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Non-Adherence to Antenatal Care Appointments and Associated Factors Among Pregnant Women at a Tertiary Hospital in Northern Uganda

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Abstract

Background

Non-adherence to antenatal care (ANC) appointments among pregnant women remains a significant public health challenge in Uganda, contributing to adverse maternal and neonatal outcomes, including stillbirths. Despite high initial ANC attendance, sustained follow-up remains low and inconsistent. This study aimed to determine the prevalence of non-adherence to ANC appointments and associated factors among pregnant women attending Lira Regional Referral Hospital (LRRH).

Methods

A hospital-based cross-sectional study was conducted at LRRH between January and March 2024. A total of 591 pregnant women were selected using systematic random sampling. Data were collected through structured questionnaires and abstraction forms and analysed using SPSS version 25. Descriptive statistics were used to summarise participant characteristics. Binary logistic regression and multivariate logistic regression were performed to identify factors associated with non-adherence.

Results

The prevalence of non-adherence to ANC appointments was 15.4% (95% CI: 12.5–18.6). Multivariate analysis revealed that living more than 5 kilometres from the health facility significantly increased the odds of non-adherence [aOR = 2.687, 95% CI: 1.124–6.427, p = 0.026]. Other individual, obstetric, and facility-related factors were not independently associated with non-adherence.

Conclusion

Approximately one in six pregnant women at LRRH missed scheduled ANC appointments, with distance to the health facility identified as the most significant barrier. To improve adherence to ANC appointments, targeted interventions such as community outreach programs, telephone reminders, and strengthening community midwifery services are recommended, particularly for women residing in remote areas.

Background

Antenatal care (ANC) plays a crucial role in ensuring optimal outcomes for both mothers and their babies. However, in many low- and middle-income countries (LMICs), including Uganda, adherence to ANC appointments is suboptimal despite efforts to promote early and continuous attendance [1]. Non-adherence to health interventions remains a significant challenge to healthcare systems globally [2]. The World Health Organization (WHO) and Uganda's Ministry of Health (MoH) recommend a minimum of eight ANC visits for women with normal pregnancies, spaced across defined gestational periods. These visits are structured to address specific health needs, from the first contact within 0–12 weeks, to the second and third contacts between 13–28 weeks, and subsequent visits between 29–40 weeks. Despite these recommendations, adherence remains low in many settings. Globally, adherence to ANC appointments varies significantly. In Iquitos, Peru, only 42.1% of women adhered to their scheduled ANC visits, and none received all the recommended services [3]. Similarly, in Saudi Arabia, 47.9% of women did not follow their scheduled appointments, with 15.7% uncertain about attending future visits after already missing one [4].

The situation in Sub-Saharan Africa is even more concerning. Approximately 80% of pregnant women in the region are non-adherent to scheduled ANC contacts [5]. In Ghana, 57% of women had fewer ANC visits than recommended [6], while in Ethiopia, nearly 57% of pregnant women were non-adherent [7, 8]. Uganda also reflects this trend, with low coverage of the recommended eight or more ANC contacts [9]. This gap in adherence has serious consequences. Non-adherence can delay the detection and management of pregnancy complications, reduce the uptake of essential services such as vaccinations and screenings, and increase the risk of adverse outcomes including stillbirth and maternal mortality [10, 11]. In East Africa, women who do not adhere to ANC appointments are more than twice as likely to forgo essential newborn care practices [12]. In Uganda, only 47% of pregnant adolescents-initiated ANC in the first trimester [13], while in urban clinics, factors such as discrimination, lack of privacy, and negative provider attitudes contribute to noncompliance [14]. The reasons for non-adherence are complex and multifaceted, ranging from low socioeconomic status [15], delays in health facilities, gravidity, and limited knowledge [16], to broader systemic issues.

