could play a role in influencing women to start using a family planning method soon after childbirth.

Many earlier studies have focused on the connection between use of maternal health care services and subsequent use of family planning. The literature shows that women's interaction with an organized health service system during the postconception and postpartum stages of reproduction offers an opportunity to provide information and counseling on family planning services. The use of modern methods increases substantially when more women use antenatal and postnatal care (Akinlo, Bisiriyu, and Esimai 2013). Ahmed and Mosley (2002) showed a direct and significant association between contraceptive use and use of maternal health care in a study of six countries with data from DHS surveys. The authors argued that the joint demand for better quality health and limited family size was translated into action through the use of maternal and child health services and fertility regulation.

A study by Zerai and Tsui (2001) showed that, after controlling for effects of living in high health service contact areas and for various demographic and background factors, prior use of prenatal

care had a strong influence on subsequent use of modern contraception in Bolivia, Egypt, and Thailand. A study in Morocco found that if women used MCH services more intensely, they were more likely to use modern contraceptive services subsequently (Hotchkiss et al. 1999). Similarly, a positive association between intensity of MCH service use and subsequent contraceptive use was found in a study of Bolivia, Guatemala, Indonesia, Morocco, and Tanzania (Hotchkiss et al. 2005). Significant associations between the service intensity of ANC and PNC combined, as well as ANC only, and postpartum modern contraceptive use were also found in Kenya and Zambia, indicating that use of such services would be an opportunity to promote modern contraceptives use (Do and Hotchkiss 2011).

Aside from maternal health services, other factors influence the use of family planning postpartum. For example, a study in Nigeria found that social and cultural factors often prevented women from obtaining reproductive health care, including family planning, indicating a need for programs to help overcome the problem in order to provide safe motherhood to all women (Yahaya 2002). Region, education, household wealth, and exposure to family planning messages are significant predictors of modern contraceptive use in the postpartum period in Nigeria (Akinlo, Bisiriyu, and Esimai 2013).

Likewise, a multi-country study based on 43 DHS surveys showed a strong correlation between use of maternal health care and use of postpartum family planning, particularly by women's urban location, household wealth, education, achievement of desired family size, and current fertility desires (Winfrey and Rakesh 2014). Their result also showed that in most of the countries postpartum contraceptive use was not strongly related to women's age, parity, and whether the last birth was wanted. Wamala, Kabagenyi, and Kasasa (2017), using data from the 2011 Uganda DHS survey, analyzed time-to-contraceptive use after resumption of sexual intercourse after last childbirth among Uganda's married women, and found that women with no formal education, women who gave birth at home or with traditional attendants, and women in the lowest wealth quintile took a significantly longer time after childbirth to begin use of modern contraceptives.

Male migration to foreign countries for earning has become more common in Nepal. About one-third of currently married women of reproductive age in Nepal reported their husbands staying away from home at the time of the 2011 NDHS (MOHP, New Era, and ICF International 2012). Spousal separation due to a husband's migration in Nepal has influenced contraceptive use (Khanal et al. 2013; Kafle 2016). Husband's presence or absence in the specified postpartum period could have a direct influence on use of a modern family planning method.

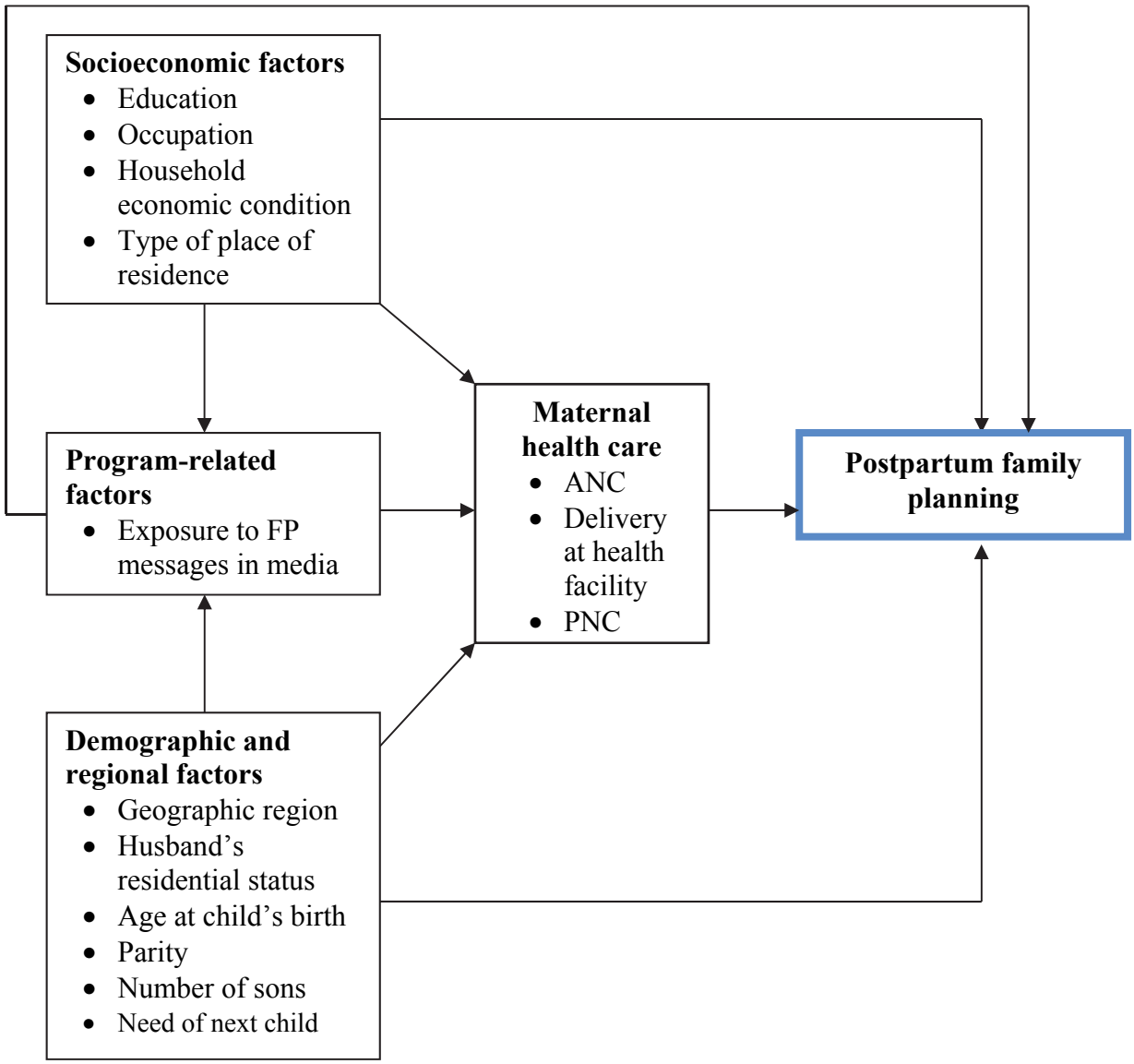
Behavioral scientists argue that the adoption of a new behavior is a process that involves passage through a sequence of behavioral changes that begins with awareness, extends through accumulation of knowledge, and ends in behavioral consolidation. Emphasizing hierarchical behavioral models, McGuire (1981) urged that the consolidation of one behavior may facilitate more rapid adoption of a similar behavior. Therefore, a woman going for maternal health care

services may be more likely to learn about and adopt family planning. Such a behavioral model helps to analyze the connection between adoption of maternal health care services and timely adoption of family planning services.

