UTILIZATION OF ANTENATAL CARE SERVICES AMONG PREGNANT WOMEN AGED (15-49) YEARS IN NORTHERN UGANDA. A CROSS-SECTIONAL STUDY.

Jimmy Okwany[1]*, Francis semuwemba[1], Dr. Jane Frank Nalubega[1]
Mildmay Institute of Health Sciences[1]

Abstract.
Background.
Maternal mortality remains a critical issue globally, particularly affecting low-income developing countries (LDCs). Inadequate utilization of antenatal care (ANC) services, especially in sub-Saharan Africa, is strongly correlated with high maternal mortality ratios. Despite the recognized importance of ANC services in improving maternal and infant health outcomes, studies indicate suboptimal utilization rates. This study aimed to assess the utilization of antenatal care services among pregnant women aged (15-49) years in Northern Uganda.

Methodology.
This study utilized data from the Uganda Demographic and Health Survey (UDHS) conducted in 2016. A cross-sectional study design was employed, focusing on women aged 15-49 years in Northern Uganda. Quantitative data analysis was conducted using Stata 14, including descriptive and inferential statistics. Factors associated with ANC utilization were assessed through logistic regression analysis, controlling for potential confounders.

Results
The UDHS 2016 data revealed that 61.72% of women in northern Uganda attended at least four ANC visits, exceeding the global prevalence in high maternal mortality countries. Factors significantly associated with ANC utilization included aged 25-34 years (AOR: 1.28, 95% CI 1.05-1.56, p=0.014), manual occupation (AOR: 1.58, 95% CI 1.17-2.14, p=0.003), women with professional engagement (AOR: 1.43, 95% CI=1.05-1.98), and women with secondary education (AOR: 1.80, 95% CI 1.24-2.6, p=0.002).

Conclusion
There are promising ANC utilization rates in Northern Uganda but also some key determinants influencing utilization patterns were identified.

Recommendation
Strategies aimed at improving ANC attendance should consider region-specific interventions targeting factors such as age, occupation, and education of women. Additionally, efforts to promote timely ANC initiation and increase awareness of ANC benefits among women of reproductive age are recommended to further enhance maternal and child health outcomes in Uganda.

Background.

Maternal mortality is a serious global challenge majorly affecting low-income developing countries (LDCs) even though there is a reducing trend of 38% (Mehboob et al., 2021). Despite progress, reports reveal that approximately 295,000 women died in 2017 due to preventable causes related to pregnancy and childbirth. More than 95% of these deaths occurred in low and middle-income countries, with a significant concentration among adolescents compared to older women (WHO, 2021, Chewe et al., 2016). It is believed that the high maternal mortality ratios in developing nations, including sub-Saharan Africa, are strongly correlated with inadequate utilization of antenatal care services (WHO, 2016b). In developing countries, particularly in sub-Saharan Africa, studies have indicated a common trend among women to postpone their first antenatal visit, initiating it later than the recommended timeframe, with only a limited proportion (38.0%) accessing

antenatal care services during the first trimester(Chewe et al., 2016).

The efficient use of antenatal care services is widely recognized as a crucial approach to lowering maternal and infant morbidity and mortality rates(Fagbamigbe and Idemudia, 2017). In the initial focused ANC framework, the World Health Organization (WHO) suggested four antenatal care (ANC) visits for uncomplicated pregnancies. Nevertheless, a revision in 2016 expanded the framework to encompass eight contacts, emphasizing that the first contact should occur within the first three months (12 weeks) of pregnancy (WHO, 2002, WHO, 2016b). Utilization of antenatal care (ANC) services from a skilled provider in a timely and appropriate manner has shown associations with improved maternal health, reduction in occurrences of low birth weights, and decreased neonatal mortality rates. Additionally, the timely utilization of ANC acts as a mediator in encouraging the use of health facility deliveries and postnatal care services (Atuhaire et al., 2020).

Despite the adoption of the Focused Antenatal Care (FANC) approach in Uganda's healthcare system in 2003, recent reports indicate that only 48% of pregnant women managed to attend a minimum of four ANC visits throughout their pregnancy, the first of which is recommended to occur in the first trimester. This underscores a recognized need for improvements in the quality of ANC services provided (WHO, 2016b). Following a recommendation by the World Health Organization (WHO), Uganda's Ministry of Health revised its framework to conform to the updated global guidelines that advocate for a continuum of care for pregnant women, encompassing eight contacts, facility-based deliveries, and care provided by skilled health personnel. This modification is intended to improve both the quality and accessibility of antenatal care (ANC) services in Uganda (Muwema et al., 2022, MOH, 2016).

