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Factors Associated with the Timing and Number of Antenatal Care Visits among Unmarried Compared to Married Youth in Uganda between 2006 and 2016

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Abstract: Antenatal care is an important determinant of pregnancy and childbirth outcomes. Although the youth disproportionately experience adverse maternal complications and poor pregnancy outcomes, including maternal mortality, timely and frequent use of antenatal care services among unmarried youth in Uganda remains low. This study examines the factors that are important predictors of the use of antenatal health care services among unmarried and married youth. Binary logistic regression was conducted on the pooled data of the 2006, 2011 and 2016 Uganda Demographic and Health Surveys among youth who had given birth within five years before each survey to examine the predictors of ANC use. This analysis was among a sample of 764 unmarried, compared to 5176 married youth aged 15–24 years. Overall, married youth were more likely to have more frequent antenatal care visits (56% versus 53%) and start antenatal care early (27% versus 23%) than unmarried youth. Factors significantly associated with use of antenatal care in the first trimester were education and occupation among unmarried youth, and place of residence and access to the radio among married youth. Key predictors of ANC frequency among unmarried youth were parity, education level, pregnancy desire, age group, sex of head of household and region of residence. Among married youth, significant predictors of ANC frequency were parity, pregnancy desire, occupation, access to the radio and region of residence. These findings will help inform health-care programmers and policy makers in initiating appropriate policies and programs for ensuring optimal ANC use for all that could guarantee universal maternal health-care coverage to enable Uganda to achieve the SDG3.

Keywords: antenatal care; unmarried youth; binary logistic regression; Uganda

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1. Introduction

Timely and frequent use of antenatal care (ANC) services among unmarried youth remains low in Uganda. Youth experience adverse maternal complications due to their young ages at pregnancy and childbirth, such as obstructed labour, fistula and unsafe abortion (Jagwe-Wadda et al. 2006; Bearinger et al. 2007; Defo 2011; Althabe et al. 2015; Zhang et al. 2020) and higher levels of maternal mortality (Ganchimeg et al. 2014; WHO 2016b). Youth also have poor pregnancy outcomes regarding low birth weight, pre-term and stillbirths (Debiec et al. 2010; Shah et al. 2011; Ganchimeg et al. 2014; UNICEF 2014). Thus, specific factors which deprive the youth and more specifically the unmarried youth from early initiation and frequent use of ANC should be appreciated and addressed in Uganda.

Previously, the World Health Organisation (WHO) recommended at least four ANC visits, and the first one would be in the first three months of the pregnancy (MoH 2013,

2016; WHO 2016a). However, this has been reviewed overtime to at least eight visits to reduce perinatal mortality and improve women's experience of care (WHO 2018; Lattof et al. 2020). Available literature shows that the threshold coverage of ANC use required to achieve the SDG 3.1 is 91% coverage of ever use of ANC and 78% of at least four antenatal care visits, together with 81% of in-facility delivery as well as 87% of skilled birth attendance (Kassebaum et al. 2016). Even though the use of at least one ANC visit among women of reproductive age is almost universal (97%) in Uganda, only 60%, 48% and 47% had at least four ANC visits, while only 30%, 21% and 17% had ANC in the first trimester in 2016, 2011 and 2006, respectively (UBOS and Macro International 2007; UBOS and ICF International 2012, 2018). This is lower among adolescents, with a much lower proportion (14%) of the adolescents having had at least four ANC visits in 2011 (UBOS and ICF International 2012).

It is envisaged that timely and frequent use of ANC would reduce maternal mortality and child mortality (Carroli et al. 2001; Simkhada et al. 2008) and attain better obstetric outcomes through early identification and management of complications (Carroli et al. 2001; Reynolds et al. 2006; Mpembeni et al. 2007). On the other hand, late ANC start has been observed to be associated with poor pregnancy outcomes like low birth weight and pre-mature births (Heaman et al. 2008). Timely and frequent ANC benefits include provision of preventive health services, such as vaccination, malaria prophylaxis, iron supplementation, nutrition counselling, and HIV counselling and testing (Carroli et al. 2001; Wehby et al. 2009; Gross et al. 2012; Konje et al. 2018). Antenatal care use also influences the use of subsequent maternal health services, such as delivery in the health facilities, or under the supervision of the trained birth attendant (Birungi et al. 2011; Sein 2012; Anyait et al. 2012; Singh et al. 2014; Jacobs et al. 2017), and postnatal check-ups (Birungi et al. 2011; Rai et al. 2012; Sein 2012; Kumar et al. 2013; Singh et al. 2014).

The predictors of antenatal care among the youth include a range of demand-related (e.g., socio-economic and demographic characteristics) and supply-related (e.g., service availability/access and quality) factors. Women's education level has been observed to predict the use of ANC in many settings, and specifically youth with higher education levels are more likely to use ANC early (Ochako et al. 2011) and frequently (Rai et al. 2012; Haque et al. 2012; Ochako et al. 2011; Singh et al. 2014) than the youth with low educational attainment. However, no difference in ANC numbers in Mali were observed by education level (Singh et al. 2013b). Studies found that higher wealth status was related to higher chances of seeking ANC early (Kumar et al. 2013; Singh et al. 2014) and a higher likelihood of having at least four ANC visits compared to those in the poorest households (Rai et al. 2012; Singh et al. 2013a). Child desire and acceptance by females, society, families, partners, and peers has also been found to influence ANC use. Additionally, females who reported the pregnancy as unwanted sought ANC less efficiently compared to those whose pregnancy was wanted across different studies (Teagle and Brindis 1998; Magadi et al. 2007; Chaibva et al. 2009; Rai et al. 2013).

