RESEARCH
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FACTORS ASSOCIATED WITH LOW ANTENATAL CARE ATTENDANCE AMONG PREGNANT WOMEN ATTENDING HEALTH CENTERS OF NEMBA DISTRICT HOSPITAL, RWANDA

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Abstract
The global target is to reduce maternal mortality to 70 deaths per 100,000 live births by 2030. Antenatal care (ANC) is critical in lowering maternal and neonatal mortality rates, regardless of a community's sociodemographic background. Recognizing the benefits of ANC for mothers and newborns, Rwanda has made attending ANC a national priority. The World Health Organization (WHO) recommends that pregnant women should attend at least four antenatal visits, with one visit occurring during the first trimester. However, despite the Rwandan government's efforts to improve healthcare infrastructure, human resources, and health insurance, barriers to ANC attendance persist. Investigating the factors contributing to low ANC attendance among pregnant women in rural areas became necessary. Consequently, this study aimed to assess the factors associated with low ANC attendance among pregnant women at the health centers of Nemba Hospital. A cross-sectional study was conducted among 270 pregnant women receiving ANC services at nine health centers. Participants were recruited using a systematic sampling method, and data were collected through pretested, structured questionnaires. Data management and analysis were conducted using SPSS version 29.0. The study was approved by Mount Kenya University and the Gakenke District office, with voluntary participation. The results revealed that 60.4% of the participants had low ANC attendance, indicating that more than half of the women did not adhere to the recommended ANC schedule. Factors associated with ANC attendance included the number of children ($P < 0.001$), maternal education ($P = 0.01$), planned pregnancies ($P < 0.001$), distance from home to the health center ($P = 0.006$), number of pregnancies ($P < 0.001$), history of pregnancy complications ($P = 0.007$), prior ANC attendance ($P = 0.001$), location of the health center ($P < 0.001$), availability of ANC services, and patient waiting times ($P < 0.001$). These findings underscore the significance of accessibility and service availability in ensuring adequate ANC attendance. Based on the study's results, three recommendations are proposed. First, enhancing maternal education and awareness programs about the importance of ANC, especially for women with lower education levels and multiple children, could be beneficial. Second, improving access to healthcare facilities by reducing travel time could significantly boost ANC attendance, possibly through the establishment of more health centers or reliable transportation services. Finally, ensuring the consistent availability of ANC services, including during weekends, could better accommodate women with different schedules.
Keywords: Prevalence, Factor, Antenatal Care, Pregnant Women.

INTRODUCTION

Antenatal care (ANC) involves the healthcare services provided by skilled professionals to pregnant women and adolescent girls to ensure optimal health for both the mother and the child during pregnancy (Tola, 2021). The antenatal period is crucial for addressing concerns, offering support, and providing information that fosters healthy behaviors and parenting skills. Proper care during pregnancy and childbirth is essential for the well-being of both mother and baby (Gebremeskel, 2015). The WHO advises that all pregnant women in developing countries should begin ANC within the first trimester (WHO, 2018). On a global scale, ANC services are a critical component in reducing morbidity and mortality rates among pregnant women. Effective and recommended ANC services facilitate safe pregnancies and deliveries, thereby enhancing maternal and child health through both standard and specialized care (Azanaw, 2021). Depending on the setting, some pregnant women may require additional care and visits, especially those with specific risk factors, affecting approximately 25-30% of women (Ijeoma, 2019).

Numerous studies have examined the progress of ANC coverage in developing countries, focusing on visit frequency, timing, and the characteristics of those who do or do not utilize ANC services. The use of ANC services is influenced by socio-demographic and contextual factors (Teshome, 2020). Studies have shown that attending all recommended 8 visits plays a major role in early detection and treatment of maternal health problems in pregnancy and serves as a good basis for proper management during and after childbirth (Manyeh, 2020). Hence

skipping visits is a potential risk for complications during pregnancy, childbirth, and puerperium (Shibre, 2020). Skipping ANC visits were also associated with late diagnosis of complications which might have the potential to detrimentally affect maternal and fetus health (Wolde, 2019).