Several studies in Uganda have examined the timing of antenatal care (ANC) and discovered that socioeconomic, demographic, and cultural factors significantly influence women's decision to seek ANC services, particularly individual-level factors (Sserwanja et al., 2022). Though previous studies have shown inconsistency in results concerning the individual-level characteristics influencing the timing of antenatal care (ANC), contextual factors where women live may impact their decisions regarding the utilization of maternal health care services, irrespective of individual women's characteristics (Achia and Magento, 2015). In line with its Vision 2040, Uganda has set a challenging target of reducing maternal deaths to 15 per 100,000 live births. Furthermore, the country is dedicated to achieving the global agenda stated in Sustainable Development Goals (SDGs) 3.1, which aims to decrease maternal deaths to 70 per 100,000 live births by 2030 (Balyejjusa, 2015). However, there are lack of studies that have examined regional factors associated with the prevalence and associated factors of antenatal care service utilization in Uganda

This study will utilize data from the Uganda Demographic and Health Survey (UDHS) conducted in 2016 to investigate the utilization of antenatal care services among pregnant women aged (15-49) years in Northern Uganda.

Methodology.
Study area/site.
This study used Uganda Demographics and Health Survey, UDHS 2016 data collected between 15th June and 18th December 2016 by the Uganda Bureau of Statistics (UBOS) in collaboration with the Ministry of Health (MOH). The region selected for the study was Northern Uganda which consists of Karamoja, Lango, Acholi, and West Nile. The UDHS reports are publicly available; datasets were accessible upon application including study aim and analytical plans from DHS measure.

Study Design
This was a cross-sectional study using the UDHS 2016 women's dataset. A quantitative data collection method was used to collect data regarding ANC attendance.

Study Population
This study used data from women 15-49 years old in Northern Uganda during the time of the UDHS 2016 that used the women questionnaire for interview the pregnant women. There were a total of 2560 women included in the study.

Inclusion criteria
This study collected data from women 15-49 years and only those with antenatal care visits were included in the study.

Exclusion criteria
Women who were 15-49 years who were very ill or not available to participate during the data collection period were excluded. For this study women who had no antenatal visits were excluded

Sample size
The study comprised 2,560 respondents aged 15-49 years from the 2016 UDHS women dataset and those that were below 15 and above 49 years were excluded.

Study variable
Dependent (outcome) variables
The outcome of interest was the utilization of ANC services by women aged 15-49 years. This information was determined by searching for ANC attendance from the dataset.

Independent variables

Independent variables included; age, religion, education level, region, distance to health facility, occupation, birth order, wanting last child, residence, marital status, health insurance cover, visited health facility in the last 12 months, and wealth index.

Data management and analysis
Data management

Data was opened into Stata 14 and checked for completeness, duplicates, and accuracy or missing data. The dataset was browsed to identify type and confirm if it was the dataset requested and variables related to the study objectives were noted. Important variables were identified in the working dataset in this study, selected, and kept for analysis including the outcome variable using the keep (var) command in Stata 14.

Data analysis plan
Extraction of Analytic/working data set

Formulated the analytic dataset by use of the keep command in Stata Recoded. ANC attendance was recorded into two categories (<4 visits and ≥4 visits)

Univariate analysis

Variables were summarized after recoding (continuous variables) using the tab command for categorical variables to understand the distribution of variables. Descriptive statistics were reported in tables with percentages and frequencies.

Bi variate analysis

Variables were Cross tabulation to understand how the variables were distributed with the outcome. Mix effect logistic regression was fit with one variable at go to obtain the crude odds ratios. Variables with a chi-square P-value < 0.02 were included/considered for multivariable regression. Multicollinearity among independent variables was checked and variables with correlation coefficient >0.04 were not considered for further analysis.

Multivariable analysis

Multiple mixed effect logistic regression analysis model was fit including all variables that had passed the inclusion criteria. Variables with a P-value<0.05 were considered significant factors of association.