Many of the past studies mentioned above have taken the 3components of maternal health service in isolation instead of as a single set. Considering these 3 sequential components of maternal health together as a continuum of care envisions the length of women's exposure to health providers during their service uptake. A continuous service uptake in all the stages of maternity means that women have a longer exposure to health care, which might be associated with an easier and quicker behavioral change in terms of subsequent family planning use. Therefore, this study considers that a continuous use of maternal health service can play a crucial role in using family planning postpartum within a year of childbirth. A detailed study of this kind is expected to fill the literature gap in the Nepalese context. Therefore, a study on determining the role of maternal health care service uptake in postpartum family planning use is considered imperative for developing countries like Nepal.

The study was guided by a conceptual framework, presented in Figure 1, which represents the relationship among the study variables. The main outcome variable is use of postpartum family planning, and the main explanatory factor is use of a continuum of maternal health services. Socioeconomic, demographic, and regional factors may influence the extent to which women receive messages in the media related to family planning. These variables, selected on the basis of empirical research, also play critical roles in continuous delivery of maternal health care services. We hypothesize that the continuous uptake of maternal care plays an important role in a woman's adoption of family planning within a year after her child's birth. The direct influence of continuous uptake of maternal health service use, after controlling for socioeconomic, demographic, and other regional factors, cannot be ignored in postpartum family planning use.

Figure 1. **Conceptual framework for the study**



2. Research Objectives and Questions

2.1 Objectives

The objectives of this study were to:

1. Determine the proportion of women initiating use of modern contraception within 12 months after childbirth;
2. Analyze the differentials in the use of modern contraception within 12 months of childbirth by selected socioeconomic and demographic factors;
3. Examine the role of receiving maternal health care services in initiating the use of modern contraception within 12 months after childbirth.

2.2 Research Question

In short, this research tried to answer the following question:

> *Is women's initiation of modern contraceptive use within 12 months of childbirth associated with their use of maternal health care services even after controlling for other factors?*

3. Data and Methods

3.1 Data and sample

The study used data from the 2011 Nepal Demographic and Health Survey (NDHS). The 2011 NDHS was a nationally representative survey conducted for the fourth round in Nepal as part of The DHS Program. It was carried out under the aegis of the Ministry of Health and Population under the technical assistance of ICF and funded by the United States Agency for International Development (USAID).

The 2011 NDHS used a 2-stage sampling design and interviewed 12,674 women age 15-49 and 4,121 men age 15-49 from 10,826 sampled households. This analysis used only the information from Woman's questionnaire.

The dataset contained calendar information on the use of family planning methods for the 5 years before the survey month. Information on uptake of maternal health care services (ANC, delivery at a health facility, and PNC) was also collected for the most recent child born to a woman in the 5 years before the survey. This analysis was restricted to women who had at least one live birth during the 5 years before the survey. The analysis pertained to the most recent birth in this reference period. Applying these selection criteria, the final study sample was 4,148 women age 15-49.

3.2 Key variables and measurements

The outcome variable for the present study was the use of postpartum family planning (PPFP). This was defined as the use of any modern method—pill, IUD, injection, implant, condom (male or female), diaphragm, foam/jelly, and sterilization (male or female)—in the first 12 months following the most recent childbirth[1]. Women with their last child under age 12 months were also included in analysis. PPFP was measured as a dichotomous variable, coded "1" for use of any modern method of family planning within 12 months following the childbirth, and "0" otherwise.

The outcome variable was constructed from the calendar data collected in the survey. The DHS calendar records month-by-month information about each woman's experiences with childbearing and contraceptive use for a period of 5-6 years preceding the date of interview. Based on information provided by the woman about the date of her most recent birth and start date of using a modern method, duration in months was obtained from the last birth to the initiation of modern contraceptive method use. This duration was modeled in the survival analysis.

[1]Lactational amenorrhea method (LAM) was not included in the modern methods studied because this method is advised only for use during the 6 months following childbirth. Actually, no women reported use of LAM during the period of interest.

The explanatory variable of interest was women's use of maternal health care services. Information on ANC, place of delivery, and PNC for the most recent birth was used to construct a variable representing the continuum of maternal health care. First, the number of ANC visits was dichotomized as "0" for less than 4 visits, and "1" for at least four visits. Similarly, place of delivery was coded as "1" for institutional delivery, and "0" otherwise, and PNC was coded "1" if the woman had received PNC services within 6 weeks following childbirth, and "0" otherwise. The three variables were then used to generate the following eight categories of women using various combinations of the three services: none of the services; ANC only; facility delivery only; PNC only; ANC and facility delivery only; ANC and PNC only; facility delivery and PNC only, and all three services. Women who used all three components of maternal health care were categorized as "continuous service received." Each woman in this category sequentially used all three kinds of maternal health services, as recommended and provided by the government. All women who used any one or two of the three components of maternal health services, but not all three, were treated as a separate category in the analysis. These were the women who encountered some kind of discontinuation somewhere in the process of obtaining all three maternal care services. This category therefore was termed "discontinuous service received." All remaining women were categorized as "no service received."

A number of socioeconomic and demographic variables were controlled for in the multivariate analysis examining the association between the key explanatory factor (use of maternal health services) and outcome variable (postpartum modern contraceptive use). Women's education, occupation, household economic condition, type of place of residence, geographical region of residence, and exposure to family planning messages in the mass media were socioeconomic factors considered for analysis. Choice of these variables was made based on the existing empirical literature, as discussed earlier.

A variable representing husband's presence or absence during the reference period was considered for analysis. The data file for women contained a variable on husband's absence at the time of survey. This variable was not sufficient to capture husband's presence or absence during the specified postpartum period. Therefore, a variable on husband's absence during the 12 months after birth was computed based on the age of last child and the duration of husband's absence at the time of the interview.

Women's age at the time of the index child's birth, their parity, and fertility preferences were also considered as demographic factors for analysis. Higher preference for sons versus daughters is a cultural phenomenon in Nepal that has some influence on family planning use (Leone, Matthews, and Zuanna 2003). Therefore, women's number of living sons was also considered in the analysis. Table 1 provides the details of the study variables.