In East Africa, A recent report in Tanzania indicated that an estimated 51% of Tanzanian women implemented the recommended four or more ANC visits in 2016 (Rwabilimbo, 2020). In Uganda, Despite the fact that the WHO recommends that all women begin ANC within 12 weeks after conception and attend 8 visits during pregnancy, studies reported low ANC attendance. Being unmarried, distance to reach a health facility, and being visited by village health teams or healthcare workers at home were all linked to ANC attendance (Acup, 2022). The ANC prevalence is only 0.05% in Burundi. There is an intra-regional or intra-provincial heterogeneity in terms of attending all recommended ANC visits. Woman's education level and delivery place are significantly associated with antenatal care attendance (Barankanira, 2023). Evidence from Kenya shows that more educated women, wealthier and those living in cities were found to be more likely to use maternal health services, including antenatal care (Achia, 2015).

In Rwanda, ANC attendance forms the basis of all maternal health care provision and encompasses the evaluation of the general health of pregnant women with the goal of detecting and preventing adverse maternal and neonatal outcomes. ANC in Rwanda is provided by qualified health-care professionals notably Medical Doctors at District Hospitals and Nurse or Midwives at Health Centers (Mulungi, 2023). ANC conventionally takes the form of a one-on-one consultation between a pregnant woman and her healthcare provider. Rwanda follows WHO recommendations of 8 ANC visits (WHO, 2018)s. The antenatal visit in Rwanda integrates the usual individual pregnancy health assessment with tailored group educational activities and peer support, with the aim of motivating behavior change among pregnant women, improving pregnancy outcomes, and increasing women's satisfaction (Mulungi, 2023). The findings of the recent Rwanda Demographic and Health Survey showed that only 47% make four or more visits during their entire pregnancy and it lacks the frequency of mother attending antenatal care and associated factors (NISR, 2020).

Recognizing the proven benefits for mothers and newborns, Rwanda has prioritized ANC attendance at a national level (Schmidt, 2021). Even though 99% of pregnant women in Rwanda receive ANC services, the number of visits falls short of the standards set by the WHO and Rwanda's Ministry of Health. According to the latest Rwanda Demographic and Health Survey (RDHS), only 47% of pregnant women make the recommended four or more ANC visits throughout their pregnancy, and the timing of their first ANC visit is often not recorded (NISR, 2020). Barriers to ANC attendance continue to exist, particularly in rural areas like those served by Nemba District Hospital. Despite governmental improvements in healthcare infrastructure, human resources, and health insurance, challenges remain. Previous studies have explored factors influencing ANC attendance (Mulungi, 2023), but these studies provided limited context on how ANC attendance occurs. It is essential to assess the factors associated with low ANC attendance to inform new policies that can help reduce maternal deaths and promote maternal and child health in Rwanda, contributing to the achievement of the SDGs. Therefore, this study was conducted to assess Factors associated with low ANC attendance among pregnant women attending health centers of Nemba hospital.

MATERIALS AND METHODS

Research design

In this study, the researcher used a cross-sectional research design and adopted a quantitative research approach.

Participants

The study focused on pregnant women receiving antenatal care services at the nine health centers affiliated with Nemba District Hospital. These centers collectively serve an average of 810 women per month for antenatal care (Nemba_DH, 2023). In this study, a sample of **270** pregnant women was used as the sample size. The minimum sample size was determined using the statistical formula SOLVIN'S FORMULA for sample size calculation in smaller populations in the prevalence studies (Glen, 2023). The formula is **$n=N/ [1+N (e)^2]$.** The sample of 270 participants is large enough to represent the population of 810 study population.

Research instruments

A questionnaire was employed to be sure of the successful achievement of the research objectives. In sum, the data collection tool encompassed various aspects, including sociodemographic factors and other Factors including past medical history, developed infrastructures, number of trained staff, location, distance to health facility, distance to a facility, availability of services, accessibility of services, client provider relationship, waiting time, cost of services, healthcare system trust, transport facility

Data analysis procedure

Data management and analysis were performed using SPSS software version 29.0. The process began with cleaning and organizing the dataset, including checking for missing values, outliers, and inconsistencies. Descriptive statistics were then calculated to summarize the data, including measures of central tendency, variability, frequency distributions, and percentages for demographic characteristics and other factors related to antenatal care attendance. For correlation analysis, a Pearson chi-square test was conducted through cross-tabulations to explore relationships between adequate ANC attendance (yes/no) and factors such as age, education level, or number of pregnancies, with a p-value of less than 0.05 considered statistically significant. Multivariate logistic regression analysis was performed on significant variables to gain a deeper understanding of the relationships between factors and adequate ANC attendance. The results were presented using tables and pie charts.