Results

Figure 1: showing proportion and distribution of women aged 15-49 years who utilized ANC services in Northern Uganda.
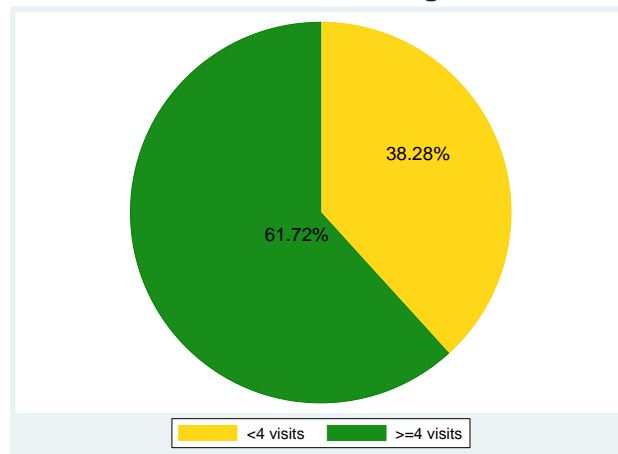

Figure: Indicating Uptake of completed recommended WHO Focused Antenatal Care (FANC) of four visits and above (≥4) among 2560 respondents in Northern Uganda aged between 15-49 years was 1580(61.72%) and those who attended three or less were 980 (38.28%).

Table 1: Showing Univariate analysis of factors associated with antenatal care services.

Variable	Frequency (N)	Percentage (%)
Age group		
15-24	846	33.1
25-34	1,115	43.6
Above 34	599	23.4
Religion		
Anglicans	548	21.4
Catholics	1,576	61.6
Moslems	217	8.5
Others	219	8.6
Region		
Karamoja	501	19.6
Lango.	689	26.9
Acholi	626	24.5
West Nile	744	29.1
Distance to the health facility		
Not Convenient	1,295	50.6
Convenient	1,265	49.4
Occupation		
Unemployed	275	10.8
Professionals	375	14.7
manual laborers	580	22.7
Self-employed	1,328	51.9
Birth order		
Firstborn	468	18.3
2- 4	1,092	42.7
5 -7	686	26.8
8+	314	12.3
Wanted last-child		
wanted then	1,330	52
wanted later	964	37.7
wanted no more	266	10.4
Residence		
Urban	312	12.2
Rural	2,248	87.8
Marital status		
Never married	101	4
Married	2,140	83.6
Widowed	58	2.3
Divorced	261	10.2
Visited health facility within one year		
No	352	13.8
Yes	2,208	86.2
Education level		
No education	612	23.9
Primary	1,619	63.2
Secondary	232	9.1
Tertiary	97	3.8
Insurance cover		
No	2,549	99.6
Yes	11	0.4
Wealth index		

Poorest	1,450	56.6
Poor	543	21.2
Middle	242	9.5
Rich	198	7.7
Richest	127	5.0

Table 1: shows that, the majority of 1115 (43.6%) of respondents were aged 25-34 years. Catholics constituted the largest religious group 1,576(61.6%) of the sample, followed by Anglicans at 21.4% with the least coming from other religions. West Nile region had the highest proportion of respondents 744 (29.1%), followed by Lango (26.9%), Acholi (24.5%), and Karamoja (19.6%).

When considering the distance to health facilities, the analysis indicated that 1,295 (50.6%) of respondents found it inconvenient while 1,265 (49.4%) found it not a problem. On occupation, the self-employed 1,328 (51.9) form the largest group, followed by manual laborers 580 (22.7%) and professionals 375 (14.7%). Of those within 2-4 birth order 1,092(42.7%) were the majority while 1,330 (52%) wanted their last child at the time of the survey. Over 2,248 (87.8%) of the respondents were rural residents compared to only 312(12.2%) from the urban setting.

Married respondents constituted the majority 2,140 (83.6%), and a large majority 2,208 (86.2%) reported visiting a health facility within the past year. On Education, the majority had attained primary education 1,619 (63.2%), with a notable proportion having no education 612 (23.9%). Regarding health insurance coverage, the overwhelming majority 2,549 (99.6%) did not have insurance coverage. Lastly, wealth index categories showed that the poorest group constituted 1,450 (56.6%) of the respondents, followed by the poor 543 (21.2%), middle 242 (9.5%), and the richest 127 (5.0%) only.