Table 1. **List of variables included in the analysis with their categories**

Variables	Categories and coding
Postpartum family planning use (PPFP)	Used a modern method in 12 months after the most recent birth (1); otherwise (0)
Time to start PPFP use	Number of months after last childbirth
Maternal health care services	No service received; discontinuous service received (received only 1 or 2 services); continuous service received (received all 3 services)
Place of residence	Urban; rural
Geographical region	Mountain; Hill; Tarai
Women's education	No education; up to primary (up to grade 8); secondary and above (higher than grade 8)
Women's occupation	Not working; agriculture; non-agriculture
Household wealth quintile	Lowest; second; middle; fourth; highest
Exposure to family planning messages in mass media (radio, television and newspaper in recent months)	Not exposed (exposed to no type of media); exposed (exposed to at least one of the media)
Husband's presence during the reference period	Present; absent
Maternal age at the last childbirth	Under age 20; 20-34; 35 and above
Parity	1; 2; 3+
Number of sons	No son (0); at least one son (1+)
Fertility preference	Want next child soon; want later; want no more

3.3 Analytical methods

Data analysis was performed with STATA 14 software. Individual women's sample weight was applied to take into account the differences in probability of selection and nonresponse. The effect of complex survey design that was followed in Nepal DHS was accounted for by applying the *svy* command. We described women's use of maternal health services and distribution of the study sample for the selected study variables. The cumulative proportion of women starting a modern family planning method over time was also obtained.

The main outcome of interest was whether a woman started using a modern family planning method within 12 months following childbirth and after how many months she started to do so. Therefore, survival analysis was considered appropriate. For this, the "event" (failure) was use of postpartum family planning and the "duration" was the number of months after childbirth at which the woman started using contraception. The duration variable was measured up to 12 months (follow-up period), and all women who did not start using contraception within 12 months were considered to be survivors and were not followed up, so it is not known if they used any modern method subsequently. Those women who had their last child less than 12 months earlier and had not started using a modern family planning method by the time of the survey were considered to be censored cases. Survival probabilities were presented as Kaplan-Meier (K-M) survival function; K-M curves for different categories of maternal health care service utilization and other selected variables were computed. The differences in the survival curves for different categories of each study variable were examined by applying the Log-Rank test. Finally, Cox regression was used to examine the unadjusted effect of each of the variables and the adjusted effect of use of maternal health care services on postpartum modern contraceptive use after controlling for selected

socioeconomic and demographic factors. Because the aim of this paper was to examine the association between maternal health care service uptake and postpartum modern contraceptive use after controlling for selected socioeconomic and demographic factors, all the variables selected for study were included in the regression rather than a specific model fitting to establish a significant association. However, a pair-wise correlation matrix was examined to detect possible multicollinearity; none of the pairs showed correlation greater than 0.6.

3.4 Data limitations

General limitations that are applicable for cross-sectional survey data, especially the issues of recall lapses in retrospective data collection and inability to establish a cause-and-effect relationship, are also applicable to this study. The possibility of recall bias in the retrospectively collected calendar data cannot be ruled out. Methodological analysis has shown that the DHS calendar does not completely capture episodes of contraceptive use, and calendar data appear to underestimate episodes of contraceptive use (Bradley, Winfrey, and Croft 2015). However, use of calendar methods to collect data on contraceptive use in large-scale retrospective surveys has become standard practice (Callahan and Becker 2012), and reporting of contraceptive histories in calendar form has been found superior to other standard forms (Goldman, Moreno, and Westoff 1989).

Moreover, some of the variables used in analysis pertain to the status of respondents at the time of the survey rather than to the reference period of study. For instance, education of women corresponds to the survey date. It was found that less than 6% of the women had the index birth before age 18. Therefore, it would be reasonably safe to assume that the current educational distribution of women was almost similar to that at the time their last children were born, at least for women with no education or only a primary education. Some changes in the educational level of women who had attained a higher level of education at the time of survey could be possible, but such detailed information was not gathered in the dataset. Because there was no information on the exposure of women to family planning messages through mass media (radio, television, and newspaper) during the reference period of study, the same information for the survey date with a reference period of a few months before the survey was used as a proxy. Rather than using common variables of media exposure, it was considered better to use exposure to family planning messages in the media.

4. Results

4.1 Background characteristics of respondents

Table 2 presents the percent distribution of the sample according to selected socioeconomic and demographic characteristics. The women under study were predominantly from rural areas (90%), and about half lived in the Tarai region (52%). Nearly half (45%) of the women were uneducated, and 58% worked in an agricultural occupation. The distribution of women by household wealth quintile shows that the highest proportion (24%) were in the lowest wealth quintile, and the lowest proportion (16%) were in the highest wealth quintile. About 60% of women were recently exposed to family planning messages in the mass media. Among the survey respondents, 14% stated that their husbands were absent from home during the first 12 months following the last childbirth.

About three-quarters of the women were age 20-34 when they gave birth to their last child within 5 years before the survey, while 18% were under age 20. Forty-one percent of women were of third or higher parity, and around one-third (32%) were of first parity at the last birth. Nearly three-quarters of women had at least one son at the time of their last birth. Regarding fertility preferences, nearly 7 in every10 women stated that they wanted no more children. Some 8% of women wanted another child within 2 years, whereas 24% wanted another child later.

Table 2. **Percent distribution of women whose last birth was within the 5 years before the survey, by selected background characteristics, Nepal DHS 2011**