Some studies have found that older youth were more likely to use antenatal care than the very young ones (Reynolds et al. 2006; Hueston et al. 2008; Ryan et al. 2009; Anderson and Rahn 2016). Higher parity was associated with reduced odds of frequent ANC compared to youth who were pregnant for the first time, especially when they have had no complications for the previous pregnancies (Birungi et al. 2011; Ochako et al. 2011; Magadi et al. 2007; Hueston et al. 2008; Shahabuddin et al. 2015). Urban residence has been observed to be associated with increased odds of early ANC start (Ryan et al. 2009; Rai et al. 2012; Haque et al. 2012; Kumar et al. 2013; Shahabuddin et al. 2015) and frequent use of ANC (Ryan et al. 2009; Rai et al. 2012; Haque et al. 2012; Shahabuddin et al. 2015) than rural areas.

Access to information through radios, televisions (TVs), and print media (Singh et al. 2013a, 2014) and health visitors (Singh et al. 2021) have been observed to be associated with increased chances of adequate ANC and early ANC start (Arthur et al. 2007). Poor attitudes of health providers was observed to be a barrier to the use of ANC, while good relations increased the odds of use of maternal health services (Teagle and Brindis 1998; Magadi et al. 2007; Chaibva et al. 2009). Lack of privacy, uncomfortable waiting areas, and long waiting hours discouraged the youth from attending ANC (Chaibva et al. 2009; Duggan and Adejumo 2012; Hokororo et al. 2015). Furthermore, discrimination of giving HIV test results in privacy to only HIV positive females also discouraged ANC use among adolescents in Tanzania (Hokororo et al. 2015). Lack of privacy made youth to visit health facilities that are far (Reibel et al. 2015), or they did not access ANC services at all (Hokororo et al. 2015).

Based on the insights from the literature, several studies have tried to document the factors that influence the use of antenatal care among youth in Uganda and elsewhere (Singh et al. 2012, 2013a, 2013b, 2014; Kumar et al. 2013; Haque et al. 2012; Sein 2012; Rai et al. 2012; Ochako et al. 2011), but some patterns remain inconsistent and none has presented factors associated with use of antenatal care among unmarried youth in Uganda, which is an important gap in the literature. Although youths may be seen as a homogenous group, the unmarried youth's access to services differ from their married counterparts. They have an unrecognised and frequently unmeasured need for reproductive health services (Chandra-Mouli et al. 2014). Additionally, previous studies have documented observed variations in the use of antenatal care among married and unmarried youth (Magadi et al. 2007; Ochako et al. 2011; Hokororo et al. 2015).

Therefore, it is important to establish whether similar patterns are true in Uganda given that the policy context in Uganda on improving male involvement in reproductive health services that prioritises couples to women that come for antenatal care with no partners, which most times are the unmarried youth. Our aim was to examine the factors associated with the timing and number of antenatal care visits among unmarried compared to married youth aged 15–24 years in Uganda. The evidence from this study will guide health providers, and policy makers at the national and global level to design policies aimed at improving the timely and frequent use of antenatal care services among the youths especially the unmarried youths which will consecutively improve maternal and child health in Uganda and other Sub-Saharan African countries with similar contexts.

2. Materials and Methods

2.1. Data Source

The study was based on secondary analysis of the pooled 2006, 2011 and 2016 Uganda Demographic and Health Survey (UDHS) data. The data were retrieved with permission from MEASURE DHS (dhsprogram.com [accesed: 17 April 2020]). Pooled data were used to show trends in the use of antenatal care as well as to boost the sample size among unmarried youth thus improving the statistical power.

2.2. Study Design

The UDHS surveys are periodic national surveys conducted after every five years. These surveys were population-based household surveys that used two stage sampling where clusters (Enumeration Areas) and households from each cluster were randomly selected. Then, households are selected from the clusters randomly. Detailed sampling procedures are available in respective UDHS reports (UBOS and Macro International 2007, 2012, 2018). The Uganda Demographic and Health Surveys (UDHSs) collect data on socio-economic and demographic characteristics of women, and their use and timing of maternal and child health services, and nutrition among other factors. This study focused on females aged 15–24 years who had had a birth five years before each survey. These criteria resulted into a sample of 5969 cases, of which 764 were unmarried and 5176 were married youth.

2.3. Measures of the Outcome Variables

Antenatal care is measured by two variables: the number of ANC visits and the timing of the first ANC visit. These data were captured from women who sought ANC during the last pregnancy in the five years before each survey. Women were asked if they had ANC for their last pregnancy. Those who consulted a trained health provider for ANC were asked how many times they did receive antenatal care during that pregnancy. They were also asked how many months pregnant they were, the first time they received ANC for that pregnancy. For this study, a binary outcome was constructed for timing of antenatal care; youth who initiated ANC visits in the first three months of the pregnancy were coded as one '1' for 'early start of ANC', while those who never attended or started after the three months were coded as zero '0'. Number of ANC visits was also treated as a binary variable with frequent/adequate visits coded as '1′ for youth who had at least four ANC visits and '0' for youth who had no or less than four ANC visits.

