Education and Fertility preference among women in Uganda

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Abstract

Background: Women's education is pivotal in addressing elevated fertility rates, particularly in developing nations. Despite declining fertility rates, Uganda sustains a high fertility rate of 6.2, surpassing the sub-Saharan Africa regional average of 4.6. This heightened fertility poses a significant obstacle to Uganda's sustainable development goals. This study investigates the relationship between female education and fertility preference among Ugandan women in 2006, 2011 and 2016.

Methods: The study used data from the Uganda Demographic and Health Survey for 2006, 2011, and 2016, with a sample of 6,216, 5,205, and 10,741 women, respectively. A multivariable logistic model was utilized to establish the relationship between female education and fertility preference.

Results: Findings revealed the existence of an inverse relationship between female education and fertility preference over the years 2006, 2011 and 2016 (Primary OR=0.67, 95% CI 0.53-0.84; OR=0.58, 95% CI 0.45-0.74; OR=0.70, 95% CI 0.57-086) respectively. For secondary or more education, OR =0.43, 95% CI 0.22-0.87; OR=0.56, 95%CI 0.34-0.92, OR =0.80, 95% CI 0.56-1.14) respectively. Fertility preference is inversely related to the mother's income status, age and number of living children. Fertility preference is positively associated with the ideal number of children and contraceptive use.

Conclusion: This study has shown that female education helps to manage women's fertility preferences. Educated women can access information and get better employment to decide on the desired family size. The study advocates for the continued education of females to empower them in actively shaping their desired family size. It is recommended that government efforts to strengthen universal access to education at both primary and secondary levels. To cater for those outside the school setting, we recommend the strengthening of programmes on sexual reproductive health that should include an open discussion on the ideal family size.

Keywords: total fertility rate, female education, fertility preference, reproductive health

Introduction

Many development experts suggest enhancing female education is crucial in addressing elevated fertility rates, particularly in developing nations. Increased educational attainment equips women with empowerment and the ability to assert their rights (Bola, 2015). Multiple research studies have underscored a consistent inverse correlation between female education and fertility rates (Woldeamanuel et al., 2023; Monari et al., 2022; Muluneh & Habitu, 2022; Muluneh & Yikeber, 2021). The underlying mechanism linking female education and fertility operates in a manner that, as women attain higher educational levels, various factors influencing fertility experience adverse effects.

These factors encompass delaying the age of marriage, postponing the onset of first childbirth, and an increased adoption of contraceptive methods (United Nations Department of Economic and Social Affairs, 2020).

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In Sub-Saharan Africa, the fertility rate decreased marginally from 6.3 to 4.6 in 2019, while the global trend showed a reduction in fertility from 3.2 live births per woman in 1990 to 2.5 in 2019. In sub-Saharan Africa, Uganda has one of the highest fertility rates; it may take up to 34 years for the rate to decline from 6.0 (1995) to 4.0 (2029), from 3.1 (2050) to 2.1 live births per woman (2100). Uganda's estimated fertility rate is 6.2 (Kabagenyi et al., 2015). The likelihood of achieving the 2030 Agenda for Sustainable Development has been challenged by the expected high rates of female fertility in sub-Saharan Africa (United Nations Department of Economics and Social Affairs, 2020). In many sub-Saharan African nations, the implementation of universal primary education has increased the use of contraceptives by women who are of reproductive age and is assisting in lowering the region's high fertility rates.

The 2018 World Development Report offers significant insights into women's education, where less than two-thirds of girls in developing nations complete their primary education. Neglecting the girl child leads to their disempowerment, resulting in substantial losses to a country's human capital and, consequently, its national wealth. Failing to invest in girls' education represents a missed opportunity for countries seeking to harness the demographic dividend (Wodon, Montenegro, Nguyen, & Onagoruwa, 2018). The more empowered a woman is, the more likely she is to prefer using contraceptives (Sofia, Deborah Constant, Silvia Fraga, & Jane Harries, 2022).

In a study on the relationship between female education, labour force participation, and fertility in Uganda, Bbaale (2014) uncovered that female education, particularly at the secondary and post-secondary levels, leads to reduced fertility and increased female participation in formal employment. This view is echoed by (Kasarda, 1979). Numerous development economists link education to improvements in an individual's socio-economic status, which is closely associated with an enhanced quality of life and a preference for smaller family sizes (Muluneh & Habitu, 2022; Muluneh & Yikeber, 2021; Ariho & Nzabona, 2019). This study explores the relationship between individuals who do not progress to higher education levels or those who have completed a specific primary education level and their potential fertility preferences.

