Female's Preferred Birth Interval in Uganda: What Are The Associated Factors?

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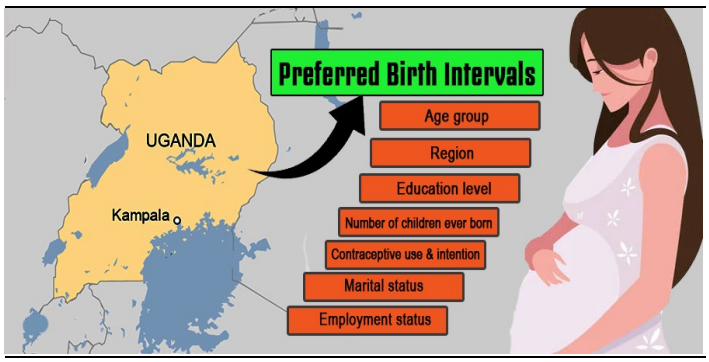
ABSTRACT

Preferred birth intervals of females can have potential effects on several maternal and neonatal health outcomes. Therefore, this study aims to ascertain factors associated with preferred birth intervals among females in Uganda. The data utilized were obtained from the 2016 Uganda Demographic and Health Survey. The Pearson chi-square test and logistic regression model were used to identify independent variables significantly associated with preferred birth intervals. The results showed that the majority of females or 77.1% preferred birth intervals of at least two years. The independent factors that significantly influenced their preferences included age group, region, education level, children ever born, contraceptive use and intention, marital status, as well as current employment status. Therefore, interventions aimed at educating females about birth intervals should be tailored to the specific regions, considering their education and level of exposure to contraceptives. This knowledge will enable females to understand the information provided, which is key to making healthy choices consistent with World Health Organization recommendations.

ABSTRAK

Pemilihan interval kelahiran pada perempuan dapat memiliki efek potensial pada beberapa hasil kesehatan ibu dan bayi yang baru lahir. Oleh karena itu, penelitian ini bertujuan untuk memastikan faktor-faktor yang terkait dengan jarak kelahiran yang lebih disukai pada wanita di Uganda. Data yang digunakan diperoleh dari Survei Demografi dan Kesehatan Uganda 2016. Uji chi-square Pearson dan model regresi logistik digunakan untuk mengidentifikasi variabel independen yang secara signifikan terkait dengan interval kelahiran yang diinginkan. Hasil penelitian menunjukkan bahwa mayoritas perempuan atau 77,1% lebih menyukai jarak kelahiran minimal dua tahun. Faktor independen yang secara signifikan mempengaruhi preferensi mereka meliputi kelompok umur, wilayah, tingkat pendidikan, anak yang pernah dilahirkan, penggunaan dan niat kontrasepsi, status perkawinan, serta status pekerjaan saat ini. Oleh karena itu, intervensi yang ditujukan untuk mendidik perempuan tentang interval kelahiran harus disesuaikan dengan wilayah tertentu, dengan mempertimbangkan pendidikan dan tingkat paparan kontrasepsi mereka. Pengetahuan ini akan memungkinkan perempuan untuk memahami informasi yang diberikan, yang merupakan kunci untuk membuat pilihan yang sehat sesuai dengan rekomendasi penting dari World Health Organization.

GRAPHICAL ABSTRACT



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INTRODUCTION

Short birth intervals can lead to adverse health outcomes, particularly for infants and children. According to a previous study, maintaining birth intervals of at least two years for mothers could translate into preventing approximately 2 million deaths in children under five years annually (Alhassan et al., 2022). Furthermore, the current recommendation for intervals between a last live birth of woman and subsequent pregnancy is at least 2 years (Exavery et al., 2012; Pimentel et al., 2020; World Health Organization, 2005). This is aimed at reducing the likelihood of negative maternal, infant, child, and perinatal health outcomes (de Jonge et al., 2014; World Health Organization, 2005). Short birth intervals are defined as inter-birth periods below 24 months (Ajayi & Somefun, 2020).