Despite the efforts by Uganda's MoH to implement WHO's goal-oriented ANC approach, strengthen community education, and standardize care through national guidelines [17], adherence remains persistently low. Nearly 90% of women attend at least one ANC visit, but only 51.4% continue through to the fourth contact [18]. While it is known that attendance of ANC visits is sub-optimal, little is known about the specific factors contributing to non-adherence within different demographic groups. The persistent prevalence of non-adherence threatens to undermine Uganda's efforts toward achieving universal access to quality maternal healthcare, as envisioned in Uganda's Vision 2040 [19, 20]. Failure to adhere not only places the mother and child at risk of undetected complications but also contributes to broader emotional, financial, and systemic burdens [21]. Therefore, this study was undertaken to determine the extent to which pregnant women missed ANC appointments and to identify the factors associated with this non-attendance.

Methods

Study Design and Setting

This was a hospital-based cross-sectional study conducted between January and March 2024 at Lira Regional Referral Hospital (LRRH), a major referral and teaching facility located in Lira City, Northern Uganda. The hospital provides services to a catchment population of approximately 2.3 million people residing in Lira City and the surrounding Lango sub-region, which comprises nine districts [22]. Lira Regional Referral Hospital (LRRH) is one of the 17 regional referral hospitals in Uganda. It provides both outpatient and inpatient services, offering a wide range of general and specialized care, including surgery, internal medicine, dentistry, orthopedics, pediatrics, gynecology, and obstetrics. Outpatient services also include immunization, HIV counseling and testing, prevention of mother-to-child transmission (EMTCT), and antenatal care [23]. On average, LRRH registers a monthly ANC attendance of approximately 1,200 women, offering free maternal health services [24]. This study area was chosen based on its status as a regional referral public health facility, providing a representative cross-section of women attending ANC in Lira city and the entire Lango sub-region.

Study Population

The study population included pregnant women aged 18–49 years attending antenatal care (ANC) services during the study period. Participants were eligible if they had attended at least one ANC visit during their current pregnancy and had been scheduled for ANC services by healthcare providers. We excluded potential participants who were unwell or experiencing discomfort due to minor pregnancy-related conditions.

Recruitment and data collection procedures

To estimate the study sample size, we aimed for a precision of 5%. Assuming a non-ANC adherence rate of 48.6% based on a prior study, we calculated a required sample of 591 respondents. This was based on a two-sided test at a 95% confidence level, 5% margin of error, and 80% power, using the standard formula for comparing two proportions.

Using systematic sampling, we enrolled respondents while they waited to be seen by healthcare providers. At the facility, mothers are registered upon arrival, and on average, 54 mothers attend ANC services daily. We aimed to recruit and interview 10 respondents per day. To achieve this, we selected the first registered mother each day and then every 5th mother thereafter (i.e., 1st, 6th, 11th, etc.) until the daily target was met

Data on non-adherence to ANC appointments were extracted from participants' ANC cards using a structured data abstraction form. This form captured basic obstetric information and ANC attendance history, including scheduled and missed appointments. Additional data on individual, obstetric, and health facility-related factors were collected through an interviewer-administered questionnaire developed for the study.

Data collection was conducted from January to March 2024 by four trained research assistants (RAs), each holding a diploma in midwifery. Participants were approached either before or after receiving routine ANC services, depending on clinic flow.

The principal investigator introduced the study and obtained written informed consent from eligible participants. ANC cards were reviewed to obtain data on age, previous appointment dates, number of scheduled ANC visits attended, and instances of missed

appointments (defined as appointments missed by more than seven days). This review and data abstraction process took approximately five minutes per participant.

Participants were subsequently interviewed using the structured questionnaire to assess factors associated with non-adherence to ANC visits. Each interview lasted approximately one hour. On average, 30 participants were enrolled and interviewed per day throughout the data collection period.

Data Analysis

Data were entered into Microsoft Excel 2016, cleaned and exported to SPSS version 25 for analysis. The primary outcome variable was non-adherence to ANC appointments, defined as missing an appointment by more than seven days beyond the scheduled date during the current pregnancy. This information was verified through a review of ANC cards. Independent variables were grouped into three categories: *individual factors*, which included age, education, occupation, marital status, income, and partner support; *obstetric factors*, such as gravidity, parity, whether the pregnancy was planned or unplanned, and any history of complications; and *health facility factors*, including distance to the facility, waiting time, healthcare provider attitudes, drug availability, and communication of return dates. Descriptive statistics (means, standard deviations, frequencies) were computed. Bivariate logistic regression was performed to assess associations between each independent variable and non-adherence. Variables with $p < 0.2$ were included in multivariate logistic regression to identify independent predictors. Adjusted odds ratios (aOR) with 95% confidence intervals were reported. Statistical significance was set at $p < 0.05$.