Ethical consideration

Ethical approval was secured from the Mount Kenya University (MKU) Office of Postgraduate Studies, and permission to conduct the study was granted by the Gakenke District Office. The heads of the selected health centers were notified about the study. Prior to data collection, participants were provided with a Kinyarwanda version of the consent form and had the opportunity to ask questions. Data were only collected from participants who voluntarily consented after receiving full explanations and signing the consent form. The questionnaire did not include any names. Confidentiality of the collected data was maintained, with access restricted to the research team and

no participant names included. Data were stored in designated computer folders with secure passwords, and physical copies were kept in a locked drawer. The study posed no risk to participants, and its benefits include informing policymakers and stakeholders about factors and barriers related to antenatal care in Gakenke District for future decision-making. The questionnaire will be discarded after five years, and data will be securely stored in the interim.

RESULTS

Table 1. Socio-Demographic Characteristics of Study Participants

Variable (N=270)	Frequency (N)	Percentage (%)
Health Center		
BUSHOKA	32	11.9
CYABINGO	29	10.7
KAMUBUGA	28	10.4
KARAMBO	23	8.5
MATABA	43	15.9
NEMBA	30	11.1
NGANZO	31	11.5
RUKURA	24	8.9
RUTENDERI	30	11.1
Age of the woman		
<20 years	6	2.20
20-29 years	143	53.0
=, > 30 years	121	44.8
Mean (SD)	29.6	7.02
Number of Children		
< 3	197	73.0
=, > 3	73	27.0
Mean (SD)	2	1.5
Family Size		
Mean (SD)	4	1.6
Marital Status		
Single	49	18.1
Married/cohabitating	207	76.7
Divorced/separated	7	2.6
Widowed	7	2.6
Head of Household		
Husband of participant	185	68.5
Participant herself	32	11.9
Father of participant	27	10.0
Mother of participant	24	8.9
Sibling of participant	2	0.7
Maternal education level		
Illiterate	11	4.1
Incomplete primary	49	18.1
Complete primary	90	33.3
Incomplete secondary	72	26.7
Complete secondary	47	17.4
University	1	0.4
Husband education level		
Illiterate	12	4.4
Incomplete primary	32	11.9
Complete primary	90	33.3
Incomplete secondary	39	14.4
Complete secondary	35	13.0
University	7	2.6
N/A	55	20.4
Religion		
None/Traditional	4	1.5
Catholic	143	53.0
ADEPR	64	23.7
Muslim	1	0.4
Adventist	19	7.0
Protestant	39	14.4
Distance to HC (Walking minutes)		
< 60 minutes	111	41.1
=, > 60 minutes	159	58.9
Mean (SD)	63	36.2

Source: researcher computations from primary data

Most participants were married or cohabitating as the marital status indicates that; single participants were 49 participants (18.1%) while married or cohabitating were 207 participants (76.7%). Among the participants, 7 (2.6%) of them were divorced while other 7(2.6%) were widowed. Concerning to head of the household, 185 (68.5%) of the participants proclaimed that they were heads of the household. Concerning education level, the majority completed the primary level education among both wife and husband where education level was 26.7% and 33.3% respectively. Regarding religion, 53.0% of the participants identified as Catholic. The average walking distance to the health center was 63 minutes, with a standard deviation of 36.2 minutes.

