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ABSTRACT

Introduction

There is an extensive body of literature on family planning and contraceptive use in Uganda. However, hardly any documented study has investigated modern contraceptive use in the period from resumption of sexual intercourse after birth among women in Uganda. This paper therefore provides an analysis of factors associated with time-to-contraceptive use after resumption of sexual intercourse among women in the country.

Methods

Data for the study come from the 2011 Uganda Demographic and Health Survey (UDHS). The assessment was made based on a sample of married women who had a birth in the three years preceding the survey and who had resumed sexual intercourse. A time-to-event approach (time from resumption of sexual intercourse to starting family planning) was adopted in the analysis based on the Kaplan Meier, Log-Rank Chi-square test and Cox Proportional Hazard regression.

Results

The median time-to-contraceptive use (19 months, range 0 - 24) after resumption of sexual intercourse demonstrates a delayed initiation of family planning. The time to adoption of modern contraceptive use was significantly longer among women who delivered at home or with a traditional birth attendant (TBA) rather than a health facility, women in the northern region, women who had 1-3 antenatal care (ANC) visits instead of the recommended four or more, women with no formal education and women in the poorest wealth quintile.

Conclusions

Measures for enhancing modern contraceptive use during and after the postpartum period should focus on: (i) addressing hindrances in accessing family planning, particularly among poor and non-educated women, (ii) integration of family planning service delivery into routine ANC through counseling; and (iii) promoting deliveries in health facilities.

Keywords: Postpartum**,** family planning, contraception use

1. INTRODUCTION

A considerable proportion of women especially in the developing countries engage in sexual relationships after childbirth without using any contraception (Marcolino and Galastro 2001). In some instances, resumption of sexual intercourse occurs earlier than the six-week period of postpartum abstinence recommended by health workers (Anzaku and Mikah 2014; Borda, Winfrey, and McKaig 2011). This has been partly attributed to the existing taboos in many sub-Saharan Africa countries. Worth noting is the fact that abstinence following a birth is widely practiced in most communities of the world, yet with varying and/or unpredictable durations (Barber 2007; Fakoya 2008). A recent study among postpartum women in Nairobi revealed that women resume sexual activity well before their menstruation (Ndugwa et al. 2011). Use of contraceptives, however, is delayed in most instances. A study of postpartum women in 17 developing countries showed that only women who had resumed menstruation used family planning (Borda, Winfrey, and McKaig 2011). This evidence demonstrates that these women are at a higher risk of unplanned or unwanted pregnancies compared with their counterparts who use contraception before resumption of menstruation. Breastfeeding as an alternative to contraceptive use would not offer some of these women protection against unwanted pregnancies due to varying levels and intensity of breastfeeding (Barber 2007; Bongaarts 1987; Bongaarts and Potter 1983; Haggerty and Rutstein 1999; Ullah and Chakraborty 1994). Therefore, it is debatable whether breastfeeding can substitute for the use of modern family planning methods during the postpartum period.

The World Health Organization (WHO) reports a global increase in access to and use of modern contraception in the recent past (WHO 2014). However, in most developing countries levels of contraceptive use have remained persistently low. This has been attributed, among other factors, to poor health infrastructure and transportation facilities that hinder access to family planning services (Cleland et al. 2006; UNFPA 2012; Yeakey et al. 2009). The situation is worsened by the high level of unmet need for family planning in these countries (WHO 2012). Studies further reveal that the preferred long-lasting methods of family planning are not always readily available in these countries. Particularly, women in the postpartum period are regarded as one of the most vulnerable groups of fecund and sexually active women who do not want to have another pregnancy but are not using any method of contraception (WHO 2012). In light of these shortfalls, particularly among the vulnerable groups, the high fertility rates of women in these

countries (Hladik 2009) should not be surprising. This has contributed to high levels of maternal mortality rates in most sub-Saharan African countries (Tsui, McDonald-Mosley, and Burke 2010). For example, Uganda's maternal mortality rate of 438 maternal deaths per 1,000 births (Uganda Bureau of Statistics (UBOS) and ICF International Inc. (ICF) 2012) does not compare favorably with the global estimate of 287 maternal deaths per 1,000 births or the Millennium Development Goal (MDG) target of 230 deaths per 1,000 births by 2015 (United Nations Department of Economic and Social Affairs 2014).

With the low level of contraceptive uptake (any method), estimated at 30% (UBOS and ICF 2012), it is questionable that the country's maternal mortality situation will improve significantly in the near future. In affirming the low level of contraceptive use, Andi et al. (2014), citing the 2011 Uganda Demographic and Health Survey (UDHS) (UBOS and ICF 2012), demonstrate that the country's contraceptive prevalence is one of the lowest among countries in the East African community. The low uptake leads to an increase in the number of unwanted pregnancies, which are usually characterized by short birth intervals. The fact that the country's level of unmet need for family planning, estimated at 34%, is the highest in Eastern Africa (UBOS and ICF 2012) worsens further the situation of unwanted pregnancies. In addition, health consequences of short birth intervals include but are not limited to neonatal and infant mortality, low birth weight and maternal anemia due to postpartum hemorrhage (Cleland et al. 2012; Johnson et al. 2006). Therefore, it is not a matter of debate whether or not use of family planning needs to be promoted among women in the country. The contentious issue, however, is the timing for the initiation of contraception following a birth, for which to date there is limited evidence.

The subject of contraceptive use is not new in the literature. Recent studies provide insights into factors that determine contraceptive use among: (i) women in the postpartum period (Ndugwa et al. 2011; Borda, Winfrey, and McKaig 2011), (ii) sexually active women in the reproductive age (Andi et al. 2014; Stephenson et al. 2007; Yadav and Dhillon 2015), and (iii) sexually active males (Kabagenyi et al. 2014). However, studies are limited in providing an understanding of the factors among women particularly after resumption of sexual intercourse following a birth. Subsequently, the issue of time-to-contraceptive use after resumption of sexual intercourse from birth has been under-investigated. To this end, it is questionable whether the factors influencing contraceptive use also hold true for the period after resumption of sexual intercourse following

birth. Therefore, this paper attempts to provide an understanding of factors associated with timing of contraception after resumption of sexual intercourse following a birth.

