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Factors associated with first antenatal care (ANC) attendance within 12 weeks of pregnancy among women in Lira City, Northern Uganda: a facility-based cross-sectional study
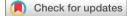
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ABSTRACT

Objective This study aimed at assessing factors associated with first antenatal care (ANC) attendance within 12 weeks of pregnancy among women in Lira City.

Design A cross-sectional study.

Settings The study was conducted in health facilities offering ANC services in Lira City, Northern Uganda.

Participants The study was among 368 pregnant mothers attending their first ANC in the three selected facilities (Lira Regional Referral Hospital, Ober Health Center IV and Pentecostal Assembly of God Mission Health Center IV) in Lira City.

Primary and secondary outcome measures Level of first ANC attendance within 12 weeks of pregnancy and associated factors.

Results Early ANC attendance was 36.1%. Women who were: unmarried (adjusted OR (aOR): 0.40, 95% CI: 0.16 to 0.99), took >2 hours to reach a health facility (aOR: 0.21, 95% CI: 0.07 to 0.62), or not visited by village health teams or healthcare workers at home (aOR: 0.33, 95% CI: 0.12 to 0.92) were less likely to attend their first ANC early. On the other hand, women who were: not knowing first that ANC guides parents on infant care (aOR: 2.22, 95% CI: 1.06 to 4.67); pregnant without consent of spouse (aOR: 4.29, 95% CI: 1.75 to 10.55); attending ANC from a private facility (aOR: 2.89, 95% CI: 1.27 to 6.15); and having two to three healthcare workers present at the ANC clinic (aOR: 1.79, 95% CI: 1.03 to 3.13) were more likely to attend ANC early.

Conclusions Despite the fact that the WHO recommends that all women begin ANC within 12 weeks after conception, Lira City in Northern Uganda had a low overall incidence of timely ANC initiation. Being unmarried, distance to reach a health facility, and being visited by village health teams or healthcare workers at home were all linked to timely ANC commencement. As a result, intervention efforts should concentrate on the highlighted determinants in order to promote ANC initiation in Lira City, Northern Uganda. This can be accomplished by providing information and education to the community on the timing and necessity of ANC in Northern Uganda.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study's key strength was that the data used in this study were obtained from a rather large sample, allowing conclusions across the region to be generalised.

⇒ Another strength was the study of multiple components, such as individual and community-level characteristics, that influence timely antenatal care (ANC) initiation using multilevel analysis to accommodate the hierarchical nature of the data.

⇒ This was a cross-sectional study; therefore, we could not establish a cause–effect relationship between variables.

⇒ By using a questionnaire to collect data, it could have led to recall bias.

⇒ ANC attendance in the first 12 weeks of pregnancy was a self-reported measure and a potential source of recall bias from respondents.

INTRODUCTION

Delayed antenatal care (ANC) attendance after 12 weeks of pregnancy is a growing public health concern. Worldwide, 303 000 maternal deaths occur due to pregnancy and childbirth-related complications yearly, with 99% happening in sub-Saharan Africa.[1] Globally, estimated coverage of first ANC attendance within 12 weeks of pregnancy was 58.6%.[2] However, it differs between developed (84.8%) and developing countries (48.1%) by 2013.[2] In Africa and East Africa, it ranges from 8.9% to 50%.[3 4] This implies that more than half of women of reproductive age in East Africa including Uganda start their first ANC attendance after 12 weeks of pregnancy. This is contrary to the recent WHO recommendation of first ANC contact within 12 weeks of pregnancy.[5 6]

Pregnancy-related and childbirth-related complications are associated with first-level

causes of maternal morbidity and mortality among pregnant women aged 15–49 years.[1] It also compromises the attainment of Sustainable Development Goal 3 and the reduction of the currently high maternal mortality ratio of 336 deaths per 100000 people. The WHO recommends the first ANC contact within 12 weeks of gestation among pregnant women, with subsequent contacts thereafter.[7 8] During these contact visits, risk identification, prevention and management of pregnancy-related conditions, health education and promotion are among the essential interventions of focus for these pregnant women.[6] Various factors associated with delayed ANC attendance have been unearthed in low-resource countries. These include unplanned and unconsented pregnancy, increased distance to a health facility, food insecurity, competing demands on family resources, long travel and waiting times, the number of health workers present at the facility and recommendations from village health teams (VHTs) for pregnant mothers to visit health centres to confirm pregnancies.[9 10] These factors have been associated with first ANC attendance after 12 weeks of pregnancy among pregnant women.[8 11 12] However, these factors tend to differ from place to place because of the different settings.