Table 2. Socio-economic characteristics of study participants

Variable (N=270)	Frequency (N)	Percentage (%)
Ubudehe Category		
Category 1	40	14.8
Category 2	109	40.4
Category 3	34	12.6
Category 4	2	0.7
No category	85	31.5
Maternal occupation		
None	29	10.7
Agriculture/farming	205	75.9
Business	30	11.1
Civil service	5	1.9
Informal (part-time)	1	0.4

Variable (N=270)	Frequency (N)	Percentage (%)
Husband occupation		
None	8	3.0
Agriculture/farming	146	54.1
Business	29	10.7
Civil service	17	6.3
Informal (part-time)	15	5.6
N/A	55	20.4
Household income (Frw per month)		
Mean (SD)	18363.70	69363.40
Motorcycle transport fees (Frw from home to HC)		
Mean (SD)	1098.58	990.37

Source: researcher computations from primary data

According to Table 2 indicating the socio-economic characteristics of the 270 participants, there were critical insights into the economic backdrop against which antenatal care was sought among the participants. A significant proportion of participants fell into Ubudehe Category 2 (40.4%), indicating a moderate living standard for many. The predominant occupation among both wives and husbands was agriculture/farming (75.9% and 54.1% respectively. The mean monthly household income was 18,363.70 Rwandan Francs (Frw), with a substantial standard deviation of 69,363.40 Frw. The high standard deviation indicates significant income disparity among participants. The mean motorcycle transport fee from home to the health center was 1,098.58 Frw, with a standard deviation of 990.37 Frw.

As per Figure 1, from the total sample, a majority, 163 participants (60.4%), had low ANC attendance, failing to meet the established criteria for optimal prenatal care. These findings underscore a notable gap in antenatal care utilization, revealing that a significant number of pregnant women are not receiving the recommended level of care.

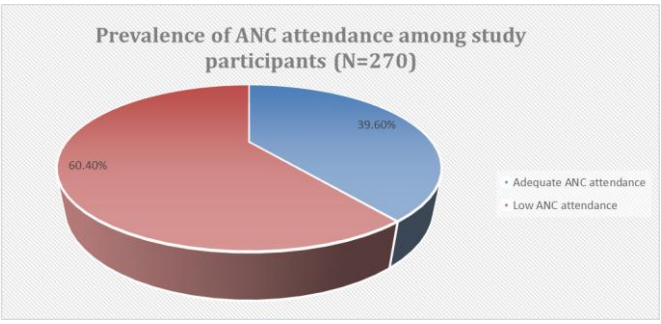

Figure 1. Frequency of ANC attendance among study participants

Table 3. Socio-demographic factors associated with ANC attendance

Variable	Low ANC attendance			
	Yes	No		
N=270	n(%)	n(%)	X^2- Value	P-Value
Age of woman			0.902	0.637
<20 years	5 (83.3)	1 (16.7)		
20-29 years	82 (57.3)	61 (42.7)		
=, > 30 years	76 (62.8)	45 (37.2)		
Number of children			3.982	**0.046**
< 3	118 (59.9)	79 (40.1)		
=, > 3	45 (61.6)	28 (38.4)		
Marital status				0.075
Single	30 (61.2)	19 (38.8)		
Married/cohabitating	125 (60.4)	82 (39.6)		
Divorced/separated	4 (57.1)	3 (42.9)		
Widowed	4 (57.1)	3 (42.9)		
Maternal education			6.905	**0.031**
Illiterate	7 (63.6)	4 (36.4)		
Incomplete primary	33 (67.3)	16 (32.7)		
Complete primary	57 (63.3)	33 (36.7)		
Incomplete secondary	36 (50.0)	36 (50.0)		
Complete secondary	32 (68.1)	15 (31.9		
University	0 (0.0)	1 (100.0)		
Head of household			8.368	0.079
Husband of woman	114 (61.6)	71 (38.4)		
Woman herself	21 (65.6)	11 (34.4)		
Father of the woman	14 (51.9)	13 (48.1)		
Mother of the woman	13 (54.2)	11 (45.8)		
Sibling of the woman	1 (50.0)	1 (50.0)		
Maternal Occupation			7.754	0.101
None	16 (55.2)	13 (44.8)		
Agriculture/farming	128 (62.4)	77 (37.6)		
Business	16 (46.7)	14 (46.7)		
Civil service	2 (40.0)	3 (60.0)		
Informal (part time)	1 (100.0)	0 (0.0)		
Distance from home to HC			10.828	**<0.001**
< 60 minutes	44 (39.6)	67 (60.4)		
=, > 60 minutes	96 (60.4)	63 (39.6)		
Husband education			10.448	0.107
Illiterate	6 (50.0)	6 (50.0)		
Incomplete primary	19 (59.4)	13 (40.6)		
Complete primary	61 (67.8)	29 (32.2)		
Incomplete secondary	21 (53.8)	18 (46.2)		
Complete secondary	17 (48.6)	18 (51.4)		
University	4 (57.1)	3 (42.9)		
N/A	35 (63.6)	20 (36.4)		