1.1 Theoretical Grounding

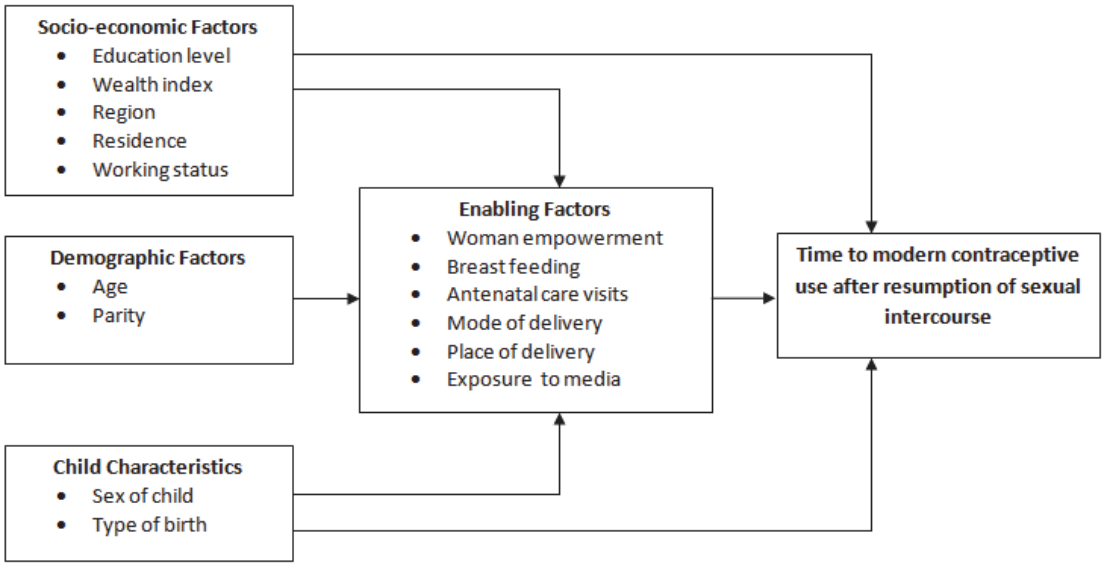
The timing of contraception after birth is evaluated in this study based on a series of postpartum behaviors and/or events including breastfeeding, postpartum amenorrhea and abstinence. Usually, these events do not follow a sequential pattern; initiation of contraception can happen any time after birth depending on, among other factors, a mother's postpartum situation and choice of method to be adopted. For example, initiation can precede resumption of sexual intercourse where a mother adopts contraception immediately after birth. Likewise, adoption of contraception can precede resumption of menses or weaning.

Similar to contraception, breastfeeding impacts the timing of a subsequent birth; longer durations of breastfeeding are associated with increased birth intervals. A debatable aspect, however, is whether breastfeeding could be adopted as a substitute for contraceptive use. This is mainly on account of varying intensities of breastfeeding among women in various communities. In affirming the relevance of breastfeeding in child spacing, the expert group at the 1988 Bellagio meeting determined that the maximum birth spacing effect of breastfeeding is achieved when a mother fully or nearly fully breastfeeds and remains amenorrheic (Kennedy, Rivera, and McNeilly 1989).

Sexual abstinence can also influence the risk of pregnancy in the postpartum period. In a scenario where the duration of abstinence goes beyond that of postpartum amenorrhea, postpartum sexual abstinence provides contraceptive benefits. Nevertheless, the duration of postpartum sexual abstinence varies across communities (Barber 2007; Fakoya 2008).

Contraceptive use, breastfeeding and resumption of sexual intercourse may be mediated by psychological factors and by the socioeconomic and demographic characteristics of women. Figure 1 presents a diagrammatic representation of these factors and how they relate to the time-to-contraceptive use after resumption of sexual intercourse following birth.

Figure 1. Conceptualization of factors associated with time to contraceptive use from resumption of sexual intercourse after birth



The predisposing factors identified in the study by socioeconomic and demographic characteristics of individuals are suggested to impact directly on contraceptive use. There exists a wide range of literature in Uganda and elsewhere in support of the impact of these factors. The debatable aspect, however, is whether or not the literature is supported among contraceptive users in the period from resumption of sexual intercourse after birth.

With regard to socioeconomic factors, contraceptive use has been associated in the literature with education level (Andi et al. 2014; Kravdal 2002; Lutalo et al. 2000; Stephenson et al 2007; UBOS and ICF 2012), wealth status (Creanga, et al. 2011; Family Health Initiative 2010), residence (Andi, et al. 2014; UBOS and ICF 2012), religion (Ntozi et al. 2000; Olaitan 2011), and working status. The consensus with regard to residence is that the level of contraceptive use is higher among urban residents compared with rural residents. In a recent study of trends and patterns of modern contraceptive use among women in Uganda, Andi et al. (2014) affirm that shortfalls in accessibility, availability of method choice and affordability are the major causes of the low level of family planning use in the rural areas. Given that the northern region of the country is predominantly rural, it is not surprising that the region has lower contraceptive prevalence compared with the central region, which is predominantly urban.

Educated women are regarded as having higher odds of modern contraceptive use compared with the non-educated (Kravdal 2002; Lutalo et al. 2000; Stephenson et. al. 2007). The contentious issues, however, are: (i) whether contraceptive use increases with education level, and (ii) the minimum level of education associated with increased odds of contraceptive use. In a study of women in six sub-Saharan African countries, secondary or higher education was associated with modern contraceptive use (Stephenson et al. 2007). However, this may not be the case in countries elsewhere due to variations in characteristics of individuals and their communities. Certainly, household wealth plays an important role in promoting contraceptive use because of the cost implications associated with its uptake (Andi et al. 2014; Creanga et al. 2011). In their extensive review of the literature, Andi et al. (2014) reveal that other costs associated with the services (for example, transport) would hinder people from seeking family planning services even if formal fees on the service were non-existent or low. Contraceptive use is reported to be twice as likely among the wealthiest women compared with the poorest women (Family Health Initiative 2010).

The literature on family planning use shows that contraceptive use assumes an inverse U-shape relationship with women's age. Contraceptive use increases up to about the early 30s and declines at older ages (Bongaarts and Potter 1983; Stephenson et. al. 2007). Pertaining to parity, Andi et al. (2014) affirm that contraceptive use is more likely among women with a higher number of surviving children.