2.4. Measures of Predictor Variables

Based on previous empirical literature and their availability in the Uganda Demographic and Health Survey data, independent factors that were included in the analysis are presented in Table 1 below.

Table 1. Description of predictor variables.

Name of Predictor Variable	Measure
Age	Coded as 1 for 15–19 and 2 for 20–24 years
Parity	A dichotomous variable coded as 1 if the respondent had one child and 2 if the respondent had two or more children
Pregnancy desire	A dichotomous variable coded as 1 if the respondent wanted to get pregnant then and 2 if she did not want to get pregnant or wanted to get pregnant later
Sex of household head	Coded as 1 = if respondent was living in a male-headed household at the time of the survey; 2 = otherwise.
Education level	Dummy variables for highest educational attainment classified into two categories: no education or primary education; and secondary and above
Religion	Dummy variables for religious affiliation, re-coded into four categories: 1. Catholics, 2. Protestants, 3. Muslims 4. Other religions
Wealth index	Dummy variables for DHS household wealth index that is developed from household assets and constructed by principle component analysis. The PCA scores are classified as poorest, poorer, middle, richer, and richest wealth quintiles
Occupation	Dummy variables for occupation recoded as not working, those employed in the agriculture sector, professionals, and labourers
Place of residence	Coded as 1 if the respondent was residing in rural areas and 2 if the respondent was residing in urban areas
Region	Dummy variables for region coded into four categories: central, east, north, and west
Access to newspapers	Dummy variables for access to newspapers categorised into three categories as: no access3 less frequent access or some access; and more frequent access or daily access
Access to radio	Dummy variables for access to radio categorised into three categories: no access; less frequent access or some access; and more frequent access or daily access
Access to television	Dummy variables for access to television categorised into three categories as: no access; less frequent access or some access; and more frequent access or daily access

The data were weighted using the individual/women weights (v005) to account for the complex survey design that is applied in DHS data collection and non-response.

2.5. Statistical Analysis

Data were analysed at the univariate, bivariate, and multivariate levels using SPSS 24. Descriptive statistics of the background characteristics of the respondents were presented at univariate level. At bivariate level, Pearson's chi-squared (χ^2) tests were used to examine the significant differences between ANC timing and frequency and the explanatory variables, and the trends in ANC use over the years. Binary logistic regression models were fitted to examine the predictors of ANC timing and ANC numbers among unmarried compared to married youth. Separate models for unmarried and married youth to find differences in factors for use of ANC were conducted. Explanatory variables whose p-values were less than 0.05 during the chi-square tests, except for age group and survey year, were included in the multivariate model. Results are presented in the form of odds ratios (ORs) with 95% confidence intervals of the ORs. We also tested for multi-collinearity of the variables using tolerance and the variance inflation factor (VIF). Multicollinearity test results (results not shown) indicate that none of the variables in the model had a tolerance threshold of less than 0.10, or a VIF of 10; actually, all VIF values were below 2. The goodness of fit was tested using the Hosmer and Lemeshow test, and the models were good fit, as the Hosmer–Lemeshow chi-squared p-values were greater than 5% for both unmarried and married youth (results not shown).

3. Results

Almost all youth who had births in the last five years before each survey had some antenatal care (95.3% among unmarried and 96.9% among married), though very low proportions had antenatal care within the first three months (23.3% for unmarried and 26.7% for married). The levels of the use of ANC in the first trimester increased among both unmarried (19.6% to 26%) and married youth (20–30%) between 2006 and 2016. This increment was significant among married youth only ($p = 0.000$). In addition, almost half of the youth had at least four ANC visits across the survey years indicating an increasing trend, the increasing trend was significant for married youth ($p < 0.001$), but was not significant among unmarried youth ($p = 0.057$).

Bivariate analysis in Table 2 further shows that there was a significant difference in ANC timing by education ($p = 0.047$) among the unmarried youth. Use of ANC in the first trimester was higher among unmarried youth with no or primary education (26%) compared to those who had at least secondary education (20%). Apart from the differences in years of data collection and education levels, no significant difference was observed by other factors. Results in Table 2 showed that among married youth, significant differences in ANC timing were observed by education level ($p = 0.028$), parity ($p = 0.017$), pregnancy desire ($p = 0.001$), region ($p = 0.001$), access to the radio ($p = 0.032$), and television ($p = 0.001$). Early initiation of ANC was higher among married youth who wanted the pregnancy then (29%) and were of parity one (29%) compared to those who wanted the pregnancy later/no more (23%) and those of higher parity (26%). It was also higher among married youth who had at least secondary education (29% compared to 26% for primary/no education), and highest among those who resided in western region (33%), had less frequent access to the radio (30%), and had more frequent access to the television (31%).