Uganda's Ministry of Health (MoH), together with development and implementing partners, introduced free access to ANC clinics, trained health workers, mobilised the community using VHTs and provided intermittent preventive treatment in pregnancy (plus insecticide-treated bed nets).[13] All these, among others, were meant to increase first-time ANC attendance in Uganda. However, first ANC attendance within 12 weeks of pregnancy is low, at only 29% among pregnant women,[13] implying that Ugandan women start attending their first ANC late, which has negative ramifications including preterm birth, low birth weight, stillbirths and maternal mortality.[14] In Lira district, an average of 27% was reported by the Uganda Health Sector Performance Report for financial year (FY) 2019/2020 as first ANC attendance within 12 weeks of pregnancy among pregnant women across all four quarters in FY 2019/2020. However, there seems to be little information on the first ANC attendance within 12 weeks of pregnancy in Northern Uganda. Therefore, we aimed to assess the factors associated with first ANC attendance within 12 weeks of pregnancy among women in Lira City in order to provide magnificent information to the health sector to improve first ANC uptake.

METHODS
Study area and period
The study was conducted at three health facilities (Lira Regional Referral Hospital (LRRH), Pentecostal Assemblies of God Mission (PAG) Health Center IV and Ober Health Center IV) in Lira City. These health facilities offer ANC services and receive a higher number of attendees. In accordance with WHO recommendations, Uganda's MoH advises four visits for prenatal care. First

visit: takes place during the first trimester, between weeks 10 and 20 of pregnancy; second visit: planned between weeks 26 and 28 of pregnancy; third visit: between weeks 32 (28–36) of pregnancy; fourth visit (last visit): between weeks 36 and 38 (>36) of pregnancy. In Uganda, ANC is part of the minimum healthcare package and is provided free of charge at all levels of public health facilities, but with a small cost for private health facilities. Lira City is located approximately 337 km by road north of Kampala, the capital and largest city in Uganda. This study was conducted between 13 December 2021 and 17 January 2022.

Study design and sample
This study used a facility-based, cross-sectional design employing quantitative approaches to data collection. The target population were all the pregnant women aged 15–49 years attending an ANC clinic in Lira City. The sample size was calculated using the single population proportion formula by Kish.[15] A proportion of 29% of pregnant women attending an ANC clinic in the first trimester of pregnancy in Uganda[13] was used at a 95% CI (Z=1.96). Therefore, the total sample, after adjusting for 10% non-response, was 339. However, we collected data from 368 people, which is above the minimum calculated sample size. LRRH, PAG Health Center IV and Ober Health Center IV were purposefully selected due to their high volumes of ANC attendees. Consecutive sampling was employed to select respondents who met the inclusion criteria from each clinic site. The study included all pregnant women aged 15–49 years who attended ANC clinics at the selected health facilities and provided informed consent. From those included, all women who were admitted to the hospital wards, health workers and women with a known psychiatric disorder were excluded. All participants who met the inclusion criteria during clinic days were selected for the study.

Patient and public involvement
No patients involved.

Data collection tools and procedures
Structured questionnaires (online supplemental material 1) were used to collect data from respondents and were administered by trained research assistants. The questionnaire was structured into three sections: socio-demographic factors, enabling factors and need factors influencing first ANC attendance within the first 12 weeks of pregnancy among pregnant women. The questionnaire was developed after a thorough review of the literature on related studies and given to an expert for face validity. The questionnaire was then pretested among 36 randomly selected pregnant women attending ANC in Aboke Health subdistrict, Kole district. Cronbach's alpha for the tool was run to test reliability. The reliability coefficient was 0.77. Three research assistants were recruited and trained for 2 days in the research methods and the data collection process. To recruit the participants, we

contacted the ANC clinic in charge of data collection for the particular day. The participants were selected consecutively at exit point of the ANC clinic, and whoever consented was interviewed. The purpose of the study was explained to the participants, and those who accepted to participate were interviewed after giving written consent.