Table 2: Showing bivariate analysis of factors associated with utilization of Antenatal care by chi-square

Underlying factors	< 4 visits	>4visits	Chi P-value
	N (%)	N (%)	
Age group			0.000**
15-24 Years	334 (39.5%)	512(60.5%)	
25-34 Years	379 (34.0%)	736 (66.0%)	
>34	267 (44.6%)	332 (55.4%)	
Religion			0.786
Anglican	219 (40.0%)	329 (60.0%)	
Catholics	494(37.7%)	982 (62.3%)	
Moslem	81 (37.3%)	136 (62.7%)	
Others	86 (39.3%)	133(60.7%)	
Region			0.003***
Karamoja	172 (34.3%)	329 (65.7%)	
Lango	296 (43.0%)	393(57.0%)	
Acholi	251(40.1)	375 (59.9%)	
West Nile	261(35.1%)	483 (64.9%)	
Distance to Health Facility			*0.014***
Big Problem	526 (40.6%)	769 (64.1%)	
Not a big problem	454 (35.9%)	811 (64.1%)	
Occupation			*0.001****
Unemployed	123 (44.7%)	152 (55.3%)	
Professionals	135 (36.0%)	240 (64.0%)	
Manual laborer	189 (32.6%)	391(67.4%)	
Self Employed	533 (40.1%)	795 (59.9%)	
Birth order			*0.011**
First Born	178 (38.0%)	290 (62.0%)	
2-4	394 (36.1%)	698 (63.9%)	
5-7	262 (38.2%)	424 (61.8%)	
8+	146 (46.5%)	168 (53.5%)	
Last Child			*0.002****

Wanted child then	*467 (35.1%)*	*863 (64.9%)*	
Wanted later	*397 (41.2%)*	*567 (58.8%)*	
Not wanted	*116 (43.6%)*	*150 (56.4%)*	
Residence			*0.241*
Urban	*110 (35.4%)*	*202 (64.7%)*	
Rural	*870 (38.7%)*	*1,378 (61.3%)*	
Marital Status			*0.110*
Never married	*37 (36.6%)*	*64 (63.4%)*	
Married	*816 (38.1)*	*1324 (61.9%)*	
Windowed	*31 (53.5%)*	*27 (46.6%)*	
Divorced	*96 (36.8%)*	*165 (63.2%)*	
Visited Health Facility last 12 months			*0.023*
Not Visited	*154 (43.8%)*	*198 (56.3%)*	
Visited	*826 (37.4%)*	*1,382 (62.6%)*	
Highest education level			*0.019*
No education	*259(42.3%)*	*353 (57.7%)*	
Primary	*616 (38.1%)*	*1003 (62.0)*	
Secondary	*73 (31.5%)*	*159(68.5%)*	
Higher	*32 (33.0%)*	*65 (67.0%)*	
Covered by Health Insurance			*0.046*
No	*979 (39.4%)*	*1570 (61.6%)*	
Yes	*1 (9.1%)*	*10 (90.1%)*	
wealth index combined			*0.174*
Lowest	*575 (39.9%)*	*875 (60.3%)*	
Second	*206 (37.9%)*	*337 (62.1%)*	
Middle	*94 (38.8%)*	*148 (61.2%)*	
Fourth	*66 (33.3%)*	*132 (66.7%)*	
Highest	*39 (30.7%)*	*88 (69.3%)*	

*** *P-value <0.001 **P-value<0.05 and * P-value<0.02*

Table 2: presents the results of bivariate analysis using the chi-square test to determine the association between various factors and the utilization of antenatal care (ANC). The factors examined include age group, religion, region, distance to health facility, occupation, birth order, perception of the last child, residence, marital status, recent visit to a health facility, highest education level, coverage by health insurance, and wealth index.

Several significant associations were observed in the study regarding factors influencing antenatal care (ANC) utilization, with p-values indicating the strength of these associations. Notably, the age group demonstrated a significant association (p < 0.001), with younger women (15-24 years) being less likely to have the recommended number of ANC visits compared to older women. Regional disparities were evident (p = 0.003), with different regions exhibiting varying levels of ANC utilization. Distance to health facilities was also noted as a significant factor (p = 0.014), suggesting that proximity may influence access to ANC services. Occupation showed a strong association (p = 0.001), implying that the type of occupation may impact ANC attendance. Birth order (p = 0.011) and the perception of the last child (p = 0.002) were also significantly associated with ANC utilization, indicating potential variations in attendance patterns based on these factors. Additionally, education level (p = 0.019), recent health facility visits (p = 0.023), and health insurance coverage (p = 0.046) were found to be significantly associated with ANC utilization, suggesting that factors related to education, recent health-seeking behavior, and insurance coverage may impact access to ANC services. While marital status showed some association (p = 0.110), it did not meet the significance threshold for further analysis.