Results

Participant Characteristics

The mean age of participants was 25.6 years (SD ± 5.2), with the majority aged between 18–27 years (68.4%). More than half (50.8%) had primary education, 35.0% had secondary education, and only 1% reported no formal education. Most participants were engaged in business (43.7%) or farming (21.5%). The majority (94.9%) were married, and 91.0% reported receiving support from their partners to attend ANC appointments.

The average parity was 2.6 children (SD ± 1.5). Most participants were carrying their second to fourth pregnancy (55.3%), while 11.7% had five or more pregnancies. Around 21.2% reported experiencing complications in a previous birth, with physical trauma being the most common (90.7%) (Table 1).

Table 1: Participant characteristics

Variable	Frequency	Percentage
Age [(years); Mean=25.59, SD±5.168]		
18-27	404	68.36
28-37	168	28. 43
38-47	18	3.05
48+	1	0.16
Level of education		
No formal education	6	1.01
Primary	300	50.76
Secondary	207	35.03
Tertiary	78	13.20
Occupation		
Farmer	127	21.50
Business	258	43.65
Civil service	39	6.60
Housewife	158	26.73
Others	9	1.52
Average monthly income (Ug. Shillings)		
Below 100,000=	274	46.36
100,000-500,000=	241	40.78
> 500,000=	76	12.86
Marital status		
Married	561	94.92
ANC partner support		
Yes	538	91.03
Gravidity		
1	195	33.00
2-4	327	55.33
≥5	69	11.67
Parity [Mean=2.56, SD±1.48]:		
0	237	40.10
1-4	332	56.18
≥5	22	3.72
Problem(s) in the previous birth(s)		
Traumatic deliveries	68	90.70
Sepsis	1	1.30
Haemorrhage	6	8.00
Current pregnancy planned		
Yes	362	61.25

Current gestation period (in weeks)		
<12	6	1.0
13-26	198	33.5
27+	387	65.5

Obstetric characteristics of participants

The majority of antenatal mothers (78.4%) had attended 2–4 ANC contacts, while only 1.9% had attended eight or more contacts. Most of the mothers initiated ANC in the second trimester, between 13 and 26 weeks (65.5%), followed by 31.6% who started in the first trimester and 2.9% in the third trimester.

Most participants were in the third trimester (65.5%), while only 1.0% were in the first trimester. Regarding scheduled ANC contacts, 65.3% attended as scheduled, while 34.7% missed at least one appointment. Among those who missed appointments, most missed only once (77.6%), while 1.9% missed four times. Overall, 84.9% of antenatal mothers were compliant with ANC appointments, while 15.1% were non-compliant. (Table 2)

Table 2 Obstetric characteristics of 591 participants attending ANC at Lira RRH

Variable	Number	Percentage (%)
Current ANC contact/visit:		
2-4	463	78.4
5-7	117	19.7
8+	11	1.9
Gestation period at first ANC contact (in weeks):		
0-12	187	31.6
13-26	387	65.5
27-40	17	2.9
Current gestation period (in weeks):		
<12	6	1.0
13-26	198	33.5
27+	387	65.5
Scheduled ANC contact(s):		
Attended	386	65.3
Missed	205	34.7
Number of times of missed ANC appointments:		
1	159	77.6
2	34	16.6
3	8	3.9
4	4	1.9

Status of ANC contact appointments:		
Compliant	500	84.6
Noncompliant	91	15.4

Prevalence of non-adherence

Out of 591 participants, 15.4% (95% CI: 12.5–18.6) were non-adherent to at least one scheduled ANC appointment.