Source: researcher computations from primary data
*Note * = p-value less than 0.05is significant*

Marital status does not show a significant association with low ANC attendance (P=0.075). However, single women (61.2%) and those who are married/cohabitating (60.4%) have slightly higher rates of low ANC attendance compared to divorced/separated and widowed women (both at 57.1%). The similarities in attendance across different marital statuses suggest that marital status alone does not heavily influence ANC attendance. Maternal education shows a significant association with low ANC attendance (P = 0.031). Illiterate women had the

lowest attendance rate (63.6%), suggesting that education is the key to health-seeking behaviors. Maternal education shows a significant association with low ANC attendance (p=0.031). The highest rates are among those with complete secondary education (68.1%) and incomplete primary education (67.3%), while the lowest was among university-educated women (0%).

The variable of household headship was not significantly linked to low ANC attendance (P=0.079). Women whose husbands are the household heads have a low ANC attendance rate of 61.6%, whereas those in self-headed households have a slightly higher rate of 65.6%. There was no significant association between maternal occupation and ANC attendance (P = 0.101). Civil servants had the highest attendance rate (60%), followed by those in business (46.7%) and agriculture/farming (37.6%). The lowest attendance was observed among those with informal part-time jobs (0%), highlighting potential economic and time constraints affecting attendance.

Distance from home to the health center shows a highly significant association with low ANC attendance (P< 0.001). Women living within 60 minutes of a health center had significantly higher attendance (60.4%) compared to those living farther away (39.6%). This underscores the importance of accessibility in ensuring Adequate ANC attendance. The husband's education wasnot significantly associated with low ANC attendance (P = 0.105).

Women whose husbands had completed secondary education had the highest attendance rate (51.4%), while those with husbands who had completed primary education had the lowest (32.2%).

Table 4. Maternal health factors associated with ANC attendance

Variable	Low ANC attendance			
	Yes	No		
N=270	N (%)	N (%)	X^2- Value	P-Value
Gravidity			5.024	**0.025**
Primigravida	64 (65.3)	34 (34.7)		
Multigravida	99 (57.6)	73 (42.4)		
Parity			2.546	0.280
Para 0	57 (64.0)	32 (36.0)		
Para I	34 (55.7)	27 (44.3)		
Para II and above	72 (60.0)	48 (40.0)		
History of Abortion			1.937	0.164
Yes	16 (55.2)	13 (44.8)		
No	147 (61.0)	94 (39.0)		
History of pregnancy complications			5.596	**0.018**
Yes	24 (49.0)	25 (51.0)		
No	139 (62.4)	82 (37.6)		
Pregnancy recognition			0.268	0.605
Urine test	82 (58.2)	59 (41.8)		
Missing periods	81 (62.8)	48 (37.2)		
Planned pregnancy			4.445	**0.035**
Yes	122 (60.7)	79 (39.3)		
No	41 (59.4)	28 (40.6)		
Heard about ANC prior to pregnancy			0.777	0.378
Yes	137 (61.4)	86 (38.6)		
No	26 (55.3)	21 (44.7)		
ANC attendance in the past			8.284	**0.004**
Yes	103 (60.2)	68 (39.8)		
No	60 (60.6)	39 (39.4)		

Source: researcher computations from primary data
*Note * = p-value less than 0.05is significant*

The results in Table 4 reveal a significant relationship between gravidity and ANC attendance (P = 0.025). Women who have been pregnant more than once (multigravida) had a higher rate of adequate ANC attendance (42.4%) compared to first-time pregnant women (primigravida), who had a lower attendance rate (34.7%). This suggests that previous pregnancy experience increases the likelihood of attending ANC adequately. Parity, however, does not significantly correlate with low ANC attendance (P = 0.280). Women with no children (Para 0) had a lower attendance rate (36.0%) compared to those with one child

(Para I, 44.3%) and those with two or more children (Para II and above, 40.0%).