Approximately 24.6 percent of all live birth globally occur at intervals of less than 2 years with variations observed across continents. In Sub-Saharan Africa, short birth intervals have been estimated at 19.6 percent (Belaid et al., 2021). However, even within this region, variations have been found between and within countries. For example in Zimbabwe and Kenya, short birth intervals were estimated at 11 percent, while in Nigeria, it was 23 percent. A study in Ghana also reported a short birth intervals prevalence of 49.7 percent (Alhassan et al., 2022).

Some of the reported negative consequences of short birth intervals to mothers include placenta previa, pre-eclampsia, death, maternal depletion syndrome, breast milk reduction, hypertensive disorders, anemia, third trimester bleeding, etc. (Aleni et al., 2020; Bauserman et al., 2020; Damtie et al., 2021; Grundy & Kravdal, 2014). Furthermore, several factors have been found to increase the risk of short birth intervals. These include younger age of females, lack of pregnancy planning, absence of joint decision-making with spouse or partner about having another child, inconsistent use of contraceptives, lack of health insurance, higher parity, poor wealth index, low maternal education level, rural residence, non-health facility deliveries, marital status, multi-parity, etc. (Aleni et al., 2020; Alhassan et al., 2022; Exavery et al., 2012).

The progress of Uganda in lengthening birth intervals is lagging compared to other East African countries. According to previous reports, birth intervals of Uganda was estimated at 25.9% (Aleni et al., 2020) compared to Kenya and Tanzania which had estimated values of 18 percent (KNBS & ICF International, 2015) and 19 percent (MoHCDGEC et al., 2016) respectively. A study conducted in the Yumbe district found that 52.4 percent of females attending a clinic for young children at the main hospital had short birth intervals (Aleni et al., 2020). This situation needs to be addressed, as short birth intervals have been linked to several adverse maternal, neonatal, postnatal, perinatal, and child health outcomes. These outcomes include low birth weight, premature rupture of the membrane (Belaid et al., 2021), preterm birth, intrauterine growth retardation (Singh et al., 2020), milk diminution, child mortality, etc (Rasheed & Al-Dabal, 2007).

The majority of previous studies were focused on the risk factors of short birth intervals, rather than exploring the determinants of preferred birth intervals. In Uganda, some of the studies were limited to specific geographical areas or health facilities, making it difficult to generalize the results. Therefore, this study aims to fill this gap by exploring factors associated with preferred birth intervals of females using data from a nationwide survey. The findings will provide insights for policymakers concerning interventions that can help reduce the proportion of short birth intervals in Uganda.

METHODS

This study utilized secondary data from the 2016 Uganda Demographic and Health Survey (UDHS), which was the latest data available at the time of the study. The survey covered all 112 districts of Uganda which were grouped into 15 regions, including South Central, North Central, Kampala, Busoga, Bukedi, Bugisu, Teso, Karamoja, Lango, Acholi, West Nile, Bunyoro, Tooro, Kigezi, and Ankole. The 2016 UDHS employed a two-stage stratified random sampling design. In the first stage, Enumerations Areas (EAs) were selected from the National Population and Housing Census sampling frame. A total of 697 EAs were selected with 162 in urban and 535 in rural areas (UBOS & ICF, 2018). In the second stage, a total of 20,880 households were picked from the EAs. From these households, 18,506 females aged 15-49 years were interviewed (UBOS & ICF, 2018). Only females who responded to the question concerning their preferred birth intervals in the 2016 UDHS survey were included in the study. All those who had missing information for the question were excluded.

The dependent variable was preferred birth intervals, which was a nominal scale variable with two possible outcomes, namely birth intervals of less than two years, or at least two years. Meanwhile, the independent variables considered included age, the region and place of residence for the household, education level, religion, frequency of reading newspapers or magazines, frequency of listening to the radio or watching television, household wealth index, number of children ever born, contraceptive use and intention, marital status, and current employment status.

The data were analyzed using STATA Version 14.2 in different three stages. In the first stage, a descriptive summary of all variables considered in this study was conducted using frequency distributions. In the second stage, Pearson's chi-square test was used to examine the association between preferred birth intervals of females and the plausible independent variables. Independent variables found to be significantly associated ($p \leq 0.05$) with preferred birth intervals were considered for further analysis. Finally, since the dependent variable had only two possible outcomes namely preferred birth intervals of less than two years or at least two years, the logistic regression model was used for multivariate analysis.