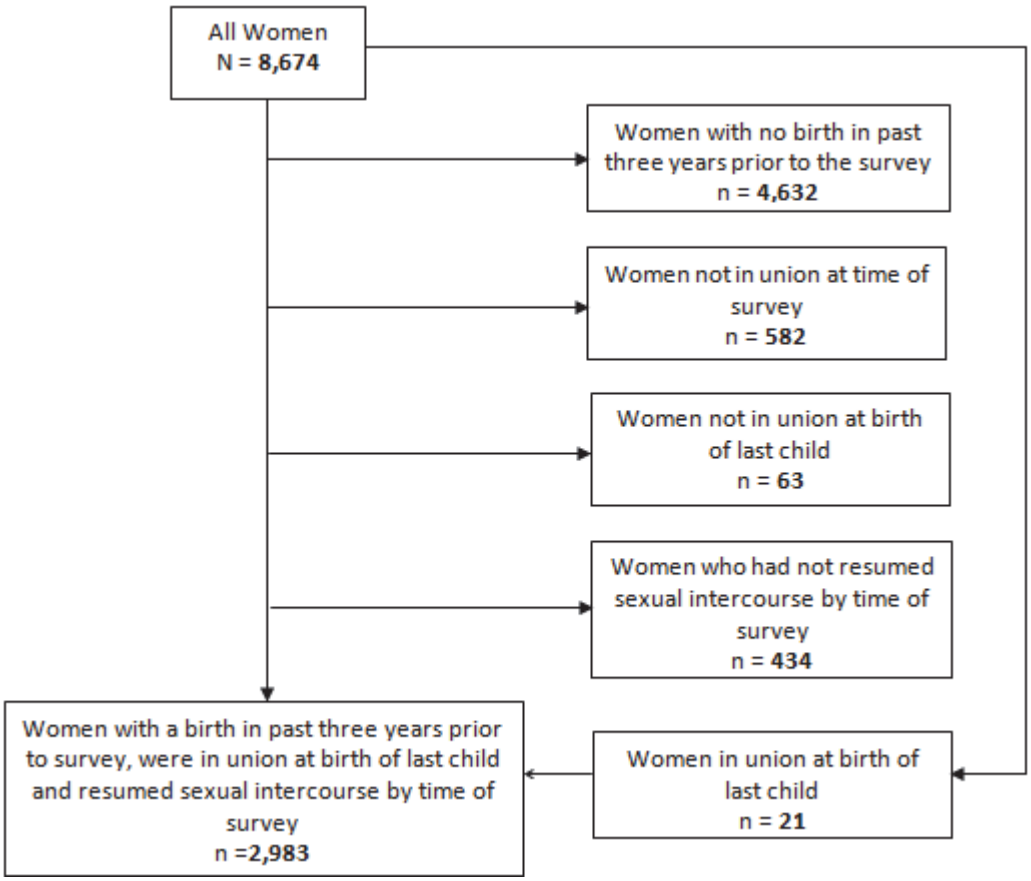
Discussion of the role of enabling factors in enhancing the use of family planning goes back to the early 1990s (Andersen 1995). In a model of health care utilization, Andersen argues that the presence or absence of these factors would promote or hinder use of health care. Among the reasons why women who do not want to get pregnant do not use contraception are opposition from partners and poor access to and quality of family planning services (Robey, Ross, and Bhushan 1996; Ross and Winfrey 2001).

2. DATA AND METHODS

2.1 Data Source

The study was based on data from the 2011 Uganda Demographic and Health Survey (UDHS) (UBOS and ICF 2012). This cross-sectional survey follows previous DHS surveys in 2006, 2000 1995 and 1988. The survey compiled data using questionnaires for households, women and men. This study was based on data from the Woman's Questionnaire, which was administered to all women age 15-49 in the selected households. A nationally representative sample of 8,624 women was obtained based on a two-stage cluster sampling. The first and second stages involved the selection of the clusters and households in each cluster, respectively. Further, stratification by rural-urban areas was taken into account. The sample excluded: (i) women with no births in the past three years preceding the survey (n = 4,632); (ii) women who were not in a marital union (n = 582) and those whose last birth was not within a union (n = 63); and (iii) women who had not resumed sexual intercourse by the time of the survey (n = 434). Thus, contraceptive use was investigated using a sample of married women with a birth in the past three years preceding the survey who had resumed sexual intercourse (n = 2,983). The study's focus on women in union was based on the indicators of assessing family planning, including contraceptive prevalence and unmet need (WHO 2012). The study focused on women who had initiated sexual intercourse during the postpartum period because they are at risk of getting pregnant. Figure 2 illustrates how the weighted sample used in the study was derived.

Figure 2. Derivation of weighted sample adopted in the investigations



2.2 Variables and Their Measurements

The study assessed time-to-contraceptive use, estimated in months, by the period from resumption of sexual intercourse following a birth to the time when a woman used modern contraception. The period is recorded using a non-negative integer value between 0 and 24, where the value zero denotes women who initiated contraception either before or at the same time as resumption of sexual intercourse. The time-to-contraceptive use was compiled from contraceptive calendar data containing information about births, pregnancies and contraceptive use in the five years preceding the survey. The calendar provides retrospective month-by-month experience of each surveyed woman with regard to aspects of reproductive health (Bradley et al. 2012). Reasons for discontinuation of each contraceptive method used also are included in the full calendar.

In this study, postpartum contraceptive use was assessed based on the two-year minimum period recommended by WHO before stopping contraception to become pregnant (WHO 2007). Nevertheless, some women were not using modern contraception (any method) at the time of the

study. A status variable, denoted by a value of zero (0), was generated to represent these women. Otherwise, the women were represented by a status value of one (1). As earlier indicated, the independent variables considered in the investigations were: (i) demographic characteristics of women, namely age and marital status, (ii) socioeconomic characteristics, namely education level, wealth status, region, residence and working status; (iii) child characteristics, namely sex, birth order and type of birth (single or multiple); and (iv) enabling factors, namely women's empowerment, mode of delivery (normal or Caesarean birth), place of delivery (public, government and other), number of antenatal care (ANC) visits, breastfeeding and exposure to media.