A history of abortion did not significantly impact ANC attendance (P = 0.164). Women with a history of abortion had a slightly higher attendance rate (44.8%) compared to those without such a history (39.0%). There was a significant association between a history of pregnancy complications and ANC attendance (P = 0.018), with women having a history of complications attending ANC more frequently (51.0%) compared to those without complications (37.6%).

The method of pregnancy recognition did not significantly affect ANC attendance (P = 0.605). Women who identified their pregnancy through a urine test had a marginally higher attendance rate (41.8%) compared to those who identified it through missed periods (37.2%), indicating that the method of recognition does not greatly influence ANC attendance. Planned pregnancies were significantly associated with lower ANC attendance (P = 0.035), with women having planned pregnancies showing a slightly lower attendance rate (39.3%) compared to those with unplanned pregnancies (40.6%). This indicates that the intent behind the pregnancy affects ANC attendance.

Prior awareness of ANC before pregnancy was not significantly related to low ANC attendance (P = 0.378). Women who knew about ANC before pregnancy had a lower attendance rate (38.6%) compared to those who did not (44.7%), suggesting that prior knowledge does not significantly impact attendance. Previous ANC attendance was significantly associated with current ANC attendance (P = 0.004), with past attendees showing a similar attendance rate (39.8%) to those who had not attended before (39.4%).However, the significant association indicates that previous experience with ANC services may reinforce the importance of attending ANC in subsequent pregnancies.

Table 5. Healthcare provider related factors associated with ANC attendance

Variable	Low ANC attendance			
	Yes	No		
N=270	N (%)	N (%)	X^2- Value	P-Value
Distance from home to HC			7.273	**<0.001**
< 60 minutes	44 (39.6)	67 (60.4)		
=, > 60 minutes	96 (60.4)	63 (39.6)		
ANC service availability at HC			4.019	**0.008**
Everyday	47 (65.3)	25 (34.7)		
Every day except weekend	69 (61.6)	43 (38.4)		
Specific days in a week	47 (54.7)	39 (45.3)		
Ambulance available at HC			2.986	0.672
Yes	66 (51.6)	62 (48.4)		
No	96 (68.1)	45 (31.9)		
Total cost expense at a single ANC Visit			4.598	0.270
< 2000 Frw	62 (66.0)	32 (34.0)		
=, > 2000 Frw	101 (57.4)	75 (42.6)		
Waiting time at ANC visit			0.789	3.728
<, = 2 hours	29 (74.4)	10 (25.6)		
> 2 hours	134 (58.0)	97 (42.0)		
Level of trust (client-provider relationship)			4.891	0.125
Strongly Agree	28 (57.1)	21 (42.9)		
Agree	57 (51.4)	54 (48.6)		
Neutral	60 (75.0)	20 (25.0)		
Disagree	16 (57.1)	12 (42.9)		
Strongly Disagree	2 (100.0)	0 (0.0)		

Source: researcher computations from primary data

*Note * = p-value less than 0.05is significant*

According to Table 5, several healthcare provider-related factors impacted Adequate Antenatal Care (ANC) attendance among the study participants. The distance from home to the health center was highly significantly associated with ANC attendance (P < 0.001). Women living within 60 minutes of the health center had a higher rate of Adequate ANC attendance (60.4%) compared to those living 60 minutes or more away (39.6%). This highlights the importance of proximity to healthcare facilities in promoting Adequate ANC attendance and suggests a need for more accessible or nearby healthcare options.

The availability of ANC services at the health center also showed a significant association with ANC attendance (P = 0.008). Women who had ANC services available on specific days of the week had the highest attendance rate (45.3%),

followed by those with services available daily except weekends (38.4%) and those with services available every day (34.7%). This indicates that having a specific and predictable schedule for ANC services could improve attendance rates.

The presence of an ambulance at the health center did not significantly impact ANC attendance (P = 0.672). Women at centers with an ambulance had a slightly higher attendance rate (48.4%) compared to those without an ambulance (31.9%), but this difference was not statistically significant.