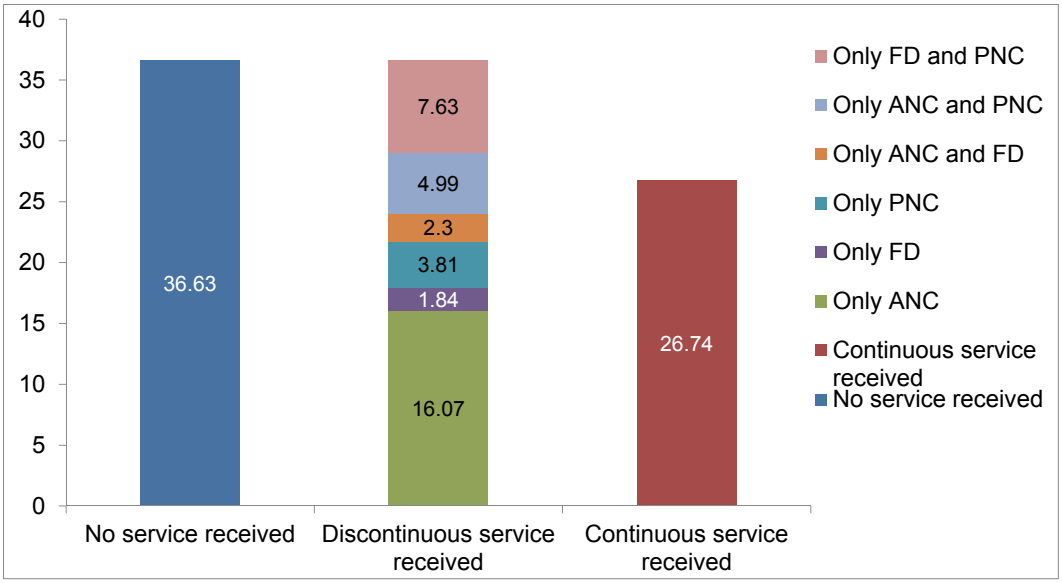
Background characteristics	Percentage	Number
Place of residence		
Urban	10.1	418
Rural	89.9	3730
Geographical region		
Mountain	7.4	306
Hill	40.2	1668
Tarai	52.4	2174
Women's education		
No education	45.0	1869
Up to primary	33.5	1388
Secondary and above	21.5	891
Women's occupation		
Not working	27.7	1150
Agriculture	58.2	2415
Non-agriculture	14.1	583
Household wealth quintile		
Lowest	23.6	979
Second	21.7	899
Middle	21.0	873
Fourth	18.0	748
Highest	15.7	649
Exposure to FP message in mass media		
Not exposed	42.4	1757
Exposed	57.6	2391
Husband's presence*		
Present	86.3	3546
Absent	13.7	561
Maternal age at last childbirth		
Less than 20	17.8	739
20-34	74.4	3085
35 and above	7.8	324
Parity		
1	31.4	1302
2	28.0	1162
3+	40.6	1684
Number of living sons		
0	26.4	1097
1+	73.6	3051
Fertility preference		
Want soon	6.9	285
Want later	24.1	1001
Want no more	69.0	2862
All	100.0	4148

* Husband's presence was calculated only for currently married women at the time of survey (n=4107).

4.2 Use of Maternal Health Care Services

Figure 2 shows use of maternal health care in terms of the number of ANC, facility delivery, and PNC services received. More than one-third (37%) of women received none of the three services. Similarly, 37% of women used only one or two of the services. About one-fourth (27%) of women used all three components of maternal health care at the last childbirth. With respect to the continuity of services, discontinuity in use of the three services substantially prevails. For example, 16% of women had only ANC, 5% had only ANC and PNC, and 8% had only facility delivery and PNC.

Figure 2. **Maternal health care received for the most recent birth**



4.3 Results from survivor analysis

Table 3 shows how women start using a modern method of family planning following childbirth. Declining survivor probabilities over the time indicate an upward trend in modern contraceptive use after childbirth. Figure 3 depicts the proportion of modern contraceptive users over time based on the reproductive calendar data. Seven percent of women had started using modern contraceptives by the end of the second month after childbirth. The proportion of users shows a gradual increase in the level of modern contraceptive use over the months, reaching 23% after 6 months, 30% after 9 months, and 37% after 12 months.

Table 3. **Survivor function of postpartum family planning use within 12 months from the time of childbirth for women who had given birth in the 5 years preceding the survey**

Beginning time (months)	Total number of exposure	Failure (due to FP use)	Lost (due to censoring)	Survivor function*	Standard error	95% confidence interval
1	4079	127	45	0.9689	0.0027	[0.9631, 0.9738]
2	3907	158	82	0.9297	0.0040	[0.9214, 0.9371]
3	3667	175	85	0.8853	0.0050	[0.8750, 0.8948]
4	3407	175	90	0.8398	0.0058	[0.8280, 0.8509]
5	3142	135	75	0.8038	0.0064	[0.7910, 0.8159]
6	2932	122	78	0.7703	0.0068	[0.7567, 0.7833]
7	2732	122	67	0.7359	0.0072	[0.7216, 0.7496]
8	2543	69	65	0.7159	0.0074	[0.7013, 0.7301]
9	2409	74	78	0.6940	0.0076	[0.6789, 0.7085]
10	2257	73	62	0.6715	0.0078	[0.6561, 0.6864]
11	2122	63	58	0.6516	0.0079	[0.6358, 0.6668]
12	2001	75	1926	0.6272	0.0081	[0.6110, 0.6428]

* This gives the proportion not using PPFP till the corresponding month of follow up.

Figure 3. **Cumulative proportion of women who started using any modern method of family planning by duration from last childbirth, Nepal 2011**

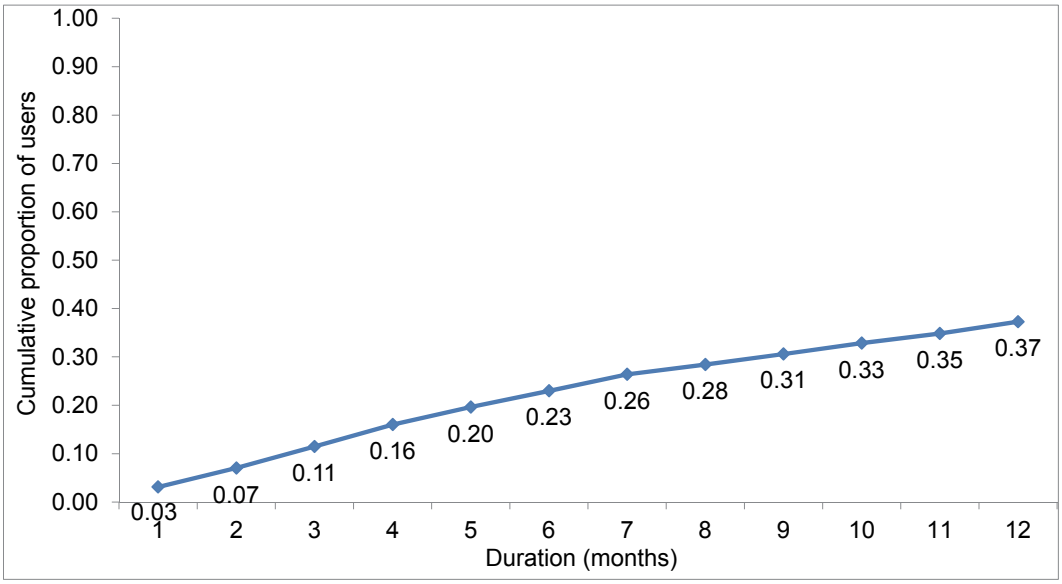
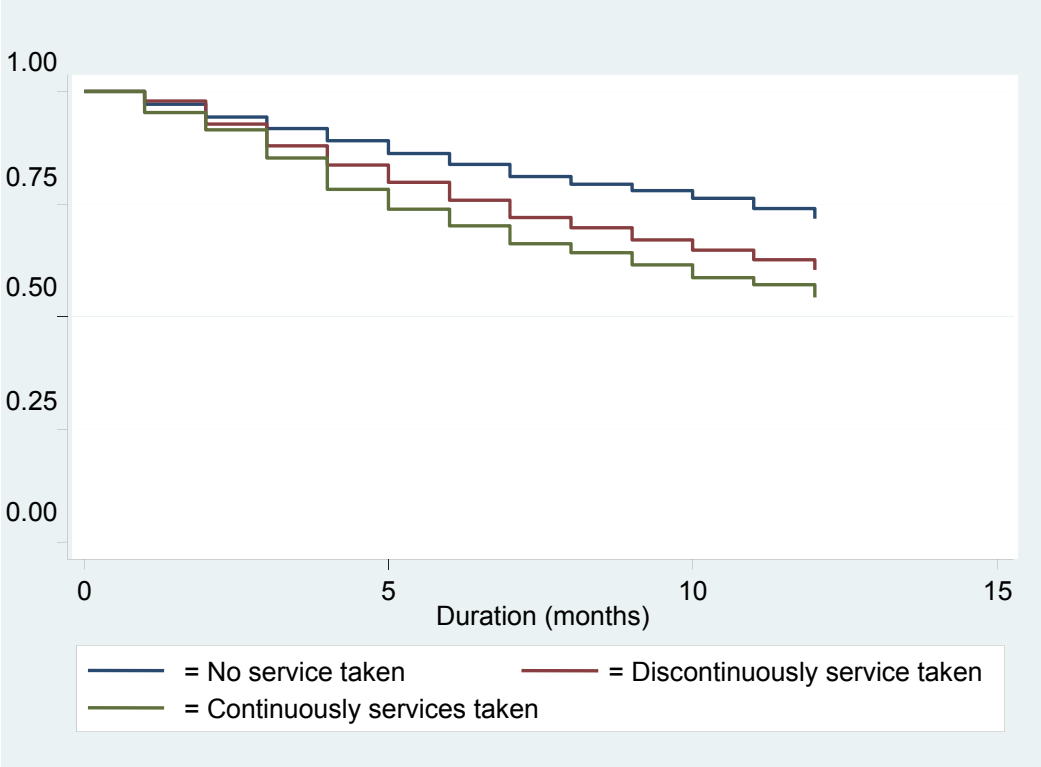