RESULTS

Table 1 shows that the majority of females or 77.07% were found to prefer birth intervals of at least two years. The highest proportion of respondents were aged 20-24 years (31.17%), from the Eastern region (27%), resided in rural areas (75.4%), attained primary level education (57.14%), and were Catholic (40.58%). Moreover, the majority did not read newspapers or magazines (76.83%), listened to the radio at least once a week (59.019%), did not watch television (68.09%), and were in the richest wealth index category (23.20%). The highest proportion had not given birth to any children yet (30.16%), non-users of contraceptives (49.51%), cohabiting (35.99%) and currently working (72.12%).

Table 2 presents a summary of the results regarding the association between preferred birth intervals and the plausible independent variables. Only the frequency of reading newspapers or magazines did not show a significant association with preferred birth intervals of the respondents. The highest proportion of females who preferred birth intervals of less than 2 years belonged to the age group of 30-49 years (40.16%), the Central region (27.86%), urban dwellers (26.06%), and had no education (34.34%). On the other hand, Angli-

Table 1
Characteristics of Respondents

Variables	Frequency	Percentage
Preferred birth intervals		
<2 years	2,225	22.93
≥2 years	7,479	77.07
Age group		
15-19	2,707	27.90
20-24	3,025	31.17
25-29	2,072	21.35
30-49	1,900	19.58
Region		
Central	2,283	23.53
Eastern	2,620	27.00
Northern	2,439	25.13
Western	2,362	24.34
Place of residence		
Urban	2,387	24.60
Rural	7,317	75.40
Education level		
No education	696	7.17
Primary	5,545	57.14
Secondary	2,601	26.80
Higher	862	8.88
Religion		
Anglican	3,027	31.19
Catholic	3,938	40.58
Muslim	1,210	12.47
Pentecostal	1,239	12.77
Others	290	2.99
Frequency of reading newspaper/magazine		
Not at all	7,456	76.83
Less than once a week	1,305	13.45
At least once a week	943	9.72
Frequency of listening to radio		
Not at all	2,433	25.07
Less than once a week	1,527	15.74
At least once a week	5,744	59.19
Frequency of watching television		
Not at all	6,607	68.09
Less than once a week	1,066	10.99
At least once a week	2,031	20.93
Wealth index		
Poorest	2,070	21.33
Poorer	1,912	19.70
Middle	1,732	17.85
Richer	1,739	17.92
Richest	2,251	23.20
Children ever born		
0	2,927	30.16
1	1,961	20.21
2	1,679	17.30
3	1,245	12.83
4+	1,892	19.50
Contraceptive use and intention		
Using modern method	2,506	25.82
Using traditional method	274	2.82
Non-user - intends to use later	4,804	49.51
Does not intend to use	2,120	21.85

Variables	Frequency	Percentage
Marital status		
Never in union	2,702	27.84
Married	2,774	28.59
Cohabiting	3,492	35.99
Widowed	50	0.52
Divorced/separated	686	7.07
Currently working		
No	2,705	27.88
Yes	6,999	72.12

can respondents (78.46%) had the highest proportion of preferring birth intervals less than 2 years followed by those who frequently listened to the radio less than once a week (25.41%), watched television at least once a week (26.05%), and were in the richest wealth index category (26.43%). Females who had not given birth to any children yet (79.33%) were found to have the highest proportion of preferring birth intervals of at least 2 years while those with at least four children ever born (25.58%) mostly preferred birth intervals of less than 2 years. Among contraceptive users, those who used modern methods (80.93%) and non-users (80.58%) had the highest proportion of preferring birth intervals of at least 2 years. Furthermore, females who were never in union (87.42%) and those currently not working (82.55%) mostly preferred birth intervals of at least 2 years.