Table 2 also shows that the number of ANC visits significantly varied by age group ($p = 0.019$), pregnancy desire ($p = 0.004$), sex of household head ($p = 0.002$), place of residence ($p = 0.005$), region ($p = 0.002$), occupation ($p = 0.002$), access to newspapers ($p = 0.019$) and television ($p = 0.002$) among unmarried youth, while it varied by pregnancy desire ($p = 0.021$), parity ($p = 0.001$), education level ($p = 0.001$), religion (0.047), place of residence ($p = 0.000$), region ($p = 0.006$), wealth index ($p = 0.001$), occupation ($p = 0.000$), access to newspapers ($p = 0.003$), radio ($p = 0.000$) and television ($p = 0.000$) among married youth.

Table 2. Distribution of respondents by antenatal care use and background characteristics.

	Unmarried Youth		Married Youth		Unmarried Youth	Married Youth	Unmarried Youth	Married Youth
Variable	**Frequency**	**%**	**Frequency**	**%**	**% ANC Visit in First Trimester**	**% ANC Visit in First Trimester**	**% 4+ ANC Visits**	**% 4+ ANC Visits**
Year of Survey					$p = 0.146$	$p = 0.000$	$p = 0.057$	$p = 0.000$
2006	171	22.7	1313	25.2	19.6	20.0	50.6	47.8
2011	169	22.4	1227	23.5	20.3	26.5	46.7	51.2
2016	414	54.9	2675	51.3	26.1	29.9	56.8	62.3
Age					$\mathbf{p = 0.486}$	$\mathbf{p = 0.752}$	$\mathbf{p = 0.019}$ *	$\mathbf{p = 0.607}$
15–19	334	43.7	1053	20.3	22.1	26.3	48.2	55.5
20–24	430	56.3	4123	79.7	24.3	26.8	56.7	56.3
Pregnancy Wanted					$p = 0.512$	$p < 0.001$ *	$p = 0.004$ *	$p = 0.021$ *
Then	208	27.2	3085	59.6	25.0	29.2	61.5	57.5
Later or not anymore	556	72.8	2091	40.4	22.7	23.1	49.8	54.2
Birth Order/Parity					$p = 0.289$	$p = 0.017$ *	$p = 0.131$	$p < 0.001$ *
One	654	85.6	2038	39.4	22.6	28.6	54.1	60.2
Two or more	110	14.4	3138	60.6	23.3	25.5	46.4	53.6
Sex of Household Head					$p = 0.546$	$p = 0.826$	$p = 0.002$ *	$p = 0.767$
Male	358	47.4	4448	85.3	24.3	26.7	47.2	56.3
Female	397	52.6	768	14.7	22.4	27.0	58.2	55.7
Place of Residence					$p = 0.822$	$p = 0.522$	$p = 0.005$ *	$p < 0.001$ *
Urban	234	30.6	941	18.2	22.8	27.6	60.7	62.3
Rural	530	69.4	4235	81.8	23.6	26.5	49.6	54.8
Region					$\mathbf{p = 0.189}$	$\mathbf{p < 0.001}$ *	$\mathbf{p = 0.002}$ *	$\mathbf{p = 0.006}$ *
Central	259	33.9	1177	22.7	23.8	25.3	61.8	59.1
Eastern	186	24.3	1507	29.1	18.6	20.0	47.3	52.6
Northern	147	19.2	1362	26.3	28.9	30.3	53.7	56.5
Western	164	22.5	1130	21.8	23.2	32.8	45.3	57.3
Woman's Education Level					$p = 0.047$ *	$p = 0.028$ *	$p = 0.388$	$p < 0.001$ *
No education or Primary education	413	54.1	3896	75.3	26.2	25.9	51.6	53.7
Secondary+	351	45.9	1280	24.7	20.0	29.1	54.7	63.7
Religion					$p = 0.464$	$p = 0.167$	$p = 0.742$	$p = 0.047$ *
Catholic	291	38.1	1775	34.3	24.9	26.3	54.0	55.2
Protestant	261	34.2	1903	36.8	24.2	27.2	50.6	55.5
Muslim	110	14.4	773	14.9	24.0	26.7	51.8	58.2
Others	102	13.4	725	14.0	16.0	26.5	55.3	63.1
Wealth Index					$p = 0.865$	$p = 0.179$	$p = 0.058$	$p < 0.001$ *
Poorest	116	15.2	1339	25.9	25.7	27.0	50	51.2
Poorer	104	13.6	1255	24.2	24.0	24.2	42.3	53.8
Middle	132	17.3	903	17.4	22.7	27.3	55.3	56.7
Richer	164	21.5	771	14.9	20.4	28.8	51.2	57.8
Richest	248	32.5	908	17.5	24.3	27.5	58.9	64.8
Woman's Occupation					$p = 0.487$	$p = 0.068$	$p = 0.002$ *	$p < 0.001$ *
Not working	244	31.9	1119	21.6	22.1	28.4	50.4	56.6
Agriculture	263	34.4	2712	52.4	22.9	25.3	47.1	53.1
Labourers	69	9.0	464	9.0	30.9	30.2	52.2	57.3
Professionals	188	24.6	880	17.0	22.7	27.2	64.9	64.5