Figure 4 presents salient features of the differences in the Kaplan-Meier survival curves by maternal health care service uptake and other selected characteristics. It is evident that the survival curves are substantially different for women who used none of the three maternal health services, used only one or two of the services, or used all three components of services continuously. Similarly, the Kaplan-Meier survival curves differ for various educational categories of women, their occupations, and their husband's residential status during the reference period. For example, a vast difference between the ultimate proportions of survivors is evidenced by husband's residential status, indicating a very low ultimate proportion of modern contraceptive use among

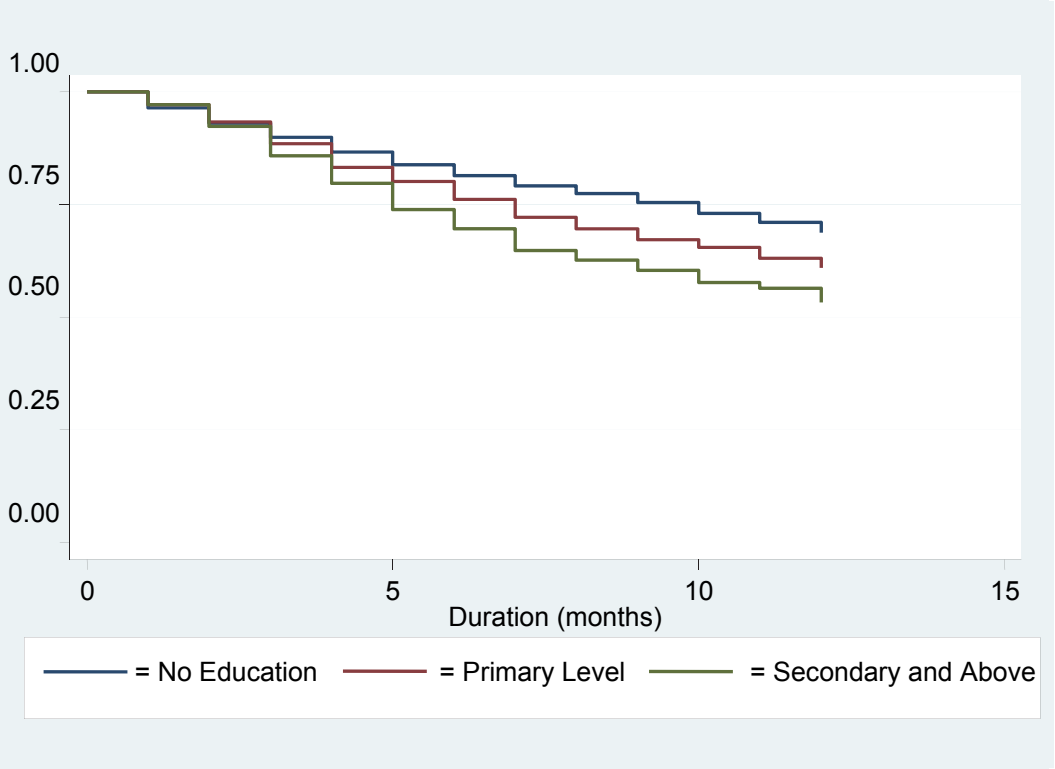
women with their husbands absent compared with those living with their husbands during the 12 months following the last childbirth.

Figure 4. **Kaplan-Meier survival curves of postpartum family planning use within 12 months from childbirth by selected characteristics of women, Nepal 2011**