The literature identifies several factors that contribute to declining fertility rates. These factors include delayed marriage (Kabagenyi et al., 2015), increased education, improved access to family planning services (Abigail, 2020; Ariho & Nzabona, 2019; Kudesia, et al., 2018), and changing characteristics of women in the reproductive age (Ariho, Kabagenyi, & Nzabona, 2018). Pradhan (2016) argues that education empowers women to decide on the desired family size better. By pursuing more education, marriage is postponed, opportunities for higher earnings are reaped, and women are empowered to better decide on the desired family size (DeCicca & Krashinsky, 2016). Similar views are held by (Abigail, 2020; Kebede, 2019; Kim, 2016; Zuzanna, 2015). Open communication between husband and wife on the desired family is essential (Sarnak & Becker, 2022; Oni, David , & Oluwaseyi , 2021; Kasarda, 1979).

Factors contributing to women's empowerment, including education, employment status, freedom of movement, and decision-making power, were negatively associated with women's fertility (Shanjida et al. Haque, 2023). During periods of economic uncertainty, such as the COVID-19 pandemic, women are more likely to delay pregnancy, especially for their first birth (Ayşe et al. Karaşahin, 2023). Ayşe et al. (2023) observed that harsh living conditions positively affect women's decision to delay pregnancy.

The demographic structure of a country, particularly in terms of age distribution and residence patterns, positively impacts its Gross Domestic Product (GDP). In contrast, annual population growth and child mortality rates under five years harm per capita GDP (Kizza, Amonya, & Kigosa, 2020). A study conducted by Bola (2015) in Nigeria revealed that women who had their first child between the ages of 15 and 19 were less likely to have more children than those who had their first child at 14 or younger. Muluneh & Habitu (2022) found a strong inclination towards larger families among women with lower levels of education, those residing in rural areas, women without formal employment, and women from lower socioeconomic backgrounds. This is

supported by (Agbaglo, et al., 2022; Kebede, 2019; Kasarda, 1979). Additionally, factors such as women's age, religious beliefs, their husband's occupation, age at first marriage, and contraceptive use were significantly linked to women's desire for children.

These findings are consistent with the work of Woldeamanuel et al. (2023), Monari, Orwa, and Agwanda (2022), and Muluneh and Yikeber (2021). The literature underscores those wealthier countries, such as the USA and countries in Europe, characterized by higher per capita GDP, tend to experience lower fertility rates. It is also evident from the literature that a country's education levels significantly influence its demographic structure. We find no literature explicitly focusing on the relationship between education and women's fertility preference with specific reference to Uganda.

Nations employ diverse strategies to address high fertility rates, especially when they risk exacerbating the country's dependency ratio. In numerous developing countries, such as Uganda, family planning is advocated as a pivotal measure to mitigate elevated fertility levels. Access to reliable information, facilitated by education, equips individuals to make informed decisions about family size (World Bank, 2021; Kasarda, 1979). We contend that acquiring at least primary education enables a broader understanding of family planning messages, subsequently increasing the utilization of family planning services and reducing a country's total fertility rates. It is posited that as a woman attains higher levels of education, her inclination to have more children diminishes (Woldeamanuel et al., 2023; Monari et al., 2022; Muluneh & Habitu, 2022).

While global fertility rates declined from 3.2 live births per woman in 1990 to 2.5 in 2019, Sub-Saharan Africa's fertility rate slightly decreased from 6.3 to 4.6 in 2019. The contributors to the high fertility rate in Uganda include residence in rural areas, lack of contraceptives and misconceptions about contraceptives, the patriarchal society where men make the decisions on children, the intention to have children, and low levels of schooling (Kwabaho et al., 2023; Nakkazi, 2022) and the values attached to childbearing. Other contributors include child marriage, with 34% of women reported to be married by the age of 15 (UNICEF, 2019) and the associated teenage pregnancy rate at 25% since 2016 (UDHS 2016).

Despite a gradual decline in fertility rates, Uganda maintains one of the region's highest rates at 6.2 (Kabagenyi et al., 2015). If left uncontrolled, this high fertility rate could significantly challenge Uganda's pursuit of sustainable development goals. This study investigated the relationship between female education and fertility preference among Ugandan women in 2006, 2011 and 2016. Specifically, our guiding research questions were: 1) What is the relationship between women's education and the desire for a child 2) What other factors have a significant effect on a woman's desire for a child among women in Uganda?