Table 2. *Cont.*

Variable	Unmarried Youth Frequency	%	Married Youth Frequency	%	Unmarried Youth % ANC Visit in First Trimester	Married Youth % ANC Visit in First Trimester	Unmarried Youth % 4+ ANC Visits	Married Youth % 4+ ANC Visits
Frequency of Reading Newspapers					$p = 0.652$	$p = 0.555$	$p = 0.019$ *	$p = 0.003$ *
Not at all	531	69.5	4274	82.6	23.1	26.4	49.7	55.1
Less frequent	116	15.2	574	11.1	21.2	27.6	58.6	61.0
More frequent	117	15.3	328	6.3	26.3	28.9	62.4	61.9
Frequency of Listening to Radio					$p = 0.897$	$p = 0.032$ *	$p = 0.883$	$p < 0.001$ *
Not at all	176	23.0	1143	22.1	24.6	24.2	54.0	51.3
Less frequent	106	13.9	655	12.7	22.3	29.9	50.9	54.5
More frequent	482	63.1	3378	65.3	23.1	26.9	53.1	58.1
Frequency of Watching TV					$p = 0.642$	$p = 0.001$ *	$p = 0.002$ *	$p < 0.001$ *
Not at all	484	63.4	3994	77.2	22.6	25.5	48.3	54.3
Less frequent	97	12.7	493	9.5	27.2	30.8	57.7	58.0
More frequent	183	24.0	689	13.3	23.1	30.9	62.8	65.9
TOTAL	N = 764	100	N = 5176	100	23.3	26.7	53.0	56.2

Note: *p*-values based on Chi-Square test; *—significant at 5% level.

A higher proportion of unmarried youth with at least four ANC visits was among those aged 20–24 years (57% versus 48% for those aged 15–19 years), who wanted the pregnancy then (62% versus 50% who wanted pregnancy later/no more) and lived in female headed households (58% versus 47% for male-headed households). Further, at least four ANC visits were higher among unmarried youth who resided in urban areas (61% versus 50% for rural), and highest among those who lived in central region (62%), or were labourers (65%). Four ANC visits were also highest among unmarried youth who had more frequent access to the newspapers (62%) and television (63%). Parity, education level, religion, wealth index and access to the radio were not significantly associated with ANC numbers among unmarried youth.

Higher levels of at least four ANC visits were observed among married youth who wanted the pregnancy then (58% versus 54% who wanted pregnancy later/no more), were of parity one (60% versus 54% for higher parity), had secondary education (64% versus 54% for primary/no education). In addition, four ANC visits were higher among married youth who resided in urban areas (62% versus 55% for rural), and highest among those in central region (59%), lived in richest households (65%), and were labourers (65%). Additionally, the highest levels of at least four ANC visits were observed among married youth who had more frequent access to the newspapers (62%), radio (58%), and television (66%). Age and sex of household head were not significantly associated with four ANC numbers among married youth.

3.1. Predictors of Antenatal Care Use in the First Trimester among Unmarried Compared to Married Youth in Uganda

Results in Table 3 show predictors of timing of antenatal care among unmarried and married youth, presented side by side to facilitate comparison. Women's education and occupation were the only significant predictors of timing of antenatal care among unmarried youth. Unmarried youth who had at least a secondary level of education were 36% less likely to attend ANC in the first trimester compared to those with no education or primary level education only (OR = 0.640, 95% CI = 0.421–0.972). Unmarried youth who were employed as labourers were 97% more likely to use ANC in the first trimester compared to unemployed unmarried youth (OR = 1.972, 95% CI = 1.019–3.815). These

two factors (education level and occupation) were not observed as significant predictors of timing of ANC among married youth.

Table 3. Logistic regression for timing of antenatal care among unmarried and married youth in Uganda between 2006 and 2016.

	Unmarried Youth	Married Youth
Variable	**Odds Ratio/95% CI**	**Odds Ratio/95% CI**
Year of Survey		
2006 (RC)	1	1
2011	1.264 (0.716–2.232)	1.415 (1.161–1.723) ***
2016	1.465 (0.897–2.393)	1.737 (1.464–2.062) ***
Age Group		
15–19 (RC)	1	1
20–24	1.385 (0.932–2.060)	1.074 (0.900–1.282)
Pregnancy Wanted		
Wanted pregnancy then (RC)	1	1
Later or not anymore	1.399 (0.899–2.178)	0.730 (0.638–0.835) ***
Birth Order/Parity		
One (RC)	1	1
Two or more	1.211 (0.720–2.035)	0.953 (0.825–1.101)
Woman's Education Level		
No education or Primary education (RC)	1	1
Secondary+	0.640 (0.421–0.972) *	1.120 (0.953–1.316)
Region		
Central (RC)	1	1
Eastern	0.779 (0.466–1.302)	0.895 (0.736–1.089)
Northern	1.042 (0.581–1.870)	1.526 (1.239–1.879) ***
Western	0.985 (0.594–1.634)	1.624 (1.342–1.966) ***
Woman's Occupation		
Not working (RC)	1	1
Agriculture	1.283 (0.797–2.065)	1.008 (0.848–1.199)
Labourers	1.972 (1.019–3.815) *	1.054 (0.811–1.370)
Professionals	1.148 (0.690–1.911)	0.993 (0.808–1.221)
Frequency of Listening to Radio		
Not at all (RC)	1	1
Less frequent	1.225 (0.673–2.230)	1.206 (0.953–1.526)
More frequent	0.847(0.538–1.334)	1.193 (1.007–1.413) *
Observations	733	5176

* $p < 0.05$, *** $p < 0.001$; CI = Confidence intervals; RC = Reference category.