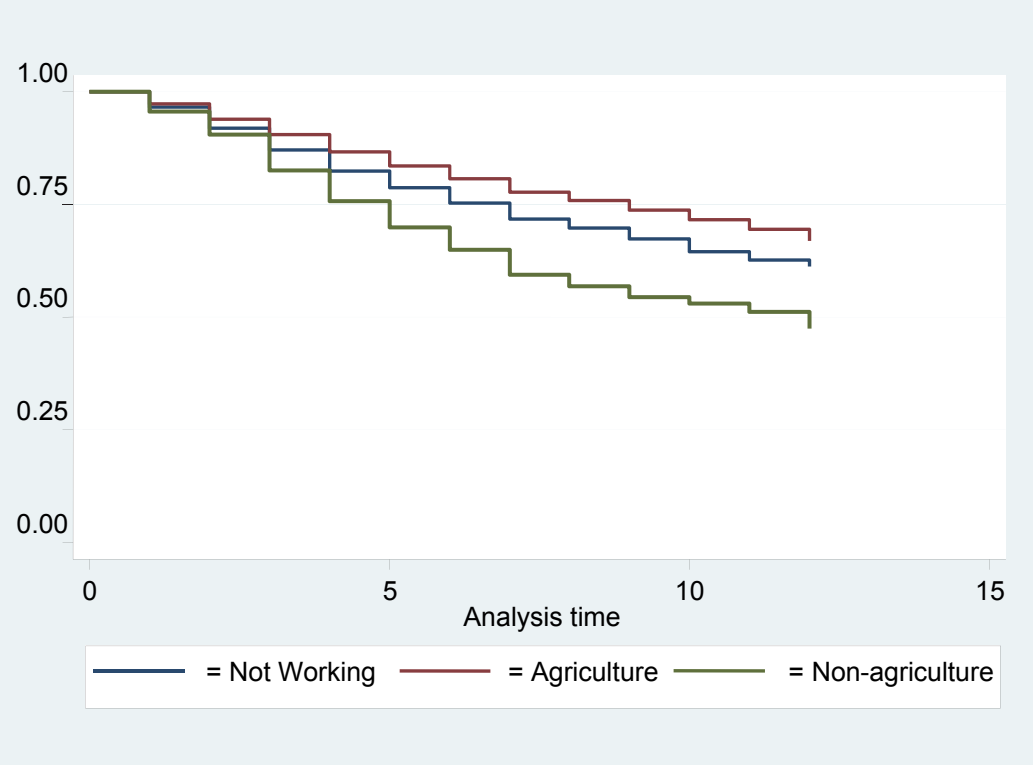
(a) Kaplan-Meier survival curves by maternal health care service utilization



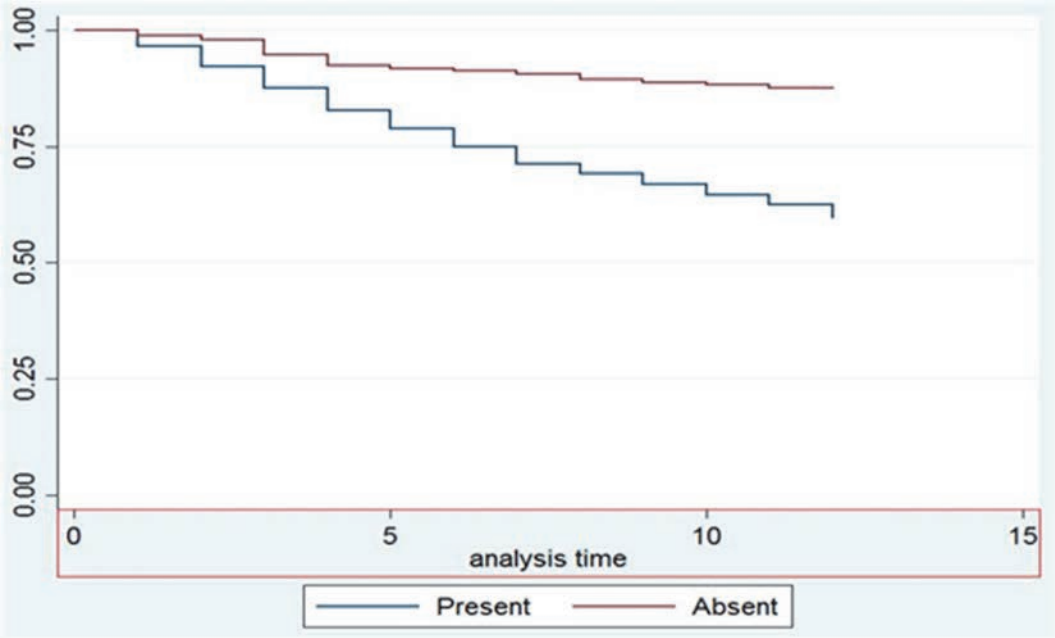
(b) Kaplan-Meier survival curves by women's education



(c) Kaplan-Meier survival curves by women's occupation



(d) Kaplan-Meier survival curves by husband's residential status



Moreover, the Log-Rank test was performed to examine the significance of the differences among the survival curves for various categories of each of the background characteristics and use of the maternal health services. Table 4 summarizes the results. Except for parity and the number of living sons, survival functions for family planning use postpartum are significantly different for various categories of all other selected characteristics.

Table 4. **Results of Log-Rank test for equality of survivor functions of postpartum family planning use for selected background characteristics, Nepal 2011 (using non-parametric test)**

Background characteristics	Chi square	p-value
Maternal health care service	84.3	p<0.001
Place of residence	46.2	p<0.001
Geographical region	23.9	p<0.001
Women's education	59.0	p<0.001
Women's occupation	87.3	p<0.001
Household wealth quintile	123.9	p<0.001
Exposure to FP message in mass media	48.4	P<0.001
Husband's presence	94.9	p<0.001
Maternal age at last childbirth	20.4	p<0.001
Parity	3.7	P=0.157
Number of living sons	1.9	p=0.170
Fertility preference	20.8	p<0.001

4.4 Results of multivariate analysis

Table 5 presents the unadjusted and adjusted hazard ratios of postpartum family planning use. A significant positive association between maternal health care service uptake and postpartum family planning use was observed without controlling for other factors. Similarly, women's urban residence, being more educated, working in the non-agricultural sector, better household economic condition, exposure to family planning messages in the mass media, less preference for having another child, lower age at last childbirth, and husband's presence were associated with significantly higher relative risk of postpartum contraceptive use, when these factors were examined one by one. Geographical region of residence, women's parity, and number of sons were not significant associated with postpartum family planning use.

The use of maternal health care services remained a significant predictor of the risk of using family planning postpartum after controlling for other socioeconomic and demographic factors. Compared with women who used none of the three maternal health services, women who used any of the services had a significantly higher likelihood of postpartum contraceptive use. When women received all three components of maternal health care continuously, their risk of using a modern method of family planning significantly increased by 1.36 times ($p<0.01$) compared with women who did not use any maternal health services. Moreover, the risk of starting family planning in the postpartum period were significantly higher (HR= 1.27, $p<0.01$) for women who received any kind of discontinuous maternal health service. However, comparison of the unadjusted and adjusted hazard ratios indicated that the strength of association between maternal health care service uptake and postpartum contraceptive use was reduced to some extent by other explanatory variables.