Methods
Study setting and design
Uganda, situated in East Africa and intersecting the equator, is a landlocked nation bordered by Kenya to the east, Tanzania to the south, Rwanda to the southwest, the Democratic Republic of Congo to the west, and South Sudan to the north. Covering an expanse of 241,039 square kilometres, the country is subdivided into 112 districts. Uganda operates under a decentralized governance system, with various functions delegated to local governments. Despite decentralization, the central government remains responsible for policy formulation, setting and overseeing standards, and ensuring national security (UBOS and ICF, 2017). This study utilises three most recent Uganda Demographic and Health Surveys (UDHS) from 2006-2016.

Data Source and Study Population
The study combines secondary data from the 2006, 2011, and 2016 Uganda Demographic and Health Surveys (UDHS). The analysis reveals a consistent approach for data collection across the

survey years. All surveys aimed at providing comprehensive estimates at the national level and for urban and rural areas, adhering to a two-stage sampling process. In all three surveys, the initial stage involved selecting clusters or enumeration areas (EAs) from previous national household surveys and linking samples for comparability.

The subsequent stage included a random selection of households from complete listings. While the number of households varied (9,864 households in 2006, 10,086 households in 2011 and 20,880 households in 2016), selecting a predetermined number from each cluster remained a common element. Interviews for each selected household consistently included men aged 15-54 and women aged 15-49. All women aged 15-49 who were permanent residents or visitors the night before the survey were eligible for the interview. About 8,531, 8,674 and 18506 women were successfully interviewed in 2006, 2011 and 2016, respectively (UBOS and Macro, 2007; UBOS and ICF, 2012 and 2017). After merging the data sets and generating the variables of interest, the study sample was 6,216, 5,205 and 10,741 women for the respective surveys.

Outcome variable: Our outcome variable is "fertility preference", which signifies the respondent's desire for more children. The response categories were "have another", "no more", "undecided", "sterilized" or "declared infecund". The Fertility preference variable was constructed as a binary outcome variable from two responses, with "have another" coded as 1 and "no more" coded as 0; the other responses were dropped to avoid a biased estimate of the outcome variable.

Exposure variable: Mothers' education is our study's primary variable of interest. The variable originally had four categories—mothers with no education, primary, secondary, and higher. We, however, keep only categories for no education, primary and secondary or higher. This is because the higher category had relatively fewer observations. To promote education, the government launched the Universal Primary Education (UPE) and Universal Secondary Education (USE) programmes (Nakkazi, 2022). The Uganda Vision 2040 and NDP III focus on girl child education. The Uganda Government is committed to the promotion of female education through programs and strategies that include the National Strategy for Girls' Education (MOES, 2013), establishing a secondary school in each sub-county, the Universal Primary Education Effective School Health (FRESH), the Education Plus and Promoting Equality in African Schools (PEAS). Other policies include The Second Chance Education Program, the policy to welcome previously pregnant mothers back into school and emphasis on "gender-sensitive educational infrastructure" in schools.

Confounding variables. The study uses other control variables in the estimation based on literature (Woldeamanuel et al., 2023; Monari et al., 2022; Muluneh & Habitu, 2022). These include the respondent's place of residence, contraceptive use, religion, occupation, age at first birth, wealth index, ideal number of children, number of living children, and the respondent's age. In Africa, the production of children is considered a blessing, and the production of a son is highly valued. Large families earn respect and prestige in society, and polygamous relationships are protected.

Most African women, on average, desire not to have less than five children, and in the process, end up producing more in search of a son, security for old age or the belief that one cannot stop producing twins (Kwabaho et al., 2023; Kabagenyi et al., 2016). Practices like bride wealth favour the production of more children as the decision on how many to produce is primarily a preserve of the men. The traditional gendered roles favour the education of the male child as opposed to the female child, who is often condemned to perform household chores (Kabagenyi et al.). In addition, religious values such as the command to produce and fill the world tend to make people apathetic to family planning. Yet other religions seem to favour child marriage, like the African traditional religion and Islam (Kabagenyi et al., 2016). This is despite the legal age of sexual consent, which is set at 18 years (Uganda Government, 2022). We employ a multivariate logistic model in the analysis and estimate the odds ratios with their respective confidence intervals.

Model Specification

We apply a multiple logistic regression given that our outcome variable is binary, and the exposure and majority of the confounders are dummies. In this model, we estimate the odds that a woman desires more children, given as $P(y = 1)$ and $P(y = 0)$ for no more children. We associate the desire for more children with a high fertility preference; otherwise, it is low. We estimate the following results.