Worth noting are the generated variables, namely empowerment and exposure to media. An index of women's empowerment was generated based on the survey data on decision-making about health, household purchases, visits to family or relatives, and woman's earnings. Each of these aspects was recorded using a binary outcome i.e. whether or not a woman was involved in decision-making, denoted by codes one (1) and zero (0), respectively. Using these, the index was generated using factor analysis and was later divided into three levels—high, medium and low. Likewise, exposure to media was evaluated using a binary outcome—whether or not a woman was exposed regularly (at least once a week) to any type of media, namely newspapers, radio or television. With regard to region, the variable was converted from the 10 conventional DHS classifications to four groups, namely Central (Kampala, Central 1 and Central 2), East (East Central and Eastern), North (North, Karamoja and West Nile) and West (Western and South West).

2.3 Data Analysis

The analysis was made using STATA 13.1 at three stages: First, a descriptive summary of women by their socioeconomic and socio-demographic characteristics was made, using frequency distributions. An assessment of the time-to-contraceptive use from resumption of sexual intercourse after birth was made using life tables based on the Kaplan-Meier estimate. Second, differentials in the time-to-contraceptive use were investigated by socioeconomic and demographic characteristics of women as well as child and enabling factors, using the Log-Rank Chi-square test. The purpose of the assessment was to select variables for further analysis at the subsequent stage. All variables with a relatively high probability value ($p > 0.25$) were excluded from the analysis at the subsequent stage unless otherwise indicated. Third, the predictors of the

time-to-contraceptive use were investigated using a Cox-Proportional Hazard regression (Cox-PH). The time-to-event approach adopted in the study is able to deal with women irrespective of whether or not they had used modern contraception by the time of the study. In light of the multi-stage design adopted in the selection of the respondents, sampling weights were applied in the analysis to ensure representativeness across the country and to correct for non-responses, stratified by regions and residence (UBOS and ICF 2012). The appropriateness of using the fitted Cox-PH regression in modeling time-to-contraceptive use was investigated using a link specification test. Further, assessment of multicollinearity was carried out using the Coldiag regression collinearity diagnostic procedure (Belsley, Kuh, and Welsch 1980). Using the diagnostic test, based on a matrix of independent variables, a condition number of 30 or higher is associated with collinearity problems. Subsequently, large variance decomposition portions (50% or more) between any two or more variables would suggest collinearity problems.

3. RESULTS

The subsequent sections present results on characteristics of women, time-to-contraceptive use and predictors of time-to-contraceptive use. As earlier indicated, the assessment was based on married women who had resumed sexual intercourse after birth.

3.1 Characteristics of Women

Table 1 presents a distribution of the women by their socioeconomic and demographic characteristics as well as enabling factors.

Table 1. Distribution by women's characteristics and predisposing factors

Characteristics	n=2983	Percentage (%)
Age		
15-19	178	6.0
20-29	1661	55.7
30-39	958	32.1
40-49	186	6.2
Education level		
None	414	13.9
Primary	1905	63.9
Secondary	664	22.3
Residence		
Urban	408	13.7
Rural	2575	86.3
Wealth status		
Lowest	604	20.3
Second	673	22.6
Middle	613	20.6
Fourth	531	17.8
Highest	562	18.8
Religion		
Catholic	1200	40.2
Protestant	892	29.9
Muslim	386	12.9
Pentecostal	398	13.4
Other	107	3.6
Region		
Central	791	26.5
East	825	27.7
North	381	12.8
South	986	33.1
Working status		
Not working	630	21.1
Working	2353	78.9
Type of birth		
Normal	2813	94.3
Caesarean	170	5.7
Place of delivery		
Public	1,342	45.0
Private	424	14.2
TBA/Home	1,217	40.8
Number of ANC visits		
None	163	5.5
1-3	1395	46.8
4++	1425	47.8
Type of birth		
Single	2,924	98.0
Multiple	59	2.0
Sex of child		
Male	1,492	50.0
Female	1,491	50.0
Breastfeeding		
Not Breastfeeding	1,189	39.9
Breastfeeding	1,794	60.1
Birth order		
First	367	12.3
2-3	939	31.5
4-5	743	24.9
6++	934	31.3
Empowerment		
Low	1,141	38.2
Medium	1,273	42.7
High	569	19.1
Exposure to media		
No exposure	669	22.4
At least one regularly	2,314	77.6

Note: Estimates are based on weighted scores

The women assessed in the study were predominantly rural residents (86%), with primary (64%) as their highest level of education attained. Forty percent of the women were Catholics, while the rest were Protestants (30%), Muslims (13%), Pentecostals (13%) and other religious affiliations (4%). With regard to age, the majority of women (56%) were in their 20s, while about one-third (32%) were in their 30s, with the rest either below age 20 (6%) or age 40 or older (6%). No major variations were noted in the distribution of women with regard to their wealth status. Among regions, the highest proportion of women lived in the South (33%), followed by Central (27%), East (28%) and North (13%). Nearly eight in every ten women (79%) reported working.

With regard to the enabling factors, nearly all women (94%) had normal birth delivery; the highest proportion of women had deliveries in public facilities (45%) and the lowest proportion in private facilities (14%), with the rest delivering elsewhere, whether at home or with a traditional birth attendant (TBA). Slightly less than a half of the women (48%) had the recommended number of four or more ANC visits, and 47% had 1-3 visits. With regard to breastfeeding, nearly two-thirds of women (60%) were breastfeeding at the time of the survey. Nearly eight in every ten women (78%) were exposed regularly to at least one form of media, comprising newspapers, radio and television.

Pertaining to child characteristics, Table 1 shows a similar proportion of males and females. By birth order, the highest proportion of children were either second or third born (32%), followed closely by birth order six or higher (31%), while 25% were birth order 4-5 and 12% were firstborn.

3.2 Time-to-Contraceptive Use

A total of 1,072 (36%) out of the 2,983 women assessed in the study used a modern contraceptive method by the date of interview. Figure 3 presents the distribution of the timing of contraception for women who used modern contraception. The figure shows that women initiated contraception at three stages: (i) before resumption of sexual intercourse, denoted by negative time values (n = 179); (ii) at resumption of sexual intercourse, represented by time zero (n = 135); and, (iii) after resumption of sexual intercourse, represented by positive time values (n = 758).