Table 5. **Unadjusted and adjusted hazard ratios for postpartum family planning use for selected background characteristics of women, Nepal 2011**

Background characteristics	Unadjusted hazard ratios	95% CI	Adjusted hazard ratios	95% CI
Maternal health care services				
No service received	1		1	
Discontinuous service received	1.45***	[1.21,1.75]	1.27**	[1.07,1.52]
Continuous service received	1.77***	[1.47, 2.13]	1.36**	[1.10, 1.67]
Place of residence				
Urban	1		1	
Rural	0.64***	[0.54, 0.76]	0.87	[0.72, 1.05]
Geographical region				
Mountain	1		1	
Hill	0.98	[0.79, 1.21]	0.87	[0.70, 1.05]
Tarai	1.17	[0.93, 1.46]	1	[0.80, 1.23]
Women's education				
No education	1		1	
Up to primary	1.25**	[1.06, 1.47]	1.01	[0.85, 1.20]
Secondary and above	1.60***	[1.32, 1.95]	0.97	[0.74, 1.27]
Women's occupation				
Not working	1		1	
Agriculture	0.97	[0.78, 1.19]	1.28*	[1.03, 1.58]
Non-agriculture	1.79***	[1.43, 2.23]	1.57***	[1.26, 1.97]
Household wealth quintile				
Lowest	1		1	
Second	1.23	[0.98, 1.54]	1.14	[0.90, 1.40]
Middle	1.44**	[1.14, 1.82]	1.37**	[1.11, 1.70]
Fourth	1.75***	[1.39, 2.20]	1.54**	[1.17, 2.04]
Highest	2.28***	[1.81, 2.86]	1.66**	[1.18, 2.34]
Exposure to FP message in mass media				
Not exposed	1		1	
Exposed	1.52***	[1.28, 1.79]	1.22*	[1.02, 1.46]
Husband's presence[1]				
Present	1		1	
Absent	0.29***	[0.21, 0.40]	0.30***	[0.22, 0.42]
Maternal age at last childbirth				
Less than 20	1		1	
20-34	1.12	[0.94, 1.34]	1	[0.81, 1.22]
35 and above	0.57***	[0.42, 0.76]	0.54**	[0.38, 0.76]
Parity				
1	1		1	
2	1.04	[0.87, 1.25]	0.96	[0.80, 1.15]
3+	0.95	[0.82, 1.11]	1.1	[0.90, 1.36]
Number of living sons				
0	1		1	
1+	1.1	[0.93, 1.29]	1.15	[0.97, 1.35]
Fertility preference				
Want soon	1		1	
Want later	1.3	[0.89, 1.90]	1.38	[0.94, 2.01]
Want no more	1.66*	[1.12, 2.46]	1.66*	[1.12, 2.44]
Number of cases	**4148**		4107	

***p<0.001; **p<0.01; *p<0.05

[1] For unadjusted model, husband presence refers to only currently married women at the time of survey (N=4107).

In the multivariate model, when all the factors were included in analysis and the results were compared with those of bivariate models, place of residence and women's education did not remain significant in the risk of postpartum family planning use. However, after controlling for other factors, a significantly higher relative likelihood of postpartum contraceptive use was observed among women working in the non-agricultural sector (HR=1.57, $p<0.001$) compared with non-working women, women exposed to the mass media (HR=1.22, $p<0.05$) compared with women unexposed, and women in the middle (HR=1.37, $p<0.01$), fourth (HR=1.54, $p<0.01$), or highest (HR=1.66, $p<0.01$) wealth index quintiles compared with those in the lowest quintile.

Husband's absence during the postpartum period was significantly associated with much lower relative risk of postpartum contraceptive use (HR=0.30, $p<0.001$ for women whose husbands were absent during the reference period compared with those who lived with their husbands). Its strength remained almost the same in bivariate and multivariate models, indicating its consistently high importance to explaining variation in the likelihood of using family planning postpartum. Higher maternal age at last childbirth was associated with reduced risk of using contraception postpartum. Compared with women under age 20 at the time of the last childbirth, women age 35 or older had a 44% lower risk of family planning use in the postpartum period. Similarly, women had a significantly greater hazard of postpartum contraceptive use if they did not intend to have another child (HR 1.66, $p<0.05$ for women who want no more children compared with those who want another child soon).

5. Discussion

The present study was designed to examine the association between maternal health care service uptake and postpartum family planning use in the Nepalese context. Some studies have taken the three major components of maternal health care services—ANC, delivery at a health facility, and PNC—separately to assess the association of receiving maternal health care with using contraception postpartum, while others have considered only ANC and delivery services. The present study considered all the three services together and considered maternal health service as a continuum.

The government of Nepal has a program that provides all three services at no cost to users if a woman takes all 3 services as a continuum of maternal care. The national planning commission of Nepal has targeted 203 as the date by which 90% of women should receive all three maternal health services (NPC 2015).

The study results showed a significant association of postpartum family planning use with maternal health service uptake after controlling for various socioeconomic and demographic factors. This finding is in line with other studies (Akinlo, Bisiriyu, and Esimai 2013; Wamala, Kabagenyi, and Kasasa 2017). In a study in Uttar Pradesh, India, Yadav and Dhillon (2015) showed that use of ANC, institutional delivery, and postnatal care services encouraged subsequent contraceptive use.

The study presented several important determinants of postpartum family planning use within 12 months of the last childbirth. Women's non-agricultural occupation, higher household wealth, exposure to family planning messages in the media, and preference for not having another child are some of the important factors associated with higher chances of using contraception within 12 months of the last childbirth. These findings are consistent with those of other studies (Gebreselassie, Retstein, and Mishra 2008; Do and Hotchkiss 2011; Akinlo, Bisiriyu, and Esimai 2013).

In the Nepalese context, a husband's absence during the specified postpartum period is one of the most important determinants of non-use of contraception postpartum and is a special phenomenon. It has consistent influence even after controlling for other socioeconomic and demographic factors. Perceived low risk of pregnancy due to infrequent sexual activity or none may be the reason for very low use of contraception among women with migrant husbands. This study finds that place of residence, women's education, and parity do not show significant differences in adjusted relative risk of postpartum family planning use. This finding differs from those of Akinlo, Bisiriyu, and Esimai (2013) in Nigeria, where, apart from the wealth index and exposure to family planning messages, region of residence and women's education are also significant predictors of the use of contraception in the postpartum period.

6. Conclusion and Policy Implications

The study finds that an increase in use of a continuum of maternal health care services supports women in their use of modern family planning methods postpartum, within a year after childbirth. To maintain good reproductive health among Nepalese women, advocacy is essential to promote maternal health care services continuously, as soon as the pregnancy is noticed. Though these services are widely spread across the country, even at the grass roots level, current services should be convenient and ensure that all women can have access to and receive all three components of maternal health care service, instead of using them only when they feel the necessity. Ensuring that all women receive a continuum of maternal health care promotes family planning use, thus improving their own health and that of their children.

Though maternal health and family planning services are available at no cost to users through the government program in Nepal, many opportunities are missed for counseling and services related to family planning. An almost stagnant level of family planning use and a high level of unmet need for family planning are evidence of this (MOHP, New Era, and ICF International 2012). Moreover, there is difficulty accessing services in rural and remote areas of the country. The prime focus of postnatal care in Nepal is to provide postpartum family planning counseling (DOHS 2014). However, only 9% women who had a live birth in the 5 years preceding the survey stated that they received counseling during their postnatal check-up, indicating many missed opportunities to impart information on family planning methods and services (MOHP, New Era, and ICF International 2012).