Results

In this section, we present the descriptive statistics in Table 1 for continuous variables, Table 2 for categorical variables, and Table 3 for the odds ratio.

Table 1: Descriptives for continuous variables

Dependent Variable	2006		2011		2016	
Fertility	**Frequency**	**Per cent**	**Frequency**	**Per cent**	**Frequency**	**Per cent**
Don't desire a child	2,757	44.4	2,180	41.9	4,140	38.5
Desire a child	3,459	55.6	3,025	58.1	6,601	61.5
Total	**6,216**		**5,205**		**10,741**	
Independent Variables						
	0	1	0	1	0	1
Current mother's age						
Obs	2,757	3,459	2,180	3,025	4,140	6,601
Mean	33	26	33	26	33	26
Std.Dev	6	5	6	5	6	5
Min	17	15	18	15	16	15
Max	49	49	49	49	49	49
Ideal No. of children						
Obs	2,757	3,459	2,180	3,025	4,140	6,601
Mean	5	5	5	5	5	5
Std.Dev	1	1	1	1	1	1
Min	0	0	0	0	0	0
Max	7	7	7	7	7	7
No. of living children						
Obs	2,757	3,459	2,180	3,025	4,140	6,601
Mean	6	3	5	3	5	3
Std.Dev	2	2	2	2	2	2
Min	1	1	1	1	1	1
Max	14	10	14	11	14	11

Table 1 shows that the percentage of women who desire a child has increased since 2006. The results indicate an increase from 55.6% in 2006 to 58.1% in 2011 and 61.5% in 2016. This trend seems to align with the literature that Uganda still has one of the highest fertility rates in SSA (United Nations Department of Economics and Social Affairs, 2020; Kabagenyi, Reid, Rutaremwa, Atuyambe, & Ntozi, 2015). The mean age for women who desire not to have a child has remained stable at 33 years over the period studied, while the mean age for women who desire to have a child has also remained stable at 26 years for the period under study. The ideal number of children is preferred for both those who desire a child and those who do not, and has remained stable at five children over the years. This supports earlier findings by (Kabagenyi et al., 2015) that despite

the noticeable decline in the fertility rate in Uganda, the fertility rate remains. The findings suggest that most women in Uganda desire to have, on average, five children and a maximum of around seven children, which somehow falls back to the 6.2 fertility rate revealed in (Kabagenyi et al.,2015). The women who had a higher number of living children, from six in 2006 to five in both 2011 and 2016, expressed no desire for a child, while those with a smaller number of living children were revealed to be three (3) throughout the study period expressed the desire to have a child. This is logical for a person with fewer children to desire more than one with more children.

Table 2: Descriptives for categorical variables

Variable	2006		2011		2016	
	0	1	0	1	0	1
Education level						
No education	706	835(54%)	431	558(56%)	738	663(47%)
Primary Education	1,754	2178(55%)	1,388	1717(55%)	2,718	4120(60%)
Secondary Education and more	297	446(60%)	361	750(68%)	684	1818(73%)
Contraceptive use: Not using	2,200	2847(56%)	1,586	2268(58%)	2,683	4122(61%)
Using	557	612(52%)	594	757(56%)	1,457	2479(63%)
Birth Age						
Birth age-below 20	136	771(85%)	95	626(87%)	168	1507(90%)
Birth age-20-34	1,887	2534(57%)	1,504	2278(60%)	2,792	4870(64%)
Birth age-35-49	734	154(17%)	581	121(17%)	1,180	224(16%)
Wealth						
Poor	940	1454(61%)	889	1343(60%)	1648	2617(61%)
Middle Income	948	1162(55%)	695	848(55%)	1305	1983(60%)
Rich	869	843(49%)	596	834(58%)	1187	2001(63%)
Residence						
Rural	2,526	3217(56%)	1,783	2478(58%)	3,530	5493(61%)
Urban	231	242(51%)	397	547(58%)	610	1108(64%)
Religion						
Anglican	1,263	1654(57%)	934	1416(60%)	1,288	2036(61%)
Catholic	1,027	1131(52%)	735	844(53%)	1,705	2764(62%)
Muslims	267	377(59%)	245	376(61%)	467	817(64%)
SDA	144	230(61%)	234	354(60%)	64	95(60%)
Others	56	67(54%)	32	35(52%)	616	889(59%)
Occupation						
Profession/tech/managerial/skilled	198	262(60%)	92	168(65%)	878	1612(65%)
Clerical/sales/services	303	349(54)	551	835(60%)	559	1082(66%)
Agriculture/household/unskilled	2,256	2848(56%)	1537	2022(57%)	2703	3907(59%)
Total Sample	6216		5205		10741	