Table 3 shows a summary of the logistic regression model results, which aimed to identify the significant predictors of preferred birth intervals among the respondents. Age group, region, education level, number of children ever born, contraceptive use and intention, marital status, and current employment status had a significant effect ($p \leq 0.05$) on preferred birth intervals. Females aged 20-24, 25-29, and 30-49 years were less likely to prefer birth intervals of at least 2 years compared to those aged 15-19 years as indicated by AOR values of 0.36, 0.16, and 0.06 respectively.

Furthermore, females from the Eastern, Northern, and Western regions were more likely to prefer birth intervals of at least 2 years compared to those from the Central region with AOR values of 1.21, 1.69, and 1.28 respectively. Regarding education level, females with primary and secondary education levels were more likely to prefer birth intervals of at least 2 years compared to those with no education as demonstrated by AOR values of 1.22 and 1.64 respectively. Also, females with at least higher education were more likely (AOR=1.80) to prefer birth intervals of at least 2 years compared to those with no education.

Regarding religion, females of other denominations were less likely (AOR=0.73) to prefer birth intervals of at least 2 years compared to Anglicans. Females who had given birth to one child were also more likely (AOR=2.73) to prefer birth intervals of at least 2 years compared to those who had never given birth. The likelihood increased for females who had given birth to two (AOR=5.8), three (AOR=9.57), and four children (AOR=14.00).

In terms of contraceptive use and intention, females who used traditional methods (AOR=0.60), did not use contraceptives but intended to use later (AOR=0.87), and did not intend to use at all (AOR=0.45) were more likely to prefer birth intervals of at least 2 years compared those who used modern methods.

Concerning marital status, females who were married (AOR=0.24), cohabiting (AOR=0.24) widowed (AOR=0.26), and divorced or separated (AOR=0.30) were less

Table 2
Association Between Preferred Birth Intervals and Plausible Independent Factors

Variables	Preferred birth intervals		n	p-value
	<2 years	≥2 years		
Age group				
15-19	11.71	88.29	2,707	0.000*
20-24	20.53	79.47	3,025	
25-29	25.29	74.71	2,072	
30-49	40.16	59.84	1,900	
Region				
Central	27.86	72.14	2,283	0.000*
Eastern	20.65	79.35	2,620	
Northern	20.58	79.42	2,439	
Western	23.12	76.88	2,362	
Place of residence				
Urban	26.06	73.94	2,387	0.000*
Rural	21.91	78.09	7,317	
Education level				
No education	34.34	65.66	696	0.000*
Primary	21.62	78.38	5,545	
Secondary	20.30	79.70	2,601	
Higher	30.05	69.95	862	
Religion				
Anglican	21.54	78.46	3,027	0.025*
Catholic	23.64	76.36	3,938	
Muslim	22.73	77.27	1,210	
Pentecostal	22.76	77.24	1,239	
Others	29.31	70.69	290	
Frequency of reading newspaper/magazine				
Not at all	22.64	77.36	7,456	0.394
Less than once a week	23.45	76.55	1,305	
At least once a week	24.50	75.50	943	
Frequency of listening to the radio				
Not at all	21.33	78.67	2,433	0.012*
Less than once a week	25.41	74.59	1,527	
At least once a week	22.95	77.05	5,744	
Frequency of watching television				
Not at all	21.81	78.19	6,607	0.000*
Less than once a week	23.92	76.08	1,066	
At least once a week	26.05	73.95	2,031	
Wealth index				
Poorest	22.13	77.87	2,070	0.000*
Poorer	21.13	78.87	1,912	
Middle	21.54	78.46	1,732	
Richer	22.71	77.29	1,739	
Richest	26.43	73.57	2,251	
Children ever born				
0	20.67	79.33	2,927	0.000*
1	24.73	75.27	1,961	
2	22.93	77.07	1,679	
3	21.37	78.63	1,245	
4+	25.58	74.42	1,892	
Contraceptive use and intention				
Using modern method	19.07	80.93	2,506	0.000*
Using traditional method	33.21	66.79	274	
Non-user - intends to use later	19.42	80.58	4,804	
Does not intend to use	34.10	65.90	2,120	

Variables	Preferred birth intervals		n	p-value
	<2 years	≥2 years		
Marital status				
Never in union	12.58	87.42	2,702	0.000*
Married	26.89	73.11	2,774	
Cohabiting	26.92	73.08	3,492	
Widowed	34.00	66.00	50	
Divorced/separated	26.53	73.47	686	
Currently working				
No	17.45	82.55	2,705	0.000*
Yes	25.05	74.95	6,999	

Note: *=p≤0.05; n = total respondents

likely to prefer birth intervals of at least 2 years compared to those who were never in union. Finally, regarding employment status, females who were currently working (AOR=0.76) preferred birth intervals of at least 2 years compared to those who were not working.