According to the bivariate analysis of the Crude Odds Ratios, women aged 25-34 years were 1.26 times more likely (95% CI=1.05-1.52) to attend antenatal care services compared to those women aged 15-24 years. On the other hand, women aged over 34 had 0.81 times lower chances (95% CI=0.66-1.003) of attending antenatal care services, although this difference was not statistically significant.

The region was significantly associated with antenatal care services attendance among women in the Lango Sub-region and Acholi at bivariate level analysis. Women in Lango and Acholi were 31% (95% CI =0.55 - 0.88) and 22% (95% CI=0.61 - 0.995) less likely to attend ANC services compared to those in Karamoja.

Women who did not consider distance to a health facility as a big problem were 1.22 times (CI 95% = 1.04 -143) more likely to attend ANC (Antenatal Care) compared to those who considered it as a big problem.

Women who were engaged in different professional activities were 1.43 times more likely (95% CI=1.05-1.98) to attend ANC services compared to those who were unemployed. Similarly, women who were manual laborers were 1.67 times more likely (95% CI=1.25-2.25) to attend ANC services compared to those who were unemployed.

The need for wanting the last child was found to be significantly associated with ANC services attendance. Women who had wanted to have their last child later were 0.77 times (95% CI=0.65-0.92) less likely to attend ANC services compared to those who wanted their last child at that time. Those who wanted no more children were 0.70 times (95% CI=0.54-0.91) less likely to attend ANC services compared to those who wanted their last child at that time.

Under the category of marital status, widowed women were 0.50 times the odds (95% CI=0.26-0.97) of attending ANC services compared to those who have never been married.

Among women aged 15-49 years who visited a health facility in the last 12 months, there was a 30% higher likelihood of receiving antenatal care (ANC) compared to those who did not visit a health facility and this was statistically significant (95% CI=1.04-1.63).

Women who had secondary education were 1.60 times the odds (CI=*1.16-2.20*)of attending ANC services compared to those with no education.

Based on the significant associations observed in the above analysis it is recommended to progress to the next level of logistic regression analysis. This advanced analysis would allow for a more in-depth exploration of the relationships between the identified factors and ANC attendance, while also controlling for potential confounding variables to understand the relative importance of each factor in predicting ANC utilization. Maternal education has been consistently been linked to improved antenatal care utilization in developing countries, with studies from Ethiopia, Nigeria, Pakistan, and Ghana all highlighting the positive association between higher levels of education and increased access to antenatal care services(Abbas et al., 2023, Basha, 2019, Duodu et al., 2022, Umar, 2017).

Table 3: Showing multi-variable Analysis of factors associated with early marriages using a mixed logistic regression