The desire to have a child among those not using contraceptives has been increasing over the years from 56% in 2006, 58% in 2011 and 61% in 2016. This is not very different from the desire among women who are currently using contraceptives. The only difference is in the magnitude where the desire to have a child among those not using contraceptives was slightly higher than those using contraceptives for the years 2006 and 2011. In 2016, the desire to have a child was higher among women using contraceptives (63%) compared to those not using contraceptives (61%). This may be explained by the value attached to the bearing of children in the African context.

The desire for a child increases the higher the level of education one attains, and this is consistent over the study period. In 2006, the desire for a child of those with no education was 54%, those with primary education 55%, while for those with secondary or more education it was 60%. In 2011, the desire for a child of those without education was 56%; for those with primary education, 55%, and for those with secondary or more education, 68%. In 2016, the desire for a child of those without education was 47%; for those with primary education, 60%, and for those with secondary or more education was 73%. This may be explained from the fact that education tends to delay childbirth. So, when people finish schooling at a given level, their desire to have a child increases. She is ageing by the time one finishes secondary or higher education level. She feels more compelled to have a child before catching up with the complexities of childbearing at an ancient age.

The findings revealed that the desire to have a child is greater among those with a birth age below 20 years and very limited among those with a birth age of 35-49%. This result is consistent over the study period. Whereas the desire for a child for the birth age below has been increasing from 2006 at 85%, 2011 at 87% and 2016 at 90%, the desire for a child among those aged between 35 and 49 has remained relatively low at 17% in 2006/2011 and 16% in 2016. This may be explained in two ways: 1) the likelihood that by the age 35-49, one already has a child or 2) the health complications associated with childbearing at an old age. The analysis of the age cohorts in the descriptive statistics has thus revealed that the preference for a child reduces with age.

For 2006 and 2011, the findings revealed that the desire for a child reduces as the person gets richer. The period 2016 posted a slightly mixed picture where the desire for a child for the poor was 61%, fell to 60% for those with primary education and rose to 63% for the rich. This may be so given that as people's income status improves, they tend to feel more capable of raising children. It is also true that often, the rich delay childbirth through long periods of education, and when they complete their studies, they tend to have a higher desire for a child. Similarly, the income levels of society are recorded as improving. This means more people are entering the rich cohort, which explains the rising percentages among the rich desiring a child as the years go by, from 49% in 2006, 58% in 2011 and 63% in 2016.

The desire for a child has increased over the years, irrespective of residence. In rural areas, the desire for a child increased from 56% in 2006 to 58% in 2011 and 61% in 2016. The desire for a child in urban areas has increased from 51% in 2006 to 58% in 2011 and 64% in 2011. Whereas the desire for a child was higher in the rural areas at 56% in 2006 compared to urban areas at 51%, there was equal desire for a child at 58% for both types of residence in 2011. However, in 2016, the desire for a child for urban residents (64%) surpassed that of rural residents (61%). This may not be surprising as development studies indicate that as society grows, people tend to live in rural areas and settle in urban areas.

The desire for a child according to faith is mixed over the study period. In 2006, the desire for a child was highest among the SDA faith (61%), followed by the Muslim faith (59%). In 2011, the desire for a child was highest among Muslims (61%), followed by SDAs and Anglicans (60%). In 2011, the desire for a child was highest among Muslims at 64%, followed by Catholics at 62%. A close analysis shows the desire for a child to be highest among the Muslim faith compared to other faiths.

According to occupation, the desire for a child was highest among those engaged in agricultural services, household chores, and unskilled workers, from 60% in 2006 to 65% in 2011 and 2016. The desire for a child among professionals, though lower than those in agriculture, is steadily increasing, from 54% in 2006 to 60% in 2011 and 66% in 2016. The same trend is evident among those in clerical, sales, and services.