DISCUSSION

This study aimed to examine factors associated with preferred birth intervals among females in Uganda. The significance of age was consistent with the results of a study conducted in Iran (Saadati & Bagheri, 2019). Based on the results, females aged 15-19 years were more likely to prefer birth intervals of at least 2 years compared to those in the age groups of 20-24, 25-29, and 30-49 years. This was presumably because the younger females prioritized going to school over having children, to avoid interfering with their education.

The higher likelihood of preferring birth intervals of at least 2 years in other regions compared to the Central region can be attributed to the implementation of certain programs or interventions. These programs culminated in improved knowledge, awareness, and attitude as well as access to reproductive health and family planning services. A study in Nwoya district, Northern Uganda reported that females, men, and youths had a clear understanding of child spacing benefits (Belaid et al., 2021). Another study carried out in Eastern Uganda found that 87.4 percent of females could correctly identify the best birth spacing intervals (Albin et al., 2013).

The significance of education level was consistent with findings by (Rasheed & Al-Dabal, 2007). The likelihood of preferring birth intervals of at least 2 years increased with higher education levels, and this could be attributed to several factors. Firstly, higher education levels have been linked to improved health awareness which translates into better health choices (Saadati & Bagheri, 2019). Secondly, educational attainment enables females to gain access to non-childbearing activities such as formal employment, etc. (Afolabi & Palamuleni, 2022). Educated females are also more likely to postpone marriage, have access to and utilize contraceptives, as well as desire fewer children (Olatoregun et al., 2014).

The number of children ever born showed a significant association with preferred birth intervals, which was not consistent with the findings reported by (Islam et al., 2022). In this study, the likelihood of preferring birth intervals of at least two years increased with a higher number of children ever born. This was because females with more children were closer to reaching their desired family size. Consequently, they were more willing to have longer birth intervals for subsequent pregnancies. Females with many children were also more willing to use contraceptives which in turn in-

Table 3
Predictors of Preferred Birth Intervals

Variables	AOR	95% Confidence Intervals	
Age group			
15-19 (ref)	1		
20-24	0.36**	0.3	0.43
25-29	0.16**	0.13	0.2
30-49	0.06**	0.05	0.08
Region			
Central (ref)	1		
Eastern	1.21**	1.03	1.43
Northern	1.69**	1.41	2.04
Western	1.28**	1.09	1.5
Place of residence			
Urban (ref)	1		
Rural	1.04	0.9	1.22
Education level			
No education (ref)	1		
Primary	1.22**	1	1.49
Secondary	1.64**	1.3	2.07
Higher	1.80**	1.36	2.37
Religion			
Anglican (ref)	1		
Catholic	0.91	0.8	1.04
Muslim	0.92	0.77	1.09
Pentecostal	1.05	0.88	1.25
Others	0.73**	0.54	0.98
Frequency of listening to radio			
Not at all (ref)	1		
Less than once a week	0.91	0.77	1.07
At least once a week	0.99	0.87	1.13
Frequency of watching television			
Not at all (ref)	1		
Less than once a week	0.96	0.8	1.14
At least once a week	0.9	0.76	1.07
Wealth index			
Poorest (ref)	1		
Poorer	1.06	0.89	1.26
Middle	1.08	0.89	1.3
Richer	1.07	0.88	1.3
Richest	1.1	0.86	1.4
Children ever born			
None (ref)	1		
1	2.73**	2.26	3.3
2	5.82**	4.67	7.25
3	9.57**	7.46	12.26
4+	14.00**	10.81	18.13
Contraceptive use and intention			
Using modern method (ref)	1		
Using traditional method	0.60**	0.45	0.8
Non-user - intends to use later	0.87**	0.76	1
Does not intend to use	0.45**	0.38	0.52