Figure 3. Distribution by timing of contraception based on resumption of sexual intercourse

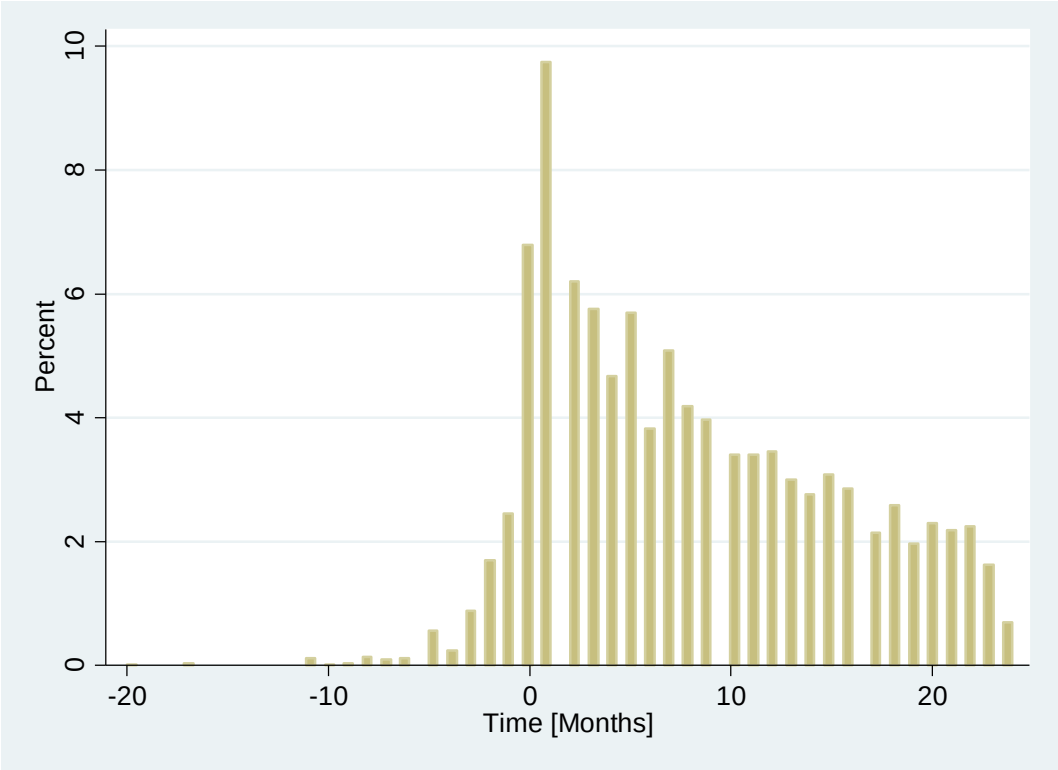


Table 2 presents a life table showing the timing of contraceptive use after resumption of sexual intercourse following birth of the most recent child.

Table 2. Timing of contraceptive use after resumption of sexual intercourse

Time (months)	Total	FP [a]	Censored	Std. Err	Survival
0	2983	314	80	0.0565	0.8934
1	2589	152	139	0.0464	0.8395
2	2298	66	119	0.0436	0.8149
3	2114	75	97	0.0409	0.7853
4	1942	50	90	0.0394	0.7647
5	1802	54	116	0.0381	0.7410
6	1632	28	86	0.0375	0.7278
7	1518	51	101	0.0365	0.7026
8	1367	32	93	0.0360	0.6858
9	1242	27	91	0.0357	0.6702
10	1123	38	64	0.0354	0.6469
11	1022	26	76	0.0352	0.6301
12	920	24	79	0.0352	0.6129
13	817	22	68	0.0352	0.5960
14	728	27	56	0.0354	0.5733
15	646	27	65	0.0358	0.5483
16	554	18	67	0.0363	0.5294
17	468	5	59	0.0365	0.5239
18	405	12	65	0.0374	0.5064
19	327	9	50	0.0385	0.4916
20	269	7	60	0.0400	0.4766
21	201	8	57	0.0432	0.4545
22	136	2	64	0.0460	0.4436
23	69	0	48	0.0460	0.4436
24	21	0	21	0.0460	0.4436

Notes: Zero (0) denotes women who initiated contraception either before or at resumption of sexual intercourse; [a] denotes use of modern contraception.

Results in Table 2 reveal an upward trend in the proportion of women using contraception after resumption of sexual intercourse following birth. The number using modern contraception before or during the time of resumption of sexual intercourse (n =314) denotes a proportion of 11%. Subsequently, the proportions of women using contraception during the first (n = 466), second (n = 532) and third month (n = 607) after resumption of sexual intercourse following birth are 16%, 18% and 20%, respectively. The median time-to-contraceptive use from resumption of sexual intercourse following birth is about 19 months (range 0–24 months). This estimate is influenced by a relatively large proportion of women (64%) who did not use contraception after resumption of sexual intercourse by the time of the study. An attempt to provide an estimate of the central tendency only among women who used modern contraception would provide results biased towards the earlier months.

3.3 Differentials in Time-to-Contraceptive Use

Differentials in time-to-contraceptive use were assessed by socioeconomic and demographic characteristics of women as well as child and enabling factors. As earlier indicated, the purpose of the assessment was to select variables for further analysis at the multivariable stage,

i.e. variables with a relatively small probability value ($p < 0.25$). Table 3 presents results of the assessment.

Table 3. Differentials in time-to-contraceptive use

Independent variables	χ^2	p-value
Age	15.70	0.0013
Education level	182.87	0.0000
Residence	111.25	0.0000
Wealth status	191.91	0.0000
Religion	14.52	0.0058
Region	111.79	0.0000
Empowerment	5.56	0.0722
Number of ANC visits	11.85	0.0027
Place of delivery	71.30	0.0000
Type of delivery	13.75	0.0002
Working status	2.60	0.1066
Breastfeeding	3.74	0.1539
Exposure to media	48.18	0.0000
Sex of child	0.69	0.4049
Type of birth	0.00	0.9792
Birth order	49.14	0.0000

With the exception of child characteristics, namely type of birth and sex of child, Table 3 shows that the rest of the variables assessed were eligible for inclusion at the multivariable stage ($p < 0.25$). However, birth order was excluded from the analysis at the subsequent stage, despite being significantly associated with the odds of contraceptive use, based on the results of the Log-rank test in Table 3. The exclusion was based on the fact that the variable made only a minimal contribution to the final model when adjusted for all the independent variables studied.