The total cost of an ANC visit did not show a significant association with ANC attendance (P = 0.270). Women who spent 2000 Frw or more per visit had higher attendance rates (42.6%) compared to those who spent less than 2000 Frw (34.0%). This suggests that higher costs might be associated with better quality services or more comprehensive care, potentially encouraging more consistent attendance.

Waiting time at ANC visits had a significant association with ANC attendance (P = 3.728). Women who waited more than 2 hours had a higher attendance rate (42.0%) compared to those who waited 2 hours or less (25.6%). This unexpected result indicates that women might tolerate longer waiting times if they perceive the care as being of higher quality or more valuable.

The level of trust in the client-provider relationship did not significantly affect ANC attendance (P = 0.125). Women who expressed trust in their healthcare provider had higher attendance rates (48.6% for those who strongly agreed and 42.9% for those who agreed) compared to those who were neutral (25.0%) or disagreed (42.9%). Although trust is an important aspect of the healthcare experience, its impact on attendance rates in this sample was not statistically significant.

Table 6. Multivariate logistic regression analysis of factors associated with ANC attendance among the study participants

Factors (N=270)	*AOR*	*95% CI*	*P- Value*
Number of children			
< 3 (n=197)	1.4	1.2-1.6	**<0.001**
=, > 3 (n=73)	Reference		
Maternal education			
Illiterate	0.5	0.2-0.8	**0.01**
Incomplete primary	1.1	0.7-1.6	0.538
Complete primary	1.2	0.6-2.3	0.475
Incomplete secondary	0.8	0.5-1.2	0.436
Complete secondary	1.4	0.9-2.4	0.119
University	Reference		
Distance from home to HC			
< 60 minutes	Reference		
=, > 60 minutes	0.8	0.6-0.9	**0.006**
Gravidity			
Primigravida	Reference		
Multigravida	0.8	1.6-4.1	**<0.001**
History of pregnancy complications			
Yes	Reference		
No	0.8	0.6-0.9	**0.007**
Planned pregnancy			
Yes	1.7	1.5-2.0	**<0.001**
No	Reference		
ANC attendance in the past			
Yes	1.5	1.2-2.1	**0.001**
No	Reference		
ANC service availability at HC			
Everyday	1.4	1.2-1.6	**<0.001**
Every day except weekend	0.5	0.2-0.8	0.01
Specific days in a week	Reference		

The results of a multivariate logistic regression analysis to identify the factors associated with Adequate Antenatal Care (ANC) attendance among study participants are presented in Table 4.6 above. Women with fewer than three children are significantly more inclined to attend ANC compared to those with three or more children (AOR = 1.4, 95% CI = 1.2-1.6, P < 0.001). Illiterate women are significantly less likely to attend ANC compared to women with university education (AOR = 0.5, 95% CI = 0.2-0.8, P = 0.01). Women with planned pregnancies are significantly more likely to attend ANC compared to those with unplanned pregnancies (AOR = 1.7, 95% CI = 1.5-2.0, P < 0.001). Women living 60 minutes or more from the health center are less likely to attend ANC (AOR = 0.8, 95% CI = 0.6-0.9, P = 0.006), highlighting the impact of accessibility on healthcare utilization.

Multigravida women are significantly less likely to attend ANC compared to primigravida women (AOR = 0.8, 95% CI = 1.6-4.1, *P*< 0.001). This could indicate that women with multiple pregnancies may feel less need for ANC due to their previous experiences. Women without a history of pregnancy complications are less likely to attend ANC (AOR = 0.8, 95% CI = 0.6-0.9, *P* = 0.007), suggesting that those with past complications are more motivated to seek care.Women who have attended ANC in the past are significantly more likely to attend ANC during the current pregnancy compared to those who have not (AOR = 1.5, 95% CI = 1.2-2.1, *P* = 0.001). Availability of ANC services every day was associated with a higher likelihood of Adequate attendance (AOR = 1.4, 95% CI = 1.2-1.6, P < 0.001).