Underlying factors	COR (95% CI)	P-value	AOR (95% CI)	P-value
Age group				
15-24Years	*Ref*			
25-34 Years	*1.26 (1.05-1.52)*	*0.012**	*1.28 (1.05-1.56)*	*0.014 **
>34 years	*0.81(0.66-1.003)*	*0.053*	*0.88 (0.69-1.13)*	*0.335*
Region				
Karamoja	*Ref*			
Lango	*0.69 (0.55 - 0.88)*	*0.003***	*0.62 (0.46-0.86)*	*0.003 ***
Acholi	*0.78 (0.61 - 0.995)*	*0.047**	*0.80 (0.58 -1.10)*	*0.167*
West Nile	*0.96 (0.76 – 1.22)*	*0.785*	*0.89 (0.66-1.22)*	*0.479*
Distance to Health Facility				
a big problem	*Ref*			
Not a big problem	*1.22 (1.04 -143)*	*0.014**	*-*	*-*
Occupation				
Unemployed	*Ref*			
Professional	*1.43 (1.05 -1.98)*	*0.025**	*1.23 (088-1.72)*	*0.224*
Manual laborer	*1.67 (1.25- 2.25)*	*0.001***	*1.58 (1.17- 2.14)*	*0.003***
Self-employed	*1.21 (0.93-1.57)*	*0.159*	*1.28 (0.97-1.69)*	*0.077*
The last child wanted				
Wanted then	*Ref*			
Wanted later	*0.77 (0.65 - 0.92)*	*0.003***	*0 .73 (0.64-0.89)*	*0.001 ***
Wanted no more	*0.70 (0.54- 0.91)*	*0.009***	*0.87 (0.26-1.18)*	*0.372*
Marital status				
Never married	*Ref*			
Married	*0.94 (0.62-1.42)*	*0.762*	*0.92 (0.60- 1.42)*	*0.711*
Widowed	*0.50 (0.26-0.97)*	*0.040*	*0.51 (0.26-1.00)*	*0.053*
Divorced	*.99 (0.62-1.60)*	*0.979*	*0.98 (0.60-1.60)*	*0.933*
Visited Health Facility last 12 months				
Not Visited	*Ref*			
Visited	*1.30 (1.04-1.63)*	*0.023**	*1.24 (0.98-1.57)*	*0.075*
Education level				
No education	*Ref*			
Primary	*1.19 (0.99-1.44)*	*0.065*	*1.50(1.18-1.90)*	*0.001***
Secondary	*1.60 (1.16-2.20)*	*0.004***	*1.80(1.24-2.6)*	*0.002***
Higher	*1.49 (0.94-2.34)*	*0.084*	*1.52(0.90-2.56)*	*0.118*
Covered by Health Insurance				
No	Ref			
Yes	6.24(0.80-48.79)	0.081	1.24 (0.98-1.57)	0.075
Wealth index combined				
Low	Ref			
Second	1.08 (0.88-1.32)	0.484	1.06 (0.86-1.34)	0.582
Middle	1.03 (.78-1.37)	0.811	0.99 (0.73-1.33)	0.960
Fourth	1.31(0.96-1-80)	0.088	1.20 (0.86-1.69)	0.288
Highest	1.48 (1.0-2.19)	0.049	1.29 (0.83-2.00)	0.263

*** P-value <0.01 **P-value<0.05 and * P-value<0.02*
COR=Crude odds Ratios, AOR=Adjusted odds Ratios.

The adjusted odds ratio (AOR) for the 25-34 age group was 1.28 (95% CI 1.05-1.56, p=0.014), indicating that individuals in this age group had 1.28 times higher odds of ANC attendance than those in the 15-24 age group.

Regarding region, individuals in the Lango region had significantly lower odds of the outcome with an AOR of 0.62 (95% CI 0.46-0.86, p=0.003), while those in the Acholi region also had lower odds with an AOR of 0.80 (95% CI 0.58-1.10, p=0.167) compared to the Karamoja region.

Manual laborers had significantly higher odds of the outcome with an AOR of 1.58 (95% CI 1.17-2.14, p=0.003) than unemployed individuals. Those who wanted their last child later had significantly lower odds of the outcome with an AOR of 0.73 (95% CI 0.64-0.89, p=0.001) compared to those who wanted their last child then.

Women with a secondary education level had significantly higher odds of the outcome with an AOR of 1.80 (95% CI 1.24-2.6, p=0.002) than those without no education.

Discussion.

Prevalence of utilization of antenatal care services among pregnant women aged (15-49) years in northern Uganda.

According to the result of this study, the level of utilization of at least four antenatal care visits among women aged 15-49 years in Northern Uganda as recommended by WHO was 61.72% before 2016. However, a multi-country analysis found that the pooled prevalence of adequate ANC visits in countries with high maternal mortality was 55.66% (Chilot et al., 2023) less than the above case of Uganda which shaded more light of good attendance in Northern Uganda.

Before 2016, the World Health Organization (WHO) recommended a minimum of four antenatal care (ANC) visits based on the Focused Antenatal Care (FANC) model. The recommended timeline for these visits was as follows: First ANC visit between 8–12 weeks of pregnancy, second ANC visit between 24–26 weeks, third ANC visit at 32nd week, and fourth ANC Visit between 36–38 weeks of gestation with the main objectives of improving access to ANC services, reduce costs, early detection of complications crucial for reducing maternal and neonatal morbidity and mortality as well as improving quality of care(WHO, 2016a), however, in 2016, WHO introduced a new ANC model that recommended a minimum of eight contacts with one contact with the first 12 weeks, two contacts from 20 to 26 weeks and five contacts between 30 to 40 weeks(WHO, 2016a).