Results of the Odds Ratios
Table 3: Factors influencing the desire for a child among women in Uganda using UBOS data sets 2006,2011 and 2016

Year	2006	2011	2016
Variable	**OR(95%CI)**	**OR(95%CI)**	**OR(95%CI)**
Current mother's age	0.91(0.89,0.93)**	0.88(0.86,0.90)**	0.88(0.87,0.90)**
The ideal number of children	2.22(0.48,0.54)**	2.07(1.93,2.22)**	2.18(2.07,2.300**
No. of living children	0.51(0.48,0.54)**	0.59(0.55,0.62)**	0.52(0.50,0.55)**
Contraceptive use	1.08(0.91,1.29)	1.39(1.18,1.65)**	1.22(1.10,1.36)**
Education level			
(Ref.No education)			
Primary level	0.67(0.53,0.84)**	0.58(0.45,0.74)***	0.70(0.57,0.86)**
Secondary and above	0.43(0.22,0.87)**	0.56(0.34,0.92)**	0.80(0.56,1.14)
Wealth (Reference poor)			
Middle income	0.67(0.49,0.91)**	0.64(0.41,0.99)*	0.49(0.35,0.70)**
Rich	0.49(0.31,0.78)**	0.63(0.32,1.22)	0.31(0.18,0.52)**
Wealth vs. education level			
(Ref. Poor with no education)			
Middle-income with primary	1.46(1.02,2.10)**	1.63(1.01,2.64)*	2.02(1.38,2.96)**
Middle income with secondary plus	4.13(1.79,9.55)**	2.23(1.10,4.52)**	2.53(1.50,4.27)**
Rich with primary	1.68(1.01,2.80)*	1.69(0.83,3.44)	3.23(1.50,4.27)**
Rich with secondary plus	2.47(1.06,5.75)**	2.99(1.30,6.85)**	3.77(2.03,7.03)**
Residence (Ref. rural)			
Urban	0.86(0.66,1.13)	0.65(0.52,0.82)**	0.94(0.80,1.09)
Birth age			
(Ref.Birth age 35 to 49			
Birth age before 20 years	0.79(0.51,1.23)	0.70(0.43,1.13)	0.75(0.53,1.05)*
Birth age 20 to 34	0.91(0.68,1.22)	0.80(1.06,1.48)	0.87(0.70,1.09)
Religion (Ref. Catholics)			
Anglicans	1.14(0.98,1.32)*	1.25(1.06,1.48)**	1.11(0.98,1.25)
Muslims	1.60(1.27,2.02)**	1.16(0.91,1.47)	1.22(1.02,1.45)**
SDA	1.47(1.10,1.95)**	1.28(1.00,1.64)*	1.05(0.67,1.63)
Others	1.81(1.09,3.00)**	1.09(0.58,2.05)	1.04(0.89,1.22)
Ocupation			
(Ref.Agriculture/household/unskilled)			
Profession/technical/managerial/skilled	1.19(0.91,1.55)	1.02(0.70,1.47)	1.11(0.97,1.26)
Clerical/sales/services	0.91(0.72,1.14)	0.88(0.74,1.05)	1.11(0.95,1.30)
_cons	9.04(4.07,20.08)**	25.52(10.75,60.54)**	26.83(14.26,50.51)**

Standard errors in parentheses   ** p<0.05, * p<0.1

The odds of desire for a child reduce as one grows older. In 2006, the desire for the child as one grows older was (OR =0.91, 95% CI 0.89-0.93). In 2011, the OR was (OR =0.86, 95% CI 0.86-0.90), while in 2016, it was (OR=0.88, 95% CI 0.87-090). These results indicate that as a person ages, the odds of desiring a child reduce compared to women slightly in a lower age bracket.
The odds of desiring a child increase with the ideal number of children. The women who prefer a high ideal number of children are more likely to desire a child than those who prefer a lower ideal number. In 2006, women desiring more children were 2.22 (95%CI 0.48-0.54) times more likely to desire a child than those who prefer a lower ideal number of children.

Women with a higher number of living children have lower odds of desiring a child than women with fewer living children. In 2006, women with more living children were 0.51 times (95%CI 0.48-0.54) less likely to desire a child. In 2011, they were 0.59 times (95%CI 0.55-0.62) less likely to desire a child, and in 2016, they were 0.52 times (95%CI 0.50-0.55) less likely to desire a child than women with fewer living children.

The odds of the desire for a child among women who use contraceptives are higher compared to women who do not use contraceptives. In 2006, the women who use contraceptives were 1.08 times (95%CI 0.91-1.29) more likely to desire a child; in 2011 (OR=1.39, 95%CI 1.18-1.65) and in 2016 (OR=1.22, 95%CI 1.10, 1.36) than women who do not use contraceptives.