Nepal, as a signatory to the Sustainable Development Goals (SDGs), should consider this situation while drafting policies and implementing programs. The findings of this study reinforce the need for information and counseling for continuous maternal health care service uptake from the beginning of pregnancy through the postpartum period. This is required for the country to help women remain in contact with health personnel, thus ensuring their reproductive health. Enhancement of this activity may support the aim of government to raise the level of use of maternal health care services—ANC, facility delivery, and PNC—to 90% by2030 (NPC 2015). Therefore, it is also vital to consider the importance of the continuum of maternal health care services and to establish a responsible institution for monitoring the program during the process of state restructuring and power devolution in the newly established federal structure in Nepal.

References

Ahmed, S., and W. H. Mosley. 2002. "Simultaneity in the Use of Maternal Child Health Care and Contraceptives: Evidence from Developing Countries." *Demography* 39(1): 75-93.

Akinlo, A., A. Bisiriyu, and O. Esimai. 2013. "Influence of Use of Maternal Health Care on Postpartum Contraception in Nigeria." DHS Working Paper Series No. 92. Calverton, Maryland, USA: ICF International.

Bradley, S. E. K., W. Winfrey, and T. N. Croft. 2015. "Contraceptive Use and Perinatal Mortality in the DHS: An Assessment of the Quality and Consistency of Calendars and Histories." DHS Methodological Reports No. 17. Rockville, Maryland, USA: ICF International.

Callahan, R. L., and S. Becker. 2012. "The Reliability of Calendar Data for Reporting Contraceptive Use: Evidence from Rural Bangladesh." *Studies in Family Planning.* 43(3): 213–222.

Department of Health Services [DOHS]. 2014. "Annual Report (2012/13)." Kathmandu: Department of Health Services, Family Health Division, Ministry of Health and Population.

Department of Health Services [DOHS]. 2009. "Operational Guidelines on Safe Motherhood Programme 2009 [2066]." Kathmandu: Department of Health Services, Family Health Division, Ministry of Health and Population.

Department of Health Services [DOHS]. 2005. "Operational Guidelines on Incentives for Safe Delivery Services 2005 [2062]." Kathmandu: Department of Health Services, Family Health Division, Ministry of Health and Population.

Do, M., and D. Hotchkiss. 2011. "Relationships between Maternal Health Care and Postpartum Modern Contraceptive Use in Kenya and Zambia." Working Paper. Chapel Hill, NC, USA: Carolina Population Center, University of North Carolina at Chapel Hill.

Gebreselassie, T., S. O. Rutstein, and V. Mishra. 2008. "Contraceptive Use, Breastfeeding, Amenorrhea and Abstinence during the Postpartum Period: An Analysis of Four Countries." DHS Analytical Studies No. 14. Calverton, MD, USA: Macro International Inc.

Goldman, N., L. Moreno, and C. F. Westoff. 1989. "Collection of Survey Data on Contraception: An Evaluation of an Experiment in Peru." *Studies in Family Planning* 20(3):147-57.

Hotchkiss, D. R, J. J. Rous, E. E. Seiber, and A. A. Berruti. 2005. "Is Maternal and Child Health Services Use a Casual Gateway to Subsequent Contraceptive Use? A Multicountry Study." *Population Research and Policy Review* 24(6):543-571.

Hotchkiss, D. R., J. Magnani, J. J. Rous, M. Azelmat, T. A. Mroz, and J. Heikel. 1999. "The Effects of Maternal-Child Health Service Utilization on Subsequent Contraceptive Use in Morocco." *Journal of Biosocial Science* 31(2): 145–165.

Khanal M. N., D. R. Shrestha, P. D. Panta, and S. Mehata. 2013. "Impact of Male Migration on Contraceptive Use, Unmet Need and Fertility in Nepal." Further analysis of the 2011 Nepal Demographic and Health Survey. Calverton, Maryland, USA: Nepal Ministry of Health and Population, New ERA, and ICF International.

Kafle, R. B. 2016. *"Fertility Transition in a Low Income Country: The Case of Nepal."* Ph. D. Thesis, New Delhi: Jawaharlal Nehru University.

Leone, T., Z. Matthews, and G. D. Zuanna. 2003. "Impact and Determinants of Sex Preference in Nepal." *International Family Planning Perspectives* 29(2):69–75.

McGuire, W. J. 1981. "The Theoretical Foundations of Campaigns in Rice." In *Public Communication Campaign,* edited by W. and W. Paisley. pp: 41-70. Beverly Hills, CA: Sage Publications.

Ministry of Health and Population (MOHP) [Nepal], New ERA, and ICF International Inc. 2012. *Nepal Demographic and Health Survey 2011*. Kathmandu, Nepal: Ministry of Health and Population, New ERA, and ICF International, Calverton, Maryland.

Ministry of Health and Population (MOHP) [Nepal], New ERA, and Macro International Inc. 2007. *Nepal Demographic and Health Survey 2006*. Kathmandu, Nepal: Ministry of Health and Population, New ERA, and Macro International Inc.

Ministry of Health [Nepal], New ERA, and ORC Macro. 2002. *Nepal Demographic and Health Survey 2001*. Calverton, Maryland, USA: Family Health Division, Ministry of Health; New ERA; and ORC Macro.

National Planning Commission (NPC). 2015. "Sustainable Development Goals, 2016-2030, National (Preliminary) Report." Kathmandu: National Planning Commission, Government of Nepal.

National Planning Commission (NPC). 1965. "The Third Plan (1965-70)." Kathmandu, Nepal: National Planning Commission.

Wamala, R., A. Kabagenyi, and S. Kasasa. 2017. "Predictors of Time-to-Contraceptive Use from Resumption of Sexual Intercourse after Birth among Women in Uganda." *International Journal of Population Studies* 2017:1-12 . doi.org/10.1155/2017/3875452.

Winfrey, W., and K. Rakesh. 2014. "Use of Family Planning in the Postpartum Period." DHS Comparative Report No. 36. Rockville, Maryland, USA: ICF International.

Yadav, D., and P. Dhillon. 2015. "Assessing the Impact of Family Planning Advice on Unmet Need and Contraceptive Use among Currently Married Women in Uttar Pradesh, India." *Plos One* 10(3):e0118584.

Yahaya, M. K. 2002. "Analysis of Women's Reproductive Health Situation in Bida Emirate of Niger State, Nigeria." *African Journal of Reproductive Health* 6(1): 50-64.

Zerai, A., and A. O. Tsui. 2001. "The Relationship between Prenatal and Subsequent Modern Contraceptive Use in Bolivia, Egypt and Thailand." *African Journal of Reproductive Health* 5(2):68-82.