DISCUSSION

In this study, the participants were distributed across nine health centers, with the largest proportion attending Mataba Health Center (23.3%). The concentration of participants in specific centers, such as Mataba, may reflect better accessibility and perceived quality of services, as observed in similar studies from Ethiopia (Haftu, 2018). The majority of participants were aged 20-29 years (53.0%), aligning with other research that shows younger women, particularly those in their 20s, are more likely to attend antenatal care (ANC) services (Acup, 2022). This demographic is often characterized by a heightened awareness of maternal health needs and fewer competing responsibilities, which may facilitate more consistent ANC attendance.

Most women in the study had fewer than three children (73.0%), with a mean of two children (SD = 1.5). This finding mirrors trends in other studies, where younger mothers with fewer children are more likely to utilize ANC services. The correlation between fewer children and higher ANC attendance may be attributed to fewer household responsibilities and greater health awareness (Shibre et al., 2020). Additionally, a significant proportion of participants were married or cohabitating (76.7%). Marital status has been consistently linked to better ANC attendance, likely due to the support systems and financial stability that often accompany marriage (Akhtarul, 2022).

A notable 75.9% of participants were engaged in agriculture, indicating a predominantly rural and farming background. Women in agricultural sectors often face barriers to healthcare access, including time constraints and lower income levels, which are consistent with findings from other studies (Mgata, 2019). This rural background may also contribute to the relatively low ANC attendance observed in this study.

The study found that 39.6% of participants attended four or more ANC visits, including at least one in the first trimester, while 60.4% had low ANC attendance. This indicates a significant gap in achieving adequate ANC attendance, which is crucial for positive maternal and neonatal health outcomes (WHO, 2018). The rate of adequate ANC attendance in this study is lower than in other regions; for example, Ethiopia reported 52% (Teshome, 2020), and Kenya 47.6% (Alkhawaldeh, 2023). These disparities could be due to differences in healthcare infrastructure, socio-economic factors, and public health initiatives across regions (Akhtarul, 2022).

Several factors were significantly associated with low ANC attendance in this study. The number of children was inversely related to ANC attendance, with women having fewer than three children showing higher attendance rates ($p = 0.046$). This supports findings from Ghana and Kenya, where multiparous women may attend ANC less frequently due to perceived experience or time constraints (Wolde, 2019). Maternal education also played a crucial role, with women who had incomplete secondary education attending ANC more frequently than those with only primary education ($p = 0.031$). This association between higher educational levels and better health-seeking behavior is well-documented (Acup, 2022).

Distance from home to the health center was another critical factor ($p < 0.001$), with women living closer to health centers attending ANC more regularly. This finding is consistent with research from rural Bangladesh and Malawi, where distance and transportation challenges are significant barriers to healthcare access (Alkhawaldeh, 2023). Additionally, a history of pregnancy complications was associated with higher ANC attendance ($p = 0.018$), likely due to increased awareness and perceived need for regular monitoring (Dusingizimana, 2023).

This study offers valuable insights into ANC attendance patterns but has several limitations. The cross-sectional design limits causality determination between identified factors and ANC attendance. Self-reported data may introduce recall bias, especially regarding ANC visits and pregnancy history. The study's specific geographic focus limits its generalizability to other regions with different socio-economic and cultural contexts. Additionally, the study did not investigate the influence of healthcare provider attitudes on ANC attendance, an area worth exploring in future research. Lastly, while it identifies associations with low ANC attendance, it lacks exploration into the qualitative reasons behind missed ANC visits.

CONCLUSION

In conclusion, the study assessed the factors associated with low antenatal care (ANC) attendance among pregnant women attending the health centers of Nemba District Hospital in Gakenke District of Rwanda. The frequency of low ANC attendance among pregnant women was 60.4%. The factors identified to be associated with low ANC attendance were; the number of children, maternal education, maternal occupation, distance to health facility, gravidity, history of pregnancy complications, planned pregnancy, location of the health facility, ANC sevices availability and waiting time. Women who lived closer to healthcare centers and had access to ANC services on specific days of the week were more likely to attend Adequately. These findings underscore the multifaceted nature of ANC attendance, influenced by a combination of individual, social, and healthcare system factors.

DECLARATIONS

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Competing interest

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