The odds of desiring a child reduce the more education one attains. In 2006, those with primary education were 0.67 times less likely to desire a child than those with no education, while those with secondary or more education was even less likely to desire a child compared with those with no education (OR=0.43,95%CI 0.22-0.87). In 2011, those with primary education had a 0.58 lower likelihood of desiring a child than those without education. The rich were 0.56 times less likely to desire a child than the poor. In 2016, the odds of desire for a child among those with primary education was (OR=0.70, 95%CI 0.57-0.86) lower than those with no education, while the odds of those with secondary or more education to desire a child was (OR=0.80, 95%CI 0.56-1.14) lower compared to those with no education. The findings generally reveal that the more education one attains, the lower the likelihood of desiring a child. The gap in desire seems to be lower in 2016 than in 2016 and 2011.

The odds of desiring a child are lower with improvements in one's income status, and this is consistent over the study period. In 2006, those in middle income were (OR=0.67, 95%CI 0.49-0.91) less likely to desire a child compared to the poor, while the rich even had lower odds (OR=0.49, 95% CI 0.31- 0.78) than the middle income. In 2016, it became even more clear that as one's income increases, the likelihood to desire a child lowers (OR=0.49, 95% CI 0.35-0.70) for the middle income and (OR=0.31, 95% CI 0.18-0.52) for the rich compared to the poor.

The interaction between education and wealth over the study period reveals that the odds of the desire for a child are more likely for both women with middle income or rich with some level of education compared to those who are poor with no education. This may be because educated women, who at the same time are well off, tend to feel more capable of taking on motherhood responsibilities.

Apart from 2011, the results revealed no significant difference in the desire for a child according to residence. However, in 2011, the results revealed that the odds of desiring a child for an urban resident were 0.56 times (OR=0.65, 95%CI 0.52, 0.82) lower than for rural residents. In 2016, the results revealed that birth age before 20 years was 0.75 times (95%CI 0.53-1.05) less likely to desire a child than those aged 35 -49.

Fertility preference decreases as the age at first birth increases, with significance observed in 2011. In general, women from faiths other than Catholicism exhibit a higher fertility preference. Between 2006 and 2011, women from the Anglican faith were, on average, 2.7% more likely to express a higher fertility preference than Catholic women. Muslim women had a 6.7% higher preference for fertility in 2006 compared to Catholic women. This trend persisted in 2011 and 2016. Other faiths, such as Pentecostals, Baptists, and Mammon, showed a 9.5% higher preference for fertility in 2006, with varied trends in 2011 and 2016, although these were not statistically significant.

Discussion

This study sought to investigate the factors contributing to the desire for a child among Ugandan women in 2006, 2011 and 2016. A sample of 6216, 5205, and 10,741 women were used as derived from the data sets for the period under study. Two research questions were formulated to guide this investigation. 1) What is the relationship between women's education and the desire for a child

2) What other factors have a significant effect on a woman's desire for a child among women in Uganda?

What is the relationship between women's education and the desire for a child among women in Uganda? The results indicated that the desire for a child among women over the study period does reduce with one's education level. This means that education is inversely related to the desire for a child. As a woman attains higher levels of education, her desire for a child lowers. The finding aligns with several authors (Woldeamanuel et al., 2023; Monari et al., 2022; Muluneh & Habitu, 2022; United Nations Department of Economics and Social Affairs, 2020). Education is associated with delaying the age at first birth (United Nations Department of Economics and Social Affairs, 2020; DeCicca & Krashinsky, 2016). This implies that when one is still pursuing her education career, the likelihood of desiring a child is generally lower than that of someone not in school. Education also empowers women to decide on when to have a child and to have a child that one is better able to look after (Pradhan, 2016). Women's empowerment through education improves their decision-making power to the desired family size (Shanjida et al., 2023)

Education plays a significant role in raising awareness about contraceptive methods, and a positive relationship between education and contraceptives has been established in various studies (Sofia et al., 2022; Bbaale, 2014). Education raises awareness about reproductive health and lessens the high infant mortality rate associated with poor child-rearing habits. The higher the expected survival rate of children, the less likely the desire for more children will be. Our results have indicated that a woman's number of living children is inversely related to her preference for more children. Education increases the woman's opportunity to access paid employment. Our findings have revealed that the desire for a child reduces as one's income status rises. Contrary to where people in African tradition associated more children with wealth, in modern society, people rarely use children to hedge against poverty. Through education, women access information that enables them to plan for their desired family size (WorldBank, 2021).