Study variables

The dependent variable was the first ANC attendance within the first 12 weeks of pregnancy. This was a self-reported measure with yes=1 and no=2 responses. The independent variables included socioeconomic and demographic characteristics of respondents (mother's age, religion, marital relationship, level of income, educational level); predisposing factors (ANC knowledge); enabling factors (distance to ANC clinic, permission to go for ANC, home visit by VHTs, transport means and cost, waiting time, health worker's attitude, advice from significant others) and need factors (perception on first ANC visit, plan for pregnancy, pregnancy confirmed through parity, gravida, previous pregnancy complication, support for ANC) influencing first ANC attendance within 12 weeks of pregnancy.

Data analysis

Data from the Kobo server were exported to an Excel worksheet (Microsoft Corporation), cleaned and coded. Coded datasets from Excel spreadsheets (CSV) were imported to STATA software V.17.0 and analysed at three levels. Univariable analysis was used to describe variables independently. Continuous variables were reported as means and SDs, while categorical variables were reported as percentages and frequencies. At the bivariate level, associations between first ANC attendance within 12 weeks of pregnancy (the dependent variable) and the independent variables were tested using univariate logistic regression at p=0.2. A binary logistic regression analysis was run to estimate the net effect of each independent factor on the dependent variable at p=0.05 using the backward elimination method while testing the necessary assumptions first. Finally, the Hosmer-Lemeshow goodness of fit was run, and a p value of 0.854 was reported, indicating that the model fits the data.

RESULTS

Sociodemographic characteristics

All 368 pregnant women approached consented and participated in the study, with a mean age of 26 years (5.4). Most of the mothers (235, 63.9%) attended their first ANC after 12 weeks of pregnancy. The majority (343, 93.2%) were in a relationship; 152 (41.3%) had primary-level education; 172 (46.7%) were peasants and 160 (43.4%) were Anglican. Finally, the mean income was 131 087 Ugandan shilling (UGX) ($34.33) with an SD of 323 495 UGX ($84.71) (table 1).

Predisposing factors of respondents

Almost all mothers (366, 99.5%) knew about the objectives of ANC care. The majority (249, 67.7%) knew about

Table 1 Sociodemographic characteristics of respondents in Lira City

Variable	Frequency	Percentage
Age		
Mean/mode/SD	26/28/5.4	
Marital relationship		
Yes	343	93.2
No	25	6.8
Level of education		
No education	7	01.9
Primary education	152	41.3
Secondary education	149	40.5
Tertiary education	60	16.3
Religion		
Catholic	127	34.5
Protestant	160	43.5
Muslim	10	02.7
Pentecostal	62	16.9
SDA	9	02.4
Occupation		
Formal employment	38	10.3
Self-employed/ businessperson	150	40.8
Student	8	02.2
Peasant	172	46.7
Income in US$		
Mean (±SD)	131 087 (±34.33)	

SDA, Seventh-day Adventist.

ANC through VHTs/health workers and 20 (5.4%) through the media. Most of the mothers (358, 97.3%) knew that they were supposed to start their first ANC visits within 12 weeks of pregnancy and knew that it was beneficial (327, 89.0%) (table 2).

Enabling factors of respondents

The majority of the pregnant women (321, 87.2%) attended public facilities and travelled for more than 5 km to the facilities (230, 62.5%). Most of the mothers (322, 87.5%) reported seeking permission and advice from their husbands, boyfriends or fiancés before going for their first ANC attendance. However, only 249 (67.6%) were escorted by their spouses to the facilities. The majority of the mothers (340, 92.4%) were not visited at home by either health workers or VHTs, and almost all mothers (364, 98.9%) reported that health workers were friendly. Finally, most mothers (329, 89.4%) reported waiting for more than 2.5 hours at the ANC clinic before being attended to, and more than half of mothers (175, 53.0%) reported a lot of examination as a contributing factor for the delay at the ANC clinics (table 2).