Health Facility Factors

Approximately 76.6% of participants lived within 5 kilometres (km) of the ANC clinic, and 73.9% reported taking less than 30 minutes to reach the facility. However, 62.8% waited more than four hours before receiving care. Despite this, most participants (89.0%) were fully satisfied with the care received. Notably, although 95.6% reported receiving prescribed medications during visits, 67.9% experienced delays or stock outs. Nearly all participants (98.5%) reported being counseled about the importance of ANC appointments. (Table 3)

Table 3: Health Facility Variables of 591 participants attending ANC at Lira RRH

Variable	Frequency	Percentage
Time taken to reach ANC clinic (in hours)		
[Mean=2.94, SD±5.25]:		
Less than 30 minutes	437	73.94
Between 30 minutes and 1 hour	134	22.67
More than 1 hour	20	3.39
Approximate distance from home to ANC clinic		
≥ 5kms	453	76.65
Time taken before being served (in hours)		
[Mean=1.57, SD±0.61]:		
Less than 2 hours	37	6.27
2-4 hours	183	30.96
More than 4 hours	371	62.77
Participant's satisfaction level with the care		
Fully Satisfied	526	89.00
Moderately satisfied	63	10.66
Unsatisfied	2	0.34
Information about keeping ANC appointment		
Yes	582	98.48
Receive drugs, at every contact		
Yes	564	95.43

Factors associated with Non-adherence to ANC Contact Appointments

Following the bivariate analysis, distance to the health facility was significantly associated with non-adherence. Women who lived more than 5 km away were more likely to miss appointments. In the multivariate logistic regression analysis, distance remained the only independent predictor. Women residing more than 5 km from the clinic had nearly three times the odds of being non-adherent [aOR = 2.687; 95% CI: 1.124–6.427]. (Table 4)

Table 4: Multivariate Analysis of the Factors Associated with Non-adherence to ANC Contact of 591 participants at Lira RRH

Variable		ANC contact appointment adherence		cOR (95% CI)	*P*-Value	aOR (95% CI)	*P*-Value
		Non-adherent N (%)	Adherent N (%)				
Occupation	Farmer	17 (13.4)	110 (86.6)	1.00		1.00	
	Business	50 (19.4)	208 (80.6)	0.642 (0.353-1.167)	0.147	0.930 (0.738-1.172)	0.543
	Civil Service	2 (5.1)	37 (94.9)	2.859 (0.630-12.96)	0.175	1.095 (0.754-1.589)	0.632
Marital status	Married	92 (16.4)	469 (83.6)	1.00		1.00	
	Unmarried	8 (26.7)	22 (73.3)	0.539 (0.233-1.248)	0.150	0.877 (0.572-1.345)	0.855
Get partner support	Yes	86 (16.0)	452 (84.0)	1.00		1.00	
	No	14 (26.4)	39 (73.6)	0.530 (0.275-1.01)	0.057	0.875 (0.631-1.214)	0.201
Problem in previous	Yes	18 (24.0)	57 (76.0)	1.00		1.00	
birth(s)	No	46 (16.5)	232 (83.5)	1.592 (0.859-2.952)	0.139	1.098 (0.821-1.467)	0.527
Time to reach ANC clinic	< 30 minutes	67 (15.3)	371 (84.7)	1.00		1.00	
	≥30 mins	29 (21.8)	104 (78.2)	0.647 (0.397-1.053)	0.080	0.923 (0.742-1.147)	0.471
Approximate distance	Within 5 kms	67 (14.8)	387 (85.2)	1.00		1.00	
from home to ANC clinic	> 5 kms	104 (75.9)	33 (24.1)	3.199 (1.607-6.368)	0.001	2.687 (1.124-6.427)	**0.026**

Discussion

This study found that 15.4% of pregnant women attending antenatal care (ANC) at Lira Regional Referral Hospital were non-adherent to scheduled appointments. While this figure is lower than non-adherence rates reported in Ethiopia (56.8%) [7] and Ghana (57%) [6], it still reflects a significant gap in the continuum of maternal healthcare. Non-adherence to or late attendance of ANC visits compromise the early detection and management of pregnancy complications and may contribute to preventable adverse outcomes. Therefore, ministries of health and individual health facilities may consider integrating appointment tracking systems and follow-up mechanisms to identify and support women at risk of non-adherence.