What other factors significantly affect a woman's desire for a child among women in Uganda?
Several factors, as informed by the literature, were considered, and only those found significant are discussed here. The current age of the woman was found to be significantly related to the desire for a child. The desire for a child lowers with the increase in the mother's age. This result is consistent with research from the United Nations Department of Economics and Social Affairs (2020) and the work of DeCicca and Krashinsky (2016). As women age, they tend to be less inclined to take on the added responsibilities of childcare and support.

The desire for a child increases when the desired number of children is not yet attained. Reducing the desired family size is a prerequisite for fertility decline, as Kebede echoed in 2019. Women with a reasonable number of living children are less likely to desire a child. This is because such women may find it more reasonable to look after the children properly as they already have rather than take on additional responsibilities that come with a new birth.

There is a higher desire for a child among women who use contraceptives. Much as the rationale for contraceptives is to limit childbirth, the intention is more on planning for a desired family as opposed to limiting production. This means that the time must come when one has to produce. This explains why our results indicate the existence of a significant relationship between contraceptive use and the desire for a child. The desire for a child among contraceptive users is more likely to increase until the desired family size is attained.

As the income status of the woman improves, her desire for a child lowers. This is consistent with research indicating a negative relationship between women's wealth and fertility (Agbaglo, et al., 2022; Muluneh E. K. & Habitu, 2022). Researchers like (Ayşe et al., 2023) have reported a positive association between harsh living conditions and the women's decision to delay pregnancy.

Much as the results revealed that women residing in urban areas have a lower desire for a child than their counterparts in rural areas, this result is only significant for 2011. Though the desire to have a child increases with age, this is only significant for the year 2016 among the birth age before 20 and is in line with (Bola, 2015).

Whereas the faiths studied had a higher desire for a child compared to the Catholic faith in 2006, this was only significant for Anglicans and SDAs in 2011 and only significant for Muslims in 2016. This differs somewhat from the findings of Muluneh M. W. & Yikeber (2021), who found that Catholics and Muslims had a higher preference for more children compared to women from other faiths in Ethiopia.

Our study did not find significant results regarding the connection between a woman's occupation and the desire for a child. This is contrary to earlier research, as seen in the study by Shanjida and colleagues (2023).

Conclusion and Policy Recommendations:

This study explored the relationship between female education and fertility preference among Ugandan women in 2006, 2011 and 2016. The study findings have revealed that the desire for a child, the ideal number of children and religion have a positive influence on women's fertility preference in Uganda. On the other hand, the mother's age, education, income and urban residence negatively influence women's fertility preference. The study findings have revealed that female education is inversely related to women's fertility preferences throughout the study period. The other significant factors that moderate this relationship include the mother's current age, the number of living children, wealth, and religion. Factors such as the ideal number of children and contraceptives showed a significant positive relationship with education. Though depicting a negative relationship, factors like residence and birth age showed mixed results of significance.

The study concludes that female education is negatively associated with women's fertility preference. Women's education empowers them to make better-informed decisions regarding the desired family size. Therefore, we recommend that government efforts to strengthen universal access to education at both primary and secondary levels. This may involve the government taking care of the hidden costs of schools, especially the uniform and feeding costs that often tempt schools to charge fees; in line with this, programmes on sexual reproductive health need to be strengthened to enrich outreach, especially for women out of school. These programmes should focus on the available sexual reproductive health services and should include a discussion on the ideal family size. We also recommend the inclusion of men in the sexual reproductive health programmes, given that most of the critical decisions regarding the production of children are made by men.

Women who are educated and have money tend to have a low fertility preference. The implication to policymakers is to develop strategies that economically empower women. The school matrons and senior women are crucial in helping the girl child stay in school. These should be supported and equipped with the relevant counselling skills. Whereas the policy to have a secondary school in each sub-county is a move in the right direction, the issue of distance to the schools needs to be considered. We recommend that the ideal of a secondary school per 5 kilometres be implemented to limit the number of girls that drop out due to long distances.

The implication to the community is the need to sensitize their members to embrace government programmes like UPE and USE. The community leaders should spearhead the sensitization of the communities on harmful cultural practices such as those that tie the girl child to performing household chores. The local leaders should lead the mobilization campaigns in support of sexual reproductive health programmes. The government should engage religious leaders to develop a common ground for positive family planning practices. This study has limitations, particularly in establishing causal relationships between education, the moderating variables, and the outcome variables, given that the data used is cross-sectional.

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