Table 2 Factors associated with first ANC attendance

Predisposing factors of respondents	Frequency	Percentage
Know any objective of first ANC care		
Yes	366	99.5
No	2	0.5
Knew ANC through		
VHTs/health worker	249	67.7
Media	20	05.4
Friends	33	09.0
Relative	66	17.9
Suppose to start first ANC in weeks		
Mean/mode/SD	9/12/4.1	
Know benefit of ANC within 12 weeks		
Yes	358	97.3
No	10	02.7
First ANC guides parents in infant and childcare		
Yes	41	11.0
No	327	89.0
Enabling factors of respondents		
Health facility		
Public	321	87.2
Private	47	12.8
Distance to facility (in km)		
Less than 5	138	37.5
More than 5	230	62.5
Time in hours to reach health facility		
Less than 2	355	96.5
More than 2	13	03.5
Seek permission for ANC from		
None	37	10.0
Husband/spouse/boyfriend/fiancé	322	87.5
In-laws (parents, brothers, sisters)	9	02.5
Husband escort you to ANC		
Yes	249	67.6
No	119	32.4
Visited by VHTs at home		
Yes	28	07.6
No	340	92.4
Language used by health worker is friendly and well understood		
Yes	364	98.9
No	4	01.1
Waiting time in ANC clinic in hours		
≤2.5	39	10.6
>2.5	329	89.4
Time wasting factors		
One midwife seeing many of us	77	21.0
A lot of examination performed	175	53.0
Attending last if without a spouse	12	03.2

Continued

Table 2 Continued

Predisposing factors of respondents	Frequency	Percentage
Health workers take long to start seeing us	84	22.8

ANC, antenatal care; VHTs, village health teams.

Need factors of respondents

Most of the 286 respondents (77.7%) knew the recommended time to start their first ANC visits in weeks. However, only 133 (36.1%) came for their first ANC attendance within 12 weeks. Almost half of mothers (199, 54.1%) had their pregnancies confirmed through urine testing, and 324 (88.0%) reported that their pregnancies were consented to by their spouses and planned by 262 (71.2%); 347 (94.3%) reported being supported for their first ANC by their family members and 310 (84.3%) reported being supported most by husbands, boyfriends or fiancés (table 3).

Factors associated with ANC attendance within the first 12 weeks of pregnancy

At bivariate analysis, age of mother, marital relationship, knowing the benefit of early ANC attendance, health facility type, distance to the health facility, time taken in hours to reach the health facility, being visited by health workers/VHTs at home, language used by health workers is well understood, number of health workers present, knowing a good time in weeks to start first ANC visits, pregnancy consented to by spouse, pregnancy type, delivered at the health facility last time and pregnancy support were associated with ANC attendance in the first 12 weeks of pregnancy (table 4).

Multivariate analysis

In the binary logistic regression analysis, not being in a marital relationship (adjusted OR (aOR)=0.40; p=0.049; 95% CI: 0.16 to 0.99); not knowing the benefit of ANC (AOR=2.22; p=0.035; 95% CI: 1.06 to 4.67); attending a private, not-for-profit health facility (aOR=2.89; p=0.010; 95% CI: 1.27 to 6.15); long distance to the facility (aOR=0.21; p=0.005; 95% CI: 0.07 to 0.62); no home visits by health workers (aOR=0.33; p=0.034; 95% CI: 0.12 to 0.92) and no spousal consent (aOR=4.29; p=0.002; 95% CI: 1.75 to 10.55) were factors associated with ANC attendance within the first 12 weeks of pregnancy (table 4).