The finding that distance to the health facility was the only variable significantly associated with non-adherence to antenatal care (ANC) appointments is notable, particularly given that the study population was somewhat educated. While higher levels of education are generally associated with increased health-seeking behaviour and greater awareness of the importance of ANC [25], education alone may not be sufficient to overcome structural barriers such as long travel distances. Women living more than five kilometres (about three miles) from the hospital were more likely to miss appointments, consistent with studies conducted in other low-resource contexts [4, 16]. This suggests that, despite being informed or motivated to attend ANC, the physical burden of distance, coupled with limited transportation options, financial constraints, and time costs, remains a critical barrier. Even among educated women, long distances may discourage repeat visits, particularly if they have other competing responsibilities such as childcare or work. These findings highlight the need for interventions that address geographic accessibility—such as decentralising ANC services, providing transportation support, or integrating community outreach programs—to complement education-based strategies and ensure more consistent ANC attendance.

Contrary to previous literature, individual factors such as gravidity, planned pregnancy, maternal age, and socioeconomic status were not significantly associated with ANC non-adherence in this setting [5, 15]. This may reflect improved community-level awareness and the influence of local health education efforts. Therefore, to continue

best practice, providers should assess ANC adherence risk based on individual patient circumstances rather than relying on demographic profiles alone. Additionally, training should emphasise critical thinking and the use of evidence-based screening tools to guide client-centred care planning.

On the other hand, non-adherence to ANC visits results in missed opportunities for essential services such as screening for pre-eclampsia, HIV, syphilis, and gestational diabetes [10, 11]. These services are integral to preventing adverse outcomes for both mothers and neonates. Therefore, we recommend that ANC sessions continue prioritising client education on the importance of consistent follow-up and ensure that missed visits are followed up actively. Additionally, midwives should be trained in client communication techniques, including motivational interviewing, to address barriers to care and reinforce adherence.

Study Strengths and Limitations

The use of a structured data abstraction form enhanced the reliability of data collection by ensuring accurate documentation and tracking of antenatal appointments. Regular checks and audits further supported data accuracy. The use of stratified and probability sampling improved representativeness and reduced selection bias, while the large sample size strengthened the robustness and generalizability of the study findings.

This study has some limitations. The cross-sectional design precludes causal inference, and reliance on patient-held ANC cards and self-reported data may introduce bias. However, it offers timely and locally relevant insights into maternal healthcare-seeking behaviour in Northern Uganda.

Conclusions

This study found that a significant number of pregnant women at Lira Regional Referral Hospital missed scheduled ANC appointments, with non-adherence notably higher among those living more than five kilometres from the facility. The findings underscore the need to strengthen ANC adherence strategies, especially for hard-to-reach populations. Interventions such as mobile ANC units, community outreach, and

revitalised community midwifery services could improve access. At the facility level, better appointment-tracking systems and client education are essential.

List of abbreviations

ANC	Antenatal Care
LRRH	Lira Regional Referral Hospital
MoH	Ministry of Health
WHO	World Health Organisation

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Makerere University School of Health Sciences Research and Ethics Committee (MAKSHSREC-2023-585), and administrative clearance was secured from Lira Regional Referral Hospital (REF-LRRH/01/24). Written informed consent was obtained from all participants. Confidentiality was maintained, and no identifiable information was collected. All procedures were carried out following the applicable guidelines and regulations and the Declaration of Helsinki.

Consent for publication

Not applicable

Availability of data and materials

This paper presents all relevant data; the raw data is available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

GO conceptualized the study, designed the methodology, and wrote the original draft. PM and TDN supervised the study and writing and editing of the original draft. SNM, JN, and MN gave technical input as experts in the study. AA and RM gave technical input

during data analysis. LK and RM supported in data collection. All authors made significant input in editing the drafted manuscript. All the authors gave final approval for the work to be published. All authors agree to be accountable for all aspects of the work to ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was governed by the Declaration of Helsinki.

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