Among married youth, significant predictors were year of survey, pregnancy desire, region of residence and frequency of listening to radio. There were increased odds of use of ANC in the first trimester in 2011 and 2016 compared to 2006, while the year of survey was not significant among unmarried youth. Married youth who did not want the pregnancy or who wanted the pregnancy later were 27% less likely to have their first ANC visit in the

first trimester compared to married youth who wanted to get pregnant then (OR = 0.730, 95% CI = 0.638–0.835). With respect to region, married youth who resided in northern and western regions had higher odds of having ANC in the first trimester compared to married youth who lived in central region (OR = 1.526, 95% CI = 1.239–1.879 & OR = 1.624, 95% CI = 1.342–1.966, respectively). Finally, married youth who had almost daily access to radio were 19% more likely to attend ANC in the first trimester compared to married youth who did not listen to the radio (OR = 1.193, 95% CI = 1.007–1.413) (Table 3).

3.2. Determinants of Numbers of Antenatal Care among Unmarried Compared to Married Youth in Uganda

Results in Table 4 reveal that both unmarried and married youth had increased odds of having four ANC visits in 2016 compared to youth in 2006. Lower odds of having at least four ANC visits were evident among both unmarried and married youth who did not want the pregnancy anymore or those who wanted to get pregnant later (OR = 0.670, 95% CI = 0.460–0.975 and OR = 0.887, 95% CI = 0.790–0.997, respectively), and among unmarried and married youth of parity two compared to their counterparts who were of parity one (OR = 0.601, 95% CI = 0.378–0.957 and OR = 0.839, 95% CI = 0.737–0.955, respectively).

Table 4. Logistic regression for four or more antenatal care visits among unmarried and married youth in Uganda between 2006 and 2016.

	Unmarried Youth	**Married Youth**
Variable	**Odds Ratio/95% CI**	**Odds Ratio/95% CI**
Year of Survey		
2006 (RC)	1	1
2011	0.910 (0.575–1.442)	1.082 (0.919–1.275)
2016	2.193 (1.433–3.357) **	1.929 (1.661–2.241) ***
Age		
15–19 (RC)	1	1
20–24	1.546 (1.105–2.164) *	1.031 (0.884–1.203)
Pregnancy Wanted		
Then (RC)	1	1
Later or not anymore	0.670 (0.460–0.975) *	0.887 (0.790–0.997) *
Birth Order/Parity		
One (RC)	1	1
Two or more	0.601 (0.378–0.957) **	0.839 (0.737–0.955) **
Sex of Household Head		
Male (RC)	1	1
Female	1.622 (1.174–2.241) **	0.978 (0.833–1.147)
Woman's Education Level		
No education or Primary education (RC)		
Secondary+	0.663 (0.455–0.965) *	1.164 (0.999–1.355)
Religion		
Catholic (RC)	1	1
Protestant	0.932 (0.648–1.341)	1.165 (1.018–1.333) *

Table 4. *Cont.*

	Unmarried Youth	Married Youth
Variable	**Odds Ratio/95% CI**	**Odds Ratio/95% CI**
Muslim	0.637 (0.389–1.041)	1.098 (0.920–1.311)
Pentecostal	0.695 (0.352–1.375)	1.190 (0.921–1.537)
Others	1.653 (0.853–3.202)	
Place of Residence		
Urban (RC)	1	1
Rural	0.960 (0.637–1.446)	0.989 (0.817–1.196)
Region		
Eastern (RC)	1	1
Eastern	0.637 (0.407–0.995) *	1.122 (0.943–1.334)
Northern	0.893 (0.506–1.576)	1.436 (1.174–1.756) ***
Western	0.526 (0.333–0.830) **	1.185 (0.992–1.416)
Wealth Index		
Poorest (RC)	1	1
Poorer	0.850 (0.456–1.587)	1.144 (0.968–1.352)
Middle	1.540 (0.829–2.859)	1.262 (1.042–1.527) *
Richer	1.298 (0.721–2.337)	1.245 (1.014–1.529) *
Richest	1.340 (0.686–2.618)	1.896 (1.448–2.483) ***
Woman's Occupation		
Not working (RC)	1	1
Agriculture	1.211 (0.803–1.825)	1.115 (0.954–1.303)
Labourers	0.822 (0.448–1.511)	0.947 (0.745–1.205)
Professionals	1.136 (0.738–1.748)	1.355 (1.121–1.638) **
Frequency of Reading Newspapers		
Not at all (RC)	1	1
Less frequent	2.083 (1.301–3.334) **	1.048 (0.865–1.270)
More frequent	1.917 (1.166–3.150) **	0.855 (0.664–1.103)
Frequency of Listening to Radio		
Not at all (RC)	1	1
Less frequent	0.828 (0.475–1.441)	1.022 (0.830–1.259)
More frequent	0.907 (0.605–1.360)	1.288 (1.110–1.496) ***
Frequency of Watching TV		
Not at all (RC)	1	1
Less frequent	0.955 (0.576–1.583)	0.980 (0.794–1.210)
More frequent	1.395 (0.888–2.189)	1.103 (0.890–1.367)
Observations	733	5176

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; CI = Confidence intervals; RC = Reference category.