Variables	AOR	95% Confidence Intervals	
Marital status			
Never in union (ref)	1		
Married	0.24**	0.2	0.3
Cohabiting	0.24**	0.2	0.29
Widowed	0.26**	0.13	0.5
Divorced/separated	0.30**	0.23	0.39
Currently working			
No (ref)	1		
Yes	0.76**	0.67	0.86
cons	9.83	6.78	14.26

Note: **=p≤0.05; ref = reference category; cons = constant; AOR=Adjusted Odds Ratios

creased the chances of having longer birth intervals.

There was a lower likelihood of having birth intervals of at least two years among females who did not use any contraception, intended to use contraception later, or did not use modern contraceptive methods. This could be attributed to the deliberate intention of females who used modern contraceptives to wait longer before their next pregnancy.

The lower likelihood of married and cohabiting females preferring birth intervals of at least two years could be attributed to the rising trend in females getting married or having stable and committed relationships compared to previous times. Consequently, these females may opt for shorter birth intervals to ensure they have their desired number of children before reaching menopause. Studies on marriage trends in Sub-Saharan Africa found a general increase in the median number of years females spent single (Marston et al., 2009) while others discovered an increase at marriage (Garenne, 2004; Hertrich, 2017). Females who had never been in a union were most likely not interested in having children or plan to have later on in life, resulting in longer birth intervals compared to the rest of the marital status categories.

The significance of employment status was consistent with the findings by (Rasheed & Al-Dabal, 2007) who reported this variable as one of the predictors of preferred birth spacing. However, this study found a reduced likelihood of preferring birth intervals of at least two years among females who were currently working. This could be attributed to a small fraction of females in the sample being engaged in the formal sector, while the majority were engaged in the informal sector. According to the 2016 UDHS report, half of the working females were involved in agriculture (UBOS & ICF, 2018). This agricultural work was predominantly subsistence in nature and commonly found in rural areas where females mostly had no formal education, were school dropouts, or already married before the age of 18 years. These females tend to lack decision-making power, especially concerning reproductive health issues such as child spacing, and contraceptive use, which were dictated by their husbands.

CONCLUSIONS

The independent factors that significantly influenced preferred birth intervals in females included the age group, region, education level, number of children ever born, contraceptive use and intention, marital status, and employment status. Interventions aimed at educating females about birth intervals should be tailored to the specific regions of the country since there are significant variations across regions. These interventions should also consider the education level of females as well as their exposure to contraceptives and other reproduc-

tive health services. Furthermore, it is essential to provide birth intervals and contraceptive use information adapted to the education level of females, enabling healthy decision-making in line with WHO recommendations. This study had some limitations including the unavailability of more up-to-date UDHS data, which necessitated the use of the 2016 UDHS dataset. Furthermore, since secondary data was used for this study, some factors that could have affected preferred birth intervals were not captured. These include health facility factors such as place of delivery, distance to the nearest health facility, and the services offered, as well as sociocultural factors including cultural beliefs and norms regarding childbirth and birth intervals, influence from relatives and in-laws, etc. The strengths of the study include the use of a nationally representative dataset which allows for the generalization of the findings to the entire population of Uganda.

Given the significance of marital status, there is a need to involve females partners in interventions aimed at influencing preferred birth intervals in Uganda. This is particularly important in communities where most household decisions are made by males. Moreover, further studies are needed on the knowledge, attitudes, and practices of females partners regarding preferred birth intervals. Understanding how these influence females preferred birth intervals can provide valuable insights for designing effective interventions.

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AUTHORS' CONTRIBUTIONS

Douglas A. Candia designed the study, carried out the data analysis, wrote, reviewed and approved the final manuscript before submission. Edward Musoke and Christabellah Namugenyi wrote, reviewed and approved the final manuscript before submission.

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COMPETING INTERESTS

The authors confirm that all of the text, figures, and tables in the submitted manuscript work are original work created by the authors and that there are no competing professional, financial, or personal interests from other parties.

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