The illustrations in Figures 4-6 provide insights into the nature of associations between selected variables and timing of adoption of modern contraception after resumption of sexual intercourse following a birth.

Figure 4. Survivorship by education level

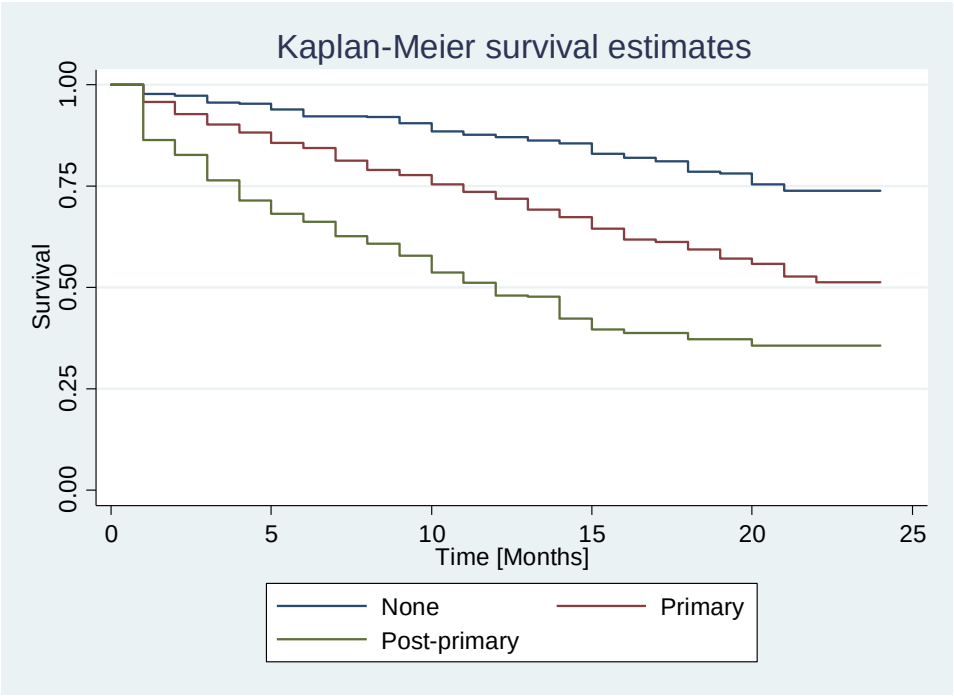


Figure 5. Survivorship by place of delivery

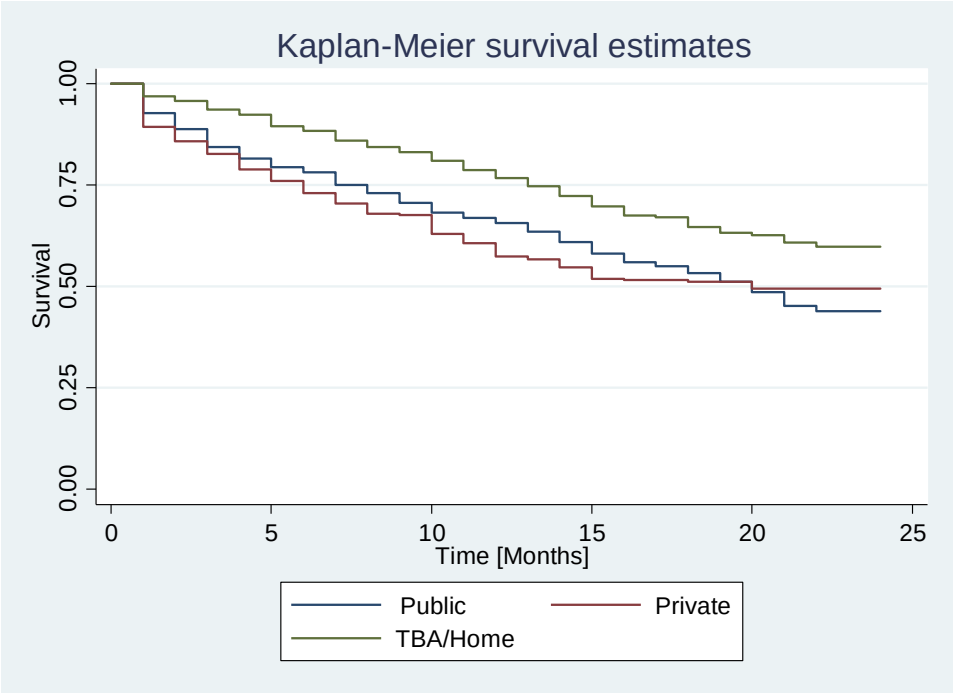
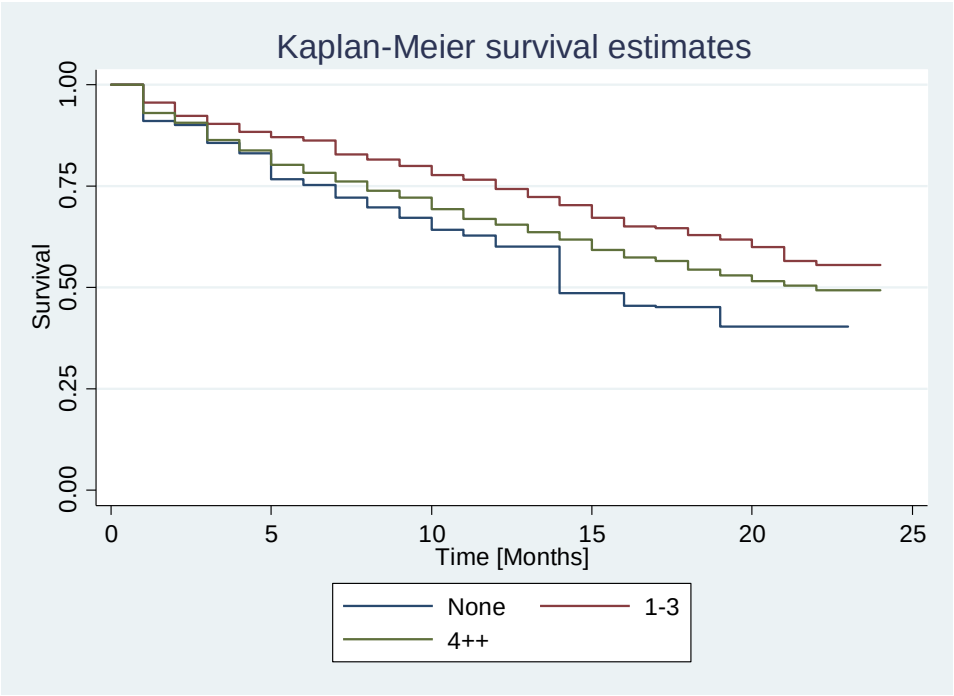