Odds of having four ANC visits were higher among unmarried youth who were aged 20–24 years compared to those aged 15–19 years (OR = 1.546, 95% CI = 1.105–2.164) and those that resided in female headed households compared to those in male headed

households (OR = 1.622, 95% CI = 1.174–2.241). Age and sex of household head were not significant among married youth.

Reduced odds of having at least four ANC visits were seen among unmarried youth with secondary education compared to those with no or primary education (OR = 0.663, 95% CI = 0.455–0.965), and those residing in eastern and western region compared to unmarried youth residing in central region (OR = 0.637, 95% CI = 0.407–0.995 and OR = 0.526, 95% CI = 0.333–0.830, respectively). However, higher odds of frequent ANC were evident among married youth residing in northern region compared to married youth residing in central region (OR = 1.436, 95% CI = 1.174–1.756). Education level was not significant among married youth.

Table 4 still shows that higher odds of having at least four ANC visits were observed among married youth of middle, richer and richest wealth index compared to married youth in poorest wealth index (OR = 1.262, 95% CI = 1.042–1.527, OR = 1.245, 95% CI = 1.014–1.529 and OR = 1.896, 95% CI = 1.448–2.483, respectively), Protestants compared to Catholics (OR = 1.165, 95% CI = 1.018–1.333), and professionals compared to the unemployed (OR = 1.255, 95% CI = 1.121–1.638). Wealth index, religion and occupation were not significant among unmarried youth.

Further, higher odds of having at least four ANC visits were observed among unmarried youth with some access and frequent access to reading newspapers compared to unmarried youth with no access to newspapers (OR = 2.083, 95% CI = 1.301–3.334 and OR = 1.917, 95% CI = 1.166–3.150, respectively). Married youth with frequent access to the radio had increased odds of having at least four ANC visits compared to married youth with no access to radio (OR = 1.288, 95% CI = 1.110–1.496).

4. Discussion

The study aimed at increasing our understanding of the factors associated with the timing and number of antenatal care visits among unmarried compared to married youth aged 15–24 years in Uganda. Overall, the results showed that married youth were more likely to have more frequent antenatal care visits and start antenatal care earlier than their unmarried counterparts. This is not surprising as the current policy environment in Uganda seems to favour the married youth than their unmarried counterparts. In Ugandan context, implementation of the national policy on increasing male involvement in reproductive health that prioritises couples over unmarried youth who do not go for ANC with partners could discourage unmarried youth to start ANC early (UNICEF 2016); having the advantage of husband support as well as health systems could favour the married women over the unmarried ones (Senderowitz 1999).

Additionally, since most pregnancies among unmarried women are unwanted, they tend to hide the pregnancies due to fear of negative family and society reaction to their pregnancies until late stages (Teagle and Brindis 1998; Chaibva et al. 2009; Reibel et al. 2015; Hokororo et al. 2015). Some unmarried youth might also be planning an abortion in the early stages of the pregnancy before it is realised by others, therefore, they are unlikely to access ANC early (Hatherall et al. 2016). These results are consistent with findings by Ochako et al. (2011) who revealed that married youth were associated with early use of ANC than unmarried youth. Prior studies in other countries of Sub-Saharan Africa also show that married youth were more likely to have frequent ANC (Magadi et al. 2007; Hokororo et al. 2015). This disparity is worse among the younger unmarried youths as our findings show that the unmarried youth aged 20–24 years had higher odds of frequent ANC compared to unmarried youth aged 15–24 years. This is similar to what has been found in previous literature (Reynolds et al. 2006; Hueston et al. 2008; Ryan et al. 2009; Anderson and Rahn 2016). This points to the level of acceptance of non-marital pregnancies among older youth than young ones, as evidenced by family and community support for older youth (Cosey and Bechtel 2001).

Interestingly, our results showed that the factors associated with the use of antenatal care in the first trimester differed by marital status. While education and occupation

were key predictors of antenatal care timing among unmarried youth, pregnancy desire and region of residence were key predictors of antenatal care timing among married youth. Additionally, while the ANC frequency was associated with pregnancy desire, parity, and region among both unmarried and married youth, we found that age, sex of household head, education level and access to newspapers were key predictors of ANC frequency among unmarried youth, and religion, wealth index, occupation, and access to the radio among were key predictors among married youth. These findings have important policy implications and programming indicating that interventions to improve the uptake of maternal health services among the youth need to be tailored to capture the diverse needs of youth especially the unmarried youths. Efforts to improve ANC service utilisation should move away from a one size fits all approach to more robust interventions.