DISCUSSION

This study set out to assess factors associated with first ANC attendance within 12 weeks of pregnancy among women in Lira City. Our results show a low level (36.1%) of first ANC attendance within 12 weeks of pregnancy among pregnant women in Lira City. This result implies that the majority of pregnant women in Lira City are endangering themselves through pregnancy complications. Late ANC

Table 3 Factors associated with first ANC attendance

Need factors of respondents	Frequency	Percentage
Recommended time in weeks to start first ANC		
≤12	82	22.3
>12	286	77.7
Weeks of pregnancy confirmation		
Mean/mode/SD	4.3/4/3	
Pregnancy age in weeks		
Mean/mode/SD	16/20/5	
Pregnancy confirmed through		
Missing period	169	45.9
Urine pregnancy test	199	54.1
Pregnancy consented to by spouse		
Yes	324	88.0
No	44	12.0
Pregnancy planned		
Yes	262	71.2
No	106	28.8
Ever experience complications		
Yes	65	17.7
No	303	82.3
Delivered last at HF		
Yes	223	60.6
No	145	39.4
Family support for early ANC attendance		
Yes	347	94.3
No	21	05.7
Who supports you the most		
Husband, boyfriend, fiancé	310	84.3
In-laws	35	09.5
VHT/Local Councils	21	05.7
Friends	2	0.5

ANC, antenatal care; HF, health facility; VHT, village health team.

initiation could potentially be linked to preterm birth, low birth weight, stillbirths and maternal mortality.[14] These findings are not surprising given that other studies in Africa have reported similar results. However, our results are lower than the 84.8% observed in developed countries.[2] These differences are probably due to the difference in settings and sample size. However, the results imply that there is a need for mass sensitisation by the stakeholders of the community about the importance of first ANC attendance within 12 weeks of pregnancy.

Our results show that women who were not married were 0.40 times less likely to attend first ANC within 12 weeks of pregnancy (aOR=0.40; p=0.049; 95% CI: 0.16 to 0.99) compared with their counterparts in a marital relationship. This might be because the unmarried women could not afford both direct and indirect costs to access ANC. Additionally, pregnancy before marriage is associated with promiscuity and thus is against societal norms. This makes single, unmarried and widowed women, when pregnant, likely to avoid early ANC services. This finding corroborates the results of previous studies, which showed that unmarried women had higher chances of late ANC utilisation compared with married women.[16] However, contrary to our findings, some studies found no significant association between marital relationships and ANC utilisation.[17] This discrepancy may be attributed to differences in cultures, settings and sample sizes. For instance, based on research from Tanzania, women's marital status was a strong predictor of early usage of ANC treatment[18] and another one in Ethiopia showed no relationship.[5]

Our results show that pregnant women with good knowledge are 2.22 times more likely to make an ANC booking (aOR=2.22; p=0.035; 95% CI: 1.06 to 4.67) compared with pregnant women who have poor knowledge of the benefits of early ANC booking. This is because mothers who know the benefit of first ANC attendance pay deeper attention to ANC schedules, continuously seek advice from significant others and always live in fear of what the future holds for their unborn babies. This makes them continuously access timely information regarding ANC services, and they become informed about the need to start ANC attendance. In line with our results, previous studies report similar observations.[19]

Our results show that women who reported attending ANC at private health facilities were about 2.89 times more likely to attend first ANC within 12 weeks of pregnancy (aOR=2.89; p=0.010; 95% CI: 1.27 to 6.15) compared with those who reported attending public health facilities. The unavailability of essential ANC and maternal healthcare supplies, services and care providers in the public sector may encourage women to resort to more private healthcare. This finding is consistent with the study conducted in Bangladesh, which stated that utilisation of private facilities for maternal healthcare services increased all over.[20] Women attending private clinics made their first antenatal visit a little earlier and had more visits compared with those attending public clinics. Education about pregnancy was inadequate in both public and private clinics.[20]

In this study, the timing of the first visit to an ANC facility for women in Lira City was adversely correlated with the community mean distance to the health facility (aOR=0.21, p=0.005, 95% CI=0.07 to 0.62). Compared with pregnant women who lived in areas that were thought to be accessible, women who lived in communities with an average lack of access to health facilities were less likely to attend their first ANC within 12 weeks of pregnancy. This increased percentage is due to the long distance from their homes and the means and cost of transport to the health facility. This finding is supported by previous studies conducted in Cameroon,[5] Ethiopia[21] and Uganda.[22] These findings suggest that Uganda's MoH should come up with and implement policies that ensure the construction of equitable, effective and efficient healthcare points closer to mothers, reducing travel