Figure 6. Survivorship by ANC attendance



Figures 4-6 show delayed initiation of modern contraceptive use after resumption of sexual intercourse following a birth among women with no education compared with women with primary or post-primary education. Women who gave birth at home or assisted by a TBA had delayed initiation of modern contraceptive use compared with women delivering in a health facility. Women who attended 1-3 ANC visits had delayed initiation compared with women who attended the recommended four or more visits. However, these findings must be verified after adjusting for the rest of the variables at the multivariate analysis stage.

3.4 Predictors of Time-to-Contraceptive Use

Table 4 presents results of unadjusted and adjusted hazards for the odds of contraceptive use by selected socioeconomic and demographic characteristics, as well as enabling factors. The unadjusted hazard ratios denote analysis on each of the independent variables by the timing of contraceptive use. The results provide insights into the changes in the impact of the variables when all variables are controlled for.

Table 4. Multivariable analysis of time-to-contraceptive use after resumption of sexual intercourse

Characteristics	Hazard Ratio (95% CI) Unadjusted	Adjusted
Age		
15-19†	1.00	.
20-29	0.93 (0.63 - 1.46)	0.93 (0.63 - 1.38)
30-39	0.80 (0.54 - 1.17)	0.81 (0.54 - 1.20)
40-49	0.64 (0.37 - 1.08)	0.77 (0.44 - 1.37)
Education level		
None †	1.00	1.00
Primary	2.25 (1.57 - 3.23)**	1.83 (1.25 - 2.68)**
Post-primary	4.61 (3.09 - 6.89)**	2.66 (1.66 - 4.26)**
Residence		
Urban †	1.00	1.00
Rural	0.43 (0.34 - 0.54)**	0.81 (0.59 - 1.11)
Religion		
Catholic †	1.00	1.00
Protestant	1.17 (0.96 - 1.41)	1.05 (0.85 - 1.29)
Muslim	1.22 (0.88 - 1.69)	0.82 (0.60 - 1.10)
Pentecostal	1.14 (0.82 - 1.57)	0.99 (0.73 - 1.36)
Other	1.28 (0.83 - 1.98)	1.14 (0.75 - 1.73)
Wealth status		
Poorest†	1.00	.
Poorer	1.31 (1.02 - 1.68)*	1.10 (0.84 - 1.44)
Middle	1.71 (1.28 - 2.28)**	1.30 (0.96 - 1.78)
Richer	1.74 (1.31 - 2.32)**	1.18 (0.86 – 1.63)
Richest	3.44 (2.59 - 4.58)**	1.56 (1.05 – 2.32)*
Region		
Central †	1.00	1.00
East	0.63 (0.48 - 0.82)**	0.85 (0.64 - 1.13)
North	0.35 (0.26 - 0.48)**	0.56 (0.40 - 0.78)**
South	0.56 (0.43 -0.72)**	0.80 (0.60 - 1.05)
Exposure to media		
No exposure	1.00	1.00
At least one regularly	1.63 (1.30 - 2.06)**	1.17 (0.92- 1.49)
Empowerment		
Low	1.00	1.00
Medium	0.89 (0.75 - 1.07)	0.93 (0.78 - 1.12)
High	1.05 (0.83 - 1.32)	1.08 (0.83 - 1.40)
Place of delivery		
Government †	1.00	1.00
Private	1.13 (0.81 - 1.56)	0.97 (0.73 - 1.30)
TBA/Home	0.59 (0.48 - 0.74)**	0.75 (0.60 - 0.93)*
ANC visits		
4 or more †	1.00	1.00
1-3	0.73 (0.62 - 0.87)**	0.83 (0.70 - 0.98)*
None	1.25 (0.90 - 1.74)	1.27 (0.92 - 1.75)
Breastfeeding status		
Not Breastfeeding †	1.00	1.00
Breastfeeding	1.00 (0.84 - 1.19)	1.10 (0.92 – 1.32)
Working status		
Not working †	1.00	1.00
Working	0.87 (0.72 – 1.04)	0.99 (0.82 – 1.19)
Type of delivery		
Normal †	1.00	1.00
Caesarean	1.33 (0.93 – 1.90)	0.79 (0.55 – 1.15)
Birth order		
1st†	1.00	.
2-3	1.07 (0.81 - 1.41)	.
4-5	0.76 (0.57 - 1.00)	.
6++	0.59 (0.45 - 0.78)**	.
Type of birth		
Single†	1.00	.
Multiple	0.78 (0.39 – 1.53)	.
Sex of child		
Male †	1.00	.
Female	1.09 (0.92 – 1.30)	.

Notes: Assessment is based on weighted data; where n = 2,889, F = 7.85, p < 0.001; hat-statistic = 0.992, p = 0.00; hat-square = -.034, p = 0.711

3.5 Regression Diagnostics

Table 5 presents results of the link specification test for the Cox-PH model fitted in Table 4. As stated earlier, the assessment evaluates the appropriateness of using the model in the analysis of contraceptive use.

Table 5. Results of specification test of fitted model

Statistic	Coef.	Std. Err	p-value
Hat	1.029	0.113	0.000
Hat-square	-0.353	0.091	0.700

Results of the specification test shows that the model was well specified as predicted by the Hat-statistic ($p < 0.05$). Results of the Hat-square statistic do not reveal otherwise regarding the appropriateness of using the fitted model ($p > 0.05$). Particularly, the Hat-square statistic demonstrates that any additional variables do not have much explanatory power. The fact that the proportionality hazard assumption is a specification test (Cleves 2008) demonstrates that the model has chosen an appropriate specification for the covariates. On the other hand, the conditioning number of 14.5 derived from the Coldiag regression collinearity diagnostic test implies no multi-collinearity problems with the independent variables adopted in the investigations (Belsley, Kuh, and Welsch 1980).