Surprisingly, whereas studies elsewhere found that higher woman's education level was associated with greater odds of the use of antenatal care (Kamal 2009; Rai et al. 2012; Haque et al. 2012; Ochako et al. 2011; Singh et al. 2014; Singh et al. 2021; Ziblim et al. 2018), our study found that higher education levels were associated with reduced odds of seeking ANC in the first trimester, and reduced odds of frequent ANC among unmarried youth. Stigmatisation of unmarried pregnancies in Uganda might lead unmarried youth to hide their pregnancies until the later stages (Atuyambe et al. 2005). It is also possible that since most unmarried youth in this age range are still in school, they could have continued with school as much as possible, a situation that competes for time with antenatal care. This finding implies that though education is empowering, other factors like stigmatisation of pregnancy among unmarried youth makes them not utilise ANC. Therefore, practices which encourage pregnant women to go for ANC with their partners or husbands could discourage some unmarried youth with secondary education and above from initiating and frequently attending to ANC.

Another interesting finding was the influence of parity and not wanting a pregnancy soon on ANC frequency among both unmarried and married youth. Higher parity was associated with reduced odds of frequent ANC visits. This is consistent with the findings of similar studies elsewhere that found poor ANC use among women of higher parity (Birungi et al. 2011; Ochako et al. 2011; Magadi et al. 2007; Hueston et al. 2008; Shahabuddin et al. 2015). This could be attributable to reduced pregnancy excitement, increased child care responsibilities for older children and limited resources in a family due to large family size (Simkhada et al. 2008). Similar to findings elsewhere, our results show that not wanting a pregnancy soon or anymore was associated with reduced odds of at least four ANC visits (Rai et al. 2013). This could be due to the fact that unwanted pregnancy has been found to be associated with fear of its disclosure, in turn leading to late start or infrequent use of antenatal care (Teagle and Brindis 1998; Chaibva et al. 2009; Reibel et al. 2015; Hokororo et al. 2015).

Regarding occupation, unmarried youth who were labourers were associated with increased odds of early ANC, and married youth who were employed as professionals were associated with higher odds of frequent ANC. Previous literature has found that being employed (Wiemann et al. 1997) was associated with higher odds of early ANC use. This could possibly be because labourers and professionals have the income to access ANC compared to the unemployed youth as Uganda has a high level of out-of-pocket health expenditures at 40%, which is higher than the WHO recommended levels for out-of-pocket expenditures (Dowhaniuk 2021). This may mean that removing financial barriers could encourage unemployed youth to access ANC services.

Additionally, female household head was associated with increased odds of frequent use of ANC among unmarried youth. This could be because females who are usually the unmarried youth mothers easily support their daughters to have frequent ANC visits. Exposure to health information has been found to have a positive impact on ANC use among females (Arthur et al. 2007; Singh et al. 2013a, 2014). Our findings agree with previous studies as daily access to the newspapers was associated with frequent use of antenatal care among unmarried youth. Frequent access to the radio was also associated with early and frequent ANC use among married youth. Access to media is associated with increased knowledge about the benefit of using maternal health services which compels youth to use antenatal care better than those with no access to media (Simkhada et al. 2008; Chaibva et al. 2009; Chaibva et al. 2010).

In agreement with previous literature (Rai et al. 2012; Singh et al. 2013a; Fulpagare et al. 2019), married youth in the middle, richer and richest wealth index were associated with increased odds of frequent ANC visits compared to married youth residing in poorest households. This might be because youth in households with some wealth could afford both direct and indirect costs to access antenatal care frequently (Arthur 2012; Leone et al. 2013).

Strengths and Limitations of the Study

This study had some limitations that need to be acknowledged. Uganda Demographic and Health surveys (UDHS) collect data from women for births in the last five years before the date of the survey, which may lead to inaccuracies due to memory lapse. The cross-sectional nature of data from UDHS did not allow us to infer a causal relationship between antenatal care use and socio-economic factors (Setia 2016). This is because antenatal care use is asked for a birth in the last five years, while socio-economic factors are as of the time of the interview. However, the UDHS remains one of the most robust nationally representative data sets in understanding ANC use in Uganda. Thus, this study increases knowledge about the predictors of ANC use among unmarried and married youth in Uganda.

5. Conclusions

Our study highlights the predictors of the use of antenatal care services among unmarried and married youth in Uganda. Although there were commonalities in the predictors of the use of antenatal care services among unmarried and married youth, the differences in the predictors were apparent indicating the need for more tailored services to meet the maternal health service needs of unmarried youth especially the younger age group. This study sheds light on the potential impact of the Uganda national policy on male involvement in reproductive health on unmarried youth access and early start of antenatal care services. While male involvement in Reproductive, Maternal, Newborn and Child Health (RMNCH) has been encouraged globally, the evidence from this study shows that the impact of implementation of such policy on unmarried youth access to maternal health services should be given adequate attention as couples prioritisation may disadvantage the unmarried youth.

Additionally, efforts should be geared towards improvements in the knowledge of the benefit of using ANC, to encourage them to seek ANC early and more frequently. Policies aimed at removing financial barriers may encourage youth from seeking ANC frequently. Overall, these findings will help inform health-care programmers and policy makers in initiating appropriate policies and programs for ensuring optimal ANC use for all that could guarantee universal maternal health-care coverage to enable Uganda achieve the SDG3.

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