Table 4 Bivariate and multivariate analyses of factors associated with first ANC attendance among women in Lira City (N=368)

Variable	First ANC attendance		COR (95% CI)	P value	AOR (95% CI)	P value
	Within 12 weeks	After 12 weeks				
Age group						
15–24	64 (41.8)	89 (58.2)	1		1	
25–34	58 (31.7)	125 (68.3)	1.55 (0.99 to 2.43)	0.055*	1.35 (0.73 to 2.50)	0.336
35–44	11 (34.4)	21 (65.6)	1.37 (0.62 to 3.12)	0.437	1.29 (0.47 to 3.55)	0.626
Marital relationship						
In marital relationship	121 (35.3)	222 (64.7)	1		1	
Not in marital relationship	12 (48.00)	13 (52.00)	0.59 (0.26 to 1.34)	0.200*	0.40 (0.16 to 0.99)	0.049**
First ANC helps diagnose maternal and obstetric complications						
Yes	22 (29.3)	53 (70.7)	1		1	
No	111 (37.9)	182 (62.1)	0.68 (0.39 to 1.18)	0.171*	0.58 (0.31 to 1.11)	0.097
First ANC guides parents in infant and childcare						
Yes	19 (46.3)	22 (53.7)	1		1	
No	114 (34.9)	111 (65.1)	1.61 (0.84 to 3.11)	0.153*	2.22 (1.06 to 4.67)	0.035**
Health facility type						
Public	121 (37.7)	200 (62.3)	1		1	
PNFP	12 (25.5)	35 (74.5)	1.77 (0.88 to 3.53)	0.109*	2.89 (1.27 to 6.15)	0.010***
Distance to health facility						
≤5 km	56 (40.6)	82 (59.4)	1		1	
>5 km	77 (33.5)	153 (66.5)	1.34 (0.88 to 2.10)	0.171*	1.41 (0.86 to 2.32)	0.183
Time in hours to reach health facility						
≤2	124 (34.9)	231 (65.1)	1		1	
>2	9 (69.2)	4 (30.8)	0.24 (0.07 to 0.79)	0.019*	0.21 (0.07 to 0.62)	0.005***
Visited by HWs/VHTs at home						
Yes	5 (17.9)	23 (82.1)	1		1	
No	128 (37.6)	212 (62.4)	0.36 (0.13 to 0.97)	0.044*	0.33 (0.12 to 0.92)	0.034**
Language used by HWs is well understood						
Yes	130 (35.7)	234 (64.3)	1		1	
No	3 (75.0)	1 (25.0)	0.19 (0.19 to 1.80)	0.147*	0.30 (0.03 to 3.05)	0.306
Number of HWs present at ANC clinic						
0–1	39 (43.3)	51 (56.7)	1		1	
2–3	57 (31.3)	125 (68.7)	1.68 (0.99 to 2.83)	0.052*	1.79 (1.03 to 3.13)	0.040**
4–5	37 (38.5)	59 (61.5)	1.22 (0.68 to 2.19)	0.507	0.97 (0.53 to 1.78)	0.913
Recommended time for first ANC						
≤12 weeks	109 (38.1)	177 (61.0)	1		1	
>12 weeks	12 (29.3)	58 (70.7)	1.49 (0.87 to 2.54)	0.144*	1.64 (0.88 to 3.03)	0.117
Pregnancy consented to by spouse						
Yes	125 (38.6)	199 (61.4)	1		1	
No	8 (18.2)	36 (81.8)	2.83 (1.27 to 6.29)	0.011*	4.29 (1.75 to 10.55)	0.002***
Pregnancy planned						
Yes	104 (39.7)	158 (60.3)	1		1	
No	29 (27.4)	77 (72.6)	1.75 (1.07 to 2.87)	0.027*	1.18 (0.61 to 2.30)	0.629
No of times gave birth to a fetus aged 24 weeks or more						
First pregnancy	57 (41.3)	81 (58.7)	1		1	