Factors associated with utilization of antenatal care services among pregnant women aged (15-49) years in northern Uganda.

According to the study findings, factors associated utilization of antenatal care services included age, region, occupation, wanted last child, and level of education among pregnant women.

The results showed that respondents aged 25-34 years (AOR: 1.28, 95% CI 1.05-1.56, p=0.014), those with manual occupation (AOR: 1.58, 95% CI 1.17-2.14, p=0.003), women with professional engagement (AOR: 1.43, 95% CI=1.05-1.98), women with secondary education (AOR: 1.80, 95% CI 1.24-2.6, p=0.002) were likely associated with utilization of antenatal care services. The result was reached based on analysis of each factor with the outcome of interest being antenatal attendance.

The finding about age, education, and occupation was found to be consistent with several studies. Several studies, including those conducted in Ghana, have identified a correlation between occupation, socioeconomic status, and the utilization of antenatal care (ANC) services among pregnant women (Anaba et al., 2022). Additionally, a study conducted in rural Ghana found that women who were engaged in farming were less likely to know the recommended number of ANC visits compared to women who were engaged in other occupations(Afaya et al., 2020) suggesting that occupation and socioeconomic status play a role in ANC utilization. Similarly, several studies have also linked the age of the mothers as a predictor associated with ANC utilization (Abbas et al., 2023, Adedokun and Yaya, 2020, Anaba et al., 2022).

Respondents within the Lango Sub-region (AOR: 0.62, 95% CI 0.46-0.86, p=0.003), and respondents with interest in the last child (AOR, 0.73, 95% CI 0.64-0.89, p=0.001), were less likely associated with utilization of antenatal care services. This finding corroborates with findings from another study conducted in rural Ethiopia where a higher birth order child was negatively associated with the number of ANC visits (Mamuye Azanaw et al., 2021)

Conclusion

Based on the findings discussed above, it can be concluded that while there has been an improvement in antenatal care (ANC) utilization in Northern Uganda, with a prevalence higher than the pooled average in countries with high maternal mortality, there are still notable disparities and challenges. Factors such as age, occupation, education level, region, and desire for the last child were identified as significant predictors of ANC attendance.

Women aged 25-34 years, those with professional or manual occupations, and those with secondary education were more likely to utilize ANC services. Conversely, women within the Lango Sub-region and those expressing a desire for their last child were less likely to attend ANC visits.

Recommendation

To enhance antenatal care (ANC) utilization in Northern Uganda, targeted education initiatives should emphasize the benefits of ANC visits, particularly among women in the Lango Sub-region and those with lower education levels.

Community engagement strategies involving local leaders and health workers can promote ANC awareness and encourage early registration for services.

Effective policy implementation, including adherence to WHO guidelines for ANC, is crucial to ensure comprehensive ANC services are provided, ultimately leading to improved maternal and neonatal health outcomes in the region.

Acknowledgment

Operational acronyms/ abbreviations

ANC: Antenatal care
FANC: Focused Antenatal Care
UDHS: Uganda Demographic and Health Survey
UNFPA: United Nations Population Fund
WHO: World Health Organization.

Source of funding

Conflict of interest

The authors declare no conflict of interest.

Authors biography

Okwany Jimmy is a student of the Mildmay Institute of Health Sciences.