3.6 Summary of Results

After adjusting for all the variables adopted in the analysis, the characteristics of women that were associated with the time-to-contraception use after resumption of sexual intercourse were household wealth, region and education level ($p < 0.05$). The odds of contraceptive use were about 56% (HR = 1.56) higher for women in the richest wealth quintile compared with the poorest quintile. This implies that women in the richest wealth quintile had a shorter time to adoption of modern contraception compared with those in the poorest quintile. Regarding highest education attained, women with primary (HR = 1.83) and secondary (HR = 2.66) education were associated with higher odds of contraceptive use after resumption of sexual intercourse compared with women with no education. This implies that women with primary and secondary education had a shorter time to adoption of contraception compared with women who had no formal education. A similar pattern was demonstrated by the findings based on the unadjusted ratios.

Women in the northern region of the country had 44% lower odds of contraceptive use after resumption of sexual intercourse compared with women in the central (HR = 0.56). In other words, women in the northern region had a longer time to adoption of modern contraception compared with their counterparts in the central region.

After adjusting for all the covariates, the enabling factors that were significantly associated with time-to-contraceptive use after resumption of sexual intercourse were ANC attendance and place of delivery ($p < 0.05$). Delivery with a TBA or at home was associated with 25% lower odds of contraceptive use after resumption of sexual intercourse compared with deliveries in government health facilities (HR = 0.75). This implies that women who delivered at a government health facility had a shorter time-to-adoption of modern contraception compared with births at home/TBA. Regarding ANC, women who attended 1-3 visits were associated with lower odds of contraceptive use after resumption of sexual intercourse compared with women who attended the recommended number of four or more visits (HR = 0.83). This implies that women who attended four or more ANC visits had a shorter time-to-contraceptive use compared with those attending 1-3 visits. A similar pattern was demonstrated by the findings based on the unadjusted ratios.

No significant impact on the odds of contraceptive use was noted in the results by the rest of the factors, namely age, empowerment, exposure to media, type of delivery (whether or not by Caesarean), woman's working status and breastfeeding ($p > 0.05$).

4. DISCUSSION

This study analyzed data from the 2011 UDHS using the contraception calendar to investigate the timing of contraceptive use after resumption of sexual intercourse following a birth. The findings show a low level of modern contraceptive use after resumption of sexual intercourse following a birth. The results regarding the timing of adoption of contraception reveal a delay in the initiation of contraceptive use after resumption of sexual intercourse, which suggests that a considerable proportion of woman in Uganda are at a high risk of unwanted or unplanned pregnancies. The issue of unwanted pregnancies is worsened by the country's high level of unmet need for family planning (UBOS and ICF 2012). To this end, it should not be surprising that the country has one of the highest fertility rates in sub-Saharan Africa and elsewhere (United Nations 2013; United Nations 2008).

The predictors of the time-to-contraceptive use after resumption of sexual intercourse following a birth are identified in the study as household wealth, region, education, number of ANC visits and place of delivery. Regarding household wealth, the study reveals a shorter time-to-contraceptive use among women in richest quintile compared with the poorest. The findings are in agreement with studies that show higher levels of modern contraceptive use among the wealthiest women (Creanga et al. 2011; Kayembe et al. 2006; Nakayiza, Wamala, and Kwagala 2014). These studies attribute the low level of contraceptive use among poor women mainly to the costs associated with the services. Further, the studies reveal that other costs associated with the services could influence contraceptive use even where fees on the contraception are non-existent. One could therefore conclude that the delayed initiation of contraception among the poor women is an issue of the costs. To this end, it should not be surprising that unmet need for family planning has persistently remained high among poor women. The fact that the northern region is predominantly rural gives credence to the argument that the delayed adoption of modern contraception among women in the region is, among other factors, an issue of costs associated with the services.

Our findings are in agreement with studies elsewhere that have identified education as a predictor of family planning use (Andi et al. 2014; Kravdal 2000; Polis et al. 2011; Riyami, Afifi, and Mabry 2004). The finding that contraceptive prevalence is higher among educated women compared with non-educated women, however, does not imply that contraceptive use increases only with education. A study by Stephenson et al. (2007) on modern contraception among women in six sub-Saharan African countries revealed that post-primary education was associated with increased odds of modern contraceptive use but the study also arrives at the same conclusion

among women with primary education. This evidence implies that the minimum level of education associated with contraceptive use may vary across countries and regions.

The longer time-to-contraceptive use among women who delivered at home/TBA compared with those who delivered at public health facilities underscores the role played by health institutions in promoting family planning use in Uganda. Public and private health facilities (hospitals, health centers and clinics) are the major sources of contraception in the country. In light of the fact that about six in every ten women (57%) in the country deliver at health facilities (Uganda Bureau of Statistics (UBOS) and ICF International Inc. 2012), there is a strong need to promote programs that target women who do not deliver at health facilities as a measure to promote contraceptive use. Examples include the Community Based Distribution (CBD) program aimed at bringing family planning services closer to the intended users, satellite clinics, and employer-based programs (Malarcher et al. 2010; Nakayiza Wamala, and Kwagala 2014; Stanback, Mbonye, and Bekiita 2007). CBD is particularly important in enhancing access to reproductive health services among the rural communities.

In a recent study on family planning advice and contraceptive use, Yadav and Dhillon (2015) show that use of critical maternal health services (ANC, institutional delivery and postnatal care) encourages subsequent contraceptive use. In our study, the longer time-to-contraceptive use observed among women who attended 1-3 ANC visits compared with those who attended the recommended four or more visits supports this finding. Thus, strengthening the integration of family planning into ANC services (Birungi and Onyango-Ouma 2006; Rutaremwa et al. 2015; Yadav and Dhillon 2015) would certainly go a long way in promoting modern contraceptive use, particularly during the postpartum period.

In conclusion, the findings provide evidence about the factors associated with time to contraceptive use after resumption of sexual intercourse following a birth. However, the findings should be interpreted in light of the following limitations, based mainly on the fact that the study used cross-sectional data: (i) all the women were not followed up for a full length of the two-year period; (ii) it is highly likely that women who used contraception after resumption of sexual intercourse were under-represented; (iii) the analysis does not account for time-varying covariates such as education level and household wealth. Further, the investigations were limited to women's most recent birth in the three years preceding the survey.

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