Continued

Table 4 Continued

| Variable | First ANC attendance | | | | | |
	Within 12 weeks	After 12 weeks	COR (95% CI)	P value	AOR (95% CI)	P value
1–2	54 (33.7)	106 (66.3)	1.38 (0.86 to 2.22)	0.180*	1.19 (0.38 to 3.70)	0.767
3–5	22 (31.4)	48 (68.6)	1.54 (0.84 to 2.82)	0.167*	1.16 (0.34 to 4.05)	0.814
Last delivered at health facility						
Yes	74 (33.2)	149 (66.8)	1			
No	59 (40.7)	86 (59.3)	0.72 (0.47 to 1.12)	0.144*	0.84 (0.29 to 2.45)	0.745
Who supports you most						
Spouse	108 (34.8)	202 (65.2)	1		1	
In-laws	19 (54.3)	16 (45.7)	0.45 (0.22 to 0.91)	0.027*	0.37 (0.16 to 0.84)	0.064
VHT/Local Councils	5 (23.8)	16 (76.2)	1.71 (0.61 to 4.80)	0.308	0.31 (0.01 to 4.12)	0.357
Friends	1 (50.0)	1 (50.0)	0.54 (0.03 to 8.67)	0.660	0.29 (0.03 to 18.51)	0.517

*P<0.05, **p<0.01, ***p<0.001.
1, reference category; ANC, antenatal care; AOR, adjusted OR; COR, crude OR; HWs, health workers; PNFP, private, not-for-profit; VHTs, village health teams.

time since the distances from home to the nearest health facility will be reduced.

The result of the present study also shows that women who were not visited by VHTs or health workers at home during their pregnancy periods were 0.33 times less likely to attend first ANC within 12 weeks of pregnancy (aOR=0.33, p=0.034, 95% CI=0.12 to 0.92) compared with those who were visited at home by health workers or VHTs. This reduction in odds of first ANC attendance relates to a lack of transport refunds, lunch allowances and a poor road network that hinders physical door-to-door visits by the VHTs and midwives to fully traverse their area of operations and sensitise the pregnant mother on the benefit of first ANC. The training of VHTs in home visiting and behaviour change communication skills during the antenatal periods significantly improves early ANC care-seeking behaviour by 10% in the rural districts.[23] Consistent with our findings, a study in Malawi revealed that lower-level village healthcare providers in maternal health-focused interventions increase the utilisation of ANC attendance, which impacts greatly on new mothers' ANC attendance rate.[24] Therefore, this calls for more community outreach and engagement of VHTs in health promotion and referral of pregnant women.

The delay in starting the first ANC visit was substantially correlated with their consent to their pregnancy. In this study, women whose spouses did not consent to their pregnancies had a 4.29-fold higher likelihood of delaying the start of their first ANC visit than their counterparts. This finding is in line with a study conducted in Ethiopia and Zambia.[25–27] The risk of non-attendance at early ANC was high for women whose husbands did not consent or were neutral.

Strengths and limitations of the study

The study's key strength was that the data used in this study were obtained from a rather large sample, allowing conclusions across the region to be generalised. Another strength was the study of multiple components, such as individual and community-level characteristics, that influence timely ANC initiation using multilevel analysis to accommodate the hierarchical nature of the data. However, the teenage mothers did not feel very comfortable providing information about their pregnancy status. This was a cross-sectional study; therefore, we could not establish a cause–effect relationship between variables. By using a questionnaire to collect data, it could have led to recall bias. However, these teenage mothers were interviewed in a private and quiet place with only one teenage mother and the interviewer at a time. The study was facility based and could have missed out on information for the mothers who remained in the community.

CONCLUSION

Despite the fact that the WHO recommends that all women begin ANC within 12 weeks after conception, Lira City in Northern Uganda had a low overall incidence of timely ANC initiation. Being unmarried, distance to reach a health facility, and being visited by VHTs or healthcare workers at home were all linked to timely ANC commencement. As a result, intervention efforts should concentrate on the highlighted determinants in order to promote ANC initiation in Lira City, Northern Uganda. This can be accomplished by providing information and education to the community on the timing and necessity of ANC particularly in Northern Uganda.

Residence City Commissioner, and the hospital administrators and health facility in charge, from whom data were collected.

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