References

1. Abbas, M., Bhamani, S., Kanjani, Y. & Sheikh, L. 2023. Enhancing antenatal education in Pakistan: an audit and recommendations. BMC Women's Health, 23, 645. https://doi.org/10.1186/s12905-023-02799-x
2. Achia, T. N. & Mageto, L. E. 2015. Individual and contextual determinants of adequate maternal health care services in Kenya. Women & Health, 55, 203-226. https://doi.org/10.1080/03630242.2014.979971
3. Afaya, A., Azongo, T. B., Dzomeku, V. M., Afaya, R. A., Salia, S. M., Adatara, P., Kaba Alhassan, R., Amponsah, A. K., Atakro, C. A. & Adadem, D. 2020. Women's knowledge and its associated factors regarding optimum utilization of antenatal care in rural Ghana: A cross-sectional study. Plos one, 15, e0234575. https://doi.org/10.1371/journal.pone.0234575
4. Anaba, E. A., Alor, S. K. & Badzi, C. D. 2022. Utilization of antenatal care among adolescent and young mothers in Ghana analysis of the 2017/2018 multiple indicator cluster survey. BMC Pregnancy Childbirth, 22, 544.
5. Atuhaire, R., Atuhaire, L. K., Wamala, R. & Nansubuga, E. 2020. Interrelationships between early antenatal care, health facility delivery and early postnatal care among women in Uganda: a structural equation analysis. Global health action, 13, 1830463. https://doi.org/10.1080/16549716.2020.1830463
6. Chewe, M. M., Muleya, M. C. & Maimbolwa, M. 2016. Factors associated with late antenatal care booking among pregnant women in Ndola District, Zambia. African Journal of Midwifery and Women's Health, 10, 169-178. https://doi.org/10.12968/ajmw.2016.10.4.169
7. Chilot, D., Belay, D. G., Ferede, T. A., Shitu, K., Asratie, M. H., Ambachew, S., Shibabaw, Y. Y., Geberu, D. M., Deresse, M. & Alem, A. Z. 2023. Pooled prevalence and determinants of antenatal care visits in countries with high maternal mortality: A multi-country analysis. Front Public Health, 11, 1035759. https://doi.org/10.3389/fpubh.2023.1035759
8. Fagbamigbe, A. F. & Idemudia, E. S. 2017. Wealth and antenatal care utilization in Nigeria: policy implications. Health care for women international, 38, 17-37. https://doi.org/10.1080/07399332.2016.1225743
9. Duodu, P. A., Bayuo, J., Mensah, J. A., Aduse-Poku, L., Arthur-Holmes, F., Dzomeku, V. M., Dey, N. E. Y., Agbadi, P. & Nutor, J. J. 2022. Trends in antenatal care visits and associated factors in Ghana from 2006 to 2018. BMC Pregnancy Childbirth, 22, 59. https://doi.org/10.1186/s12884-022-04404-9
10. Balyejjusa, S. M. 2015. Uganda's Vision 2040 and human needs promotion. Africa Development, 40, 61-90.
11. Mamuye Azanaw, M., Gebremariam, A. D., Teshome Dagnaw, F., Yisak, H., Atikilt, G., Minuye, B., Engidaw, M. T., Tesfa, D., Abebe Zewde, E. & Abebaw Tiruneh, S. 2021. Factors Associated with Numbers of Antenatal Care Visits in Rural Ethiopia. J Multidiscip Healthc, 14, 1403-1411. https://doi.org/10.2147/JMDH.S308802
12. MOH 2016. Essential Maternal and Newborn Clinical Care Guidelines for Uganda.
13. Muwema, M., Kaye, D. K., Edwards, G., Nalwadda, G., Nangendo, J., Okiring, J., Mwanja, W., Ekong, E. N., Kalyango, J. N. & Nankabirwa, J. I. 2022. Perinatal care in Western Uganda: Prevalence and factors associated with appropriate care among women attending three district hospitals. Plos one, 17, e0267015 https://doi.org/10.1371/journal.pone.0267015
14. Mehboob, R., Gilani, S. A., Khalid, S., Hassan, A. & Alwazzan, A. 2021. Maternal mortality ratio in

low-income developing countries. Global Women's Health. IntechOpen https://doi.org/10.5772/intechopen.95258

15. Sserwanja, Q., Nabbuye, R. & Kawuki, J. 2022. Dimensions of women empowerment on access to antenatal care in Uganda: a further analysis of the Uganda demographic health survey 2016. The International journal of health planning and management, 37, 1736-1753. https://doi.org/10.1002/hpm.3439

16. Umar, A. S. 2017. Does female education explain the disparity in the use of antenatal and natal services in Nigeria? Evidence from demographic and health survey data. Afr Health Sci, 17, 391-399. https://doi.org/10.4314/ahs.v17i2.13

17. WHO 2016a. 2016 WHO Recommendations: Antenatal Care for a Positive Pregnancy Experience. https://cdn.who.int/media/docs/default-source/maternal-health/anc.pdf?sfvrsn=5e2c740e_2.

18. WHO 2016b. WHO recommendations on antenatal care for a positive pregnancy experience, World Health Organization.

19. WHO 2021. Maternal mortality; https://www.who.int/europe/news-room/fact-sheets/item/maternal-mortality.

PUBLISHER DETAILS: