

Factors that Influence Non-Adherence to Prenatal Consultations in Angolan Pregnant Women

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Abstract

Introduction: Despite substantial national efforts, maternal health indicators in Angola remain concerning. Antenatal care (ANC) coverage is currently at 69%, falling short of the national target of 90% outlined in the National Health Development Plan (2012-2025). Understanding the barriers to ANC adherence is crucial to guide public health strategies aimed at reducing maternal and perinatal morbidity and mortality.

Objective: This study aimed to analyze sociodemographic, economic, and clinical factors associated with non-adherence to antenatal consultations among postpartum women in Angola.

Methods: A retrospective, cross-sectional analytical study with a quantitative approach was conducted between April and July 2021 at a secondary-level maternal and child health center in Huambo Province. The sample comprised 81 postpartum women selected through simple random sampling. Data were collected via structured interviews and analyzed using descriptive statistics and chi-square tests, with statistical significance set at $p < 0.05$.

Results: Most participants were aged 21-30 years (49.3%), married (58%), and lived in urban areas (51.8%). A significant proportion reported a household income below 50,000 AKZ (79%) and unplanned pregnancies (71.6%). Educational level, place of residence, income, gestational complications, and family support were significantly associated with ANC adherence ($p < 0.05$). Conversely, age group, marital status, occupation, parity, and pregnancy planning were not statistically significant.

Conclusion: The study found that both socioeconomic and personal factors influenced ANC adherence. Strengthening education, expanding access in peri-urban areas, enhancing social support, and improving care for high-risk pregnancies are essential strategies to increase ANC coverage. These findings provide valuable insights for designing more equitable maternal health policies in Angola.

Keywords: Antenatal care; maternal health; prenatal consultations; health equity; Angola

Abbreviations: ANC: Antenatal care; WHO: World Health Organization; PHC: Primary health care; SD: standard deviations

Introduction

The World Health Organization (WHO) envisions a world where all women and newborns receive high-quality care throughout pregnancy, childbirth, and the postnatal period. Antenatal care (ANC) serves as a crucial platform for delivering key maternal health services, including health promotion, screening, diagnosis, and disease prevention [1,2]. However, achieving these

goals depends significantly on improving pregnant women's adherence to ANC services.

The primary aim of ANC is to support pregnant women from the early stages of pregnancy and to reduce maternal and perinatal morbidity and mortality. This is achieved by adhering to international recommendations—such as those from the WHO—

that emphasize early initiation, universal coverage, regular monitoring, and integration with other preventive and curative services [2,3]. Furthermore, adherence to a minimum number of ANC visits is critical for ensuring positive health outcomes.

Maternal, neonatal, and child health indicators are widely recognized as key markers of national development and population well-being. Despite substantial efforts to enhance reproductive health services, Angola continues to face significant challenges. Recent data show that maternal and child mortality rates remain unacceptably high, with ANC coverage stagnating at around 69%—far below the national target of 90% by 2025 [4,5].

Primary health care (PHC)-based systems have demonstrated superior performance in terms of equity, access, cost-effectiveness, and population health outcomes when compared to hospital-centric models [1,6]. Within Angola's National Health Plan, PHC is viewed as essential to promoting healthy behaviors and delivering accessible, dignified, and people-centered care [6,7].

Adherence to health services is a multifaceted concept shaped by social, economic, psychological, and structural factors within the health system. It encompasses an individual's commitment to diagnostic, preventive, or therapeutic measures, including regular attendance at scheduled health consultations [8].

In Angola, maternal and infant mortality remain pressing public health concerns—challenges that could be mitigated through timely and adequate ANC [5]. Although several studies from low- and middle-income countries have identified barriers and facilitators to ANC adherence, there is still a notable research gap in the Angolan context.

This study, therefore, aims to analyze the factors associated with non-adherence to ANC among pregnant women in Angola, contributing to the evidence base necessary to enhance maternal health services in similarly low-resource settings.

Methods

Study Design and Setting

The study was conducted between April and July 2021. During this period, 102 postpartum women were admitted to the immediate postpartum ward, and 81 of them consented to participate. A simple random probability sampling method was used to select participants present in the ward during data collection.

Inclusion and Exclusion Criteria

Eligible participants included postpartum women aged 15 years or older who were present in the postpartum ward during the data collection period and provided informed consent. Exclusion criteria were: absence of an ANC record booklet, failure to attend scheduled ANC appointments, inability to comprehend the study objectives, and refusal to provide informed consent.

Ethical Considerations

All ethical and bioethical principles were strictly observed. The study protocol and data collection instrument were reviewed and approved by the Scientific Committee of the Health Training Center at Clínica Multiperfil (Ref. CC/0345/CFS/2021). Formal authorization was also obtained from the administrative board of the Maternal and Child Health Centre (Ref. CIMECA/DC/0006/2021). Participants were fully informed about the scientific purpose of the study. Data confidentiality was maintained, and all participants provided written informed consent before data collection.

Data Collection and Analysis

Data were initially entered into Microsoft Excel 2017 and later imported into IBM SPSS Statistics version 21 for analysis. ANC adherence (the dependent variable) was categorized according to WHO 2016 guidelines as follows: high adherence (≥ 8 visits), moderate adherence (6-7 visits), and low adherence (≤ 3 visits). Independent variables—including sociodemographic, obstetric, and clinical factors—were categorized for intergroup analysis and correlated with ANC adherence levels. Descriptive statistics were used for data summarization. Categorical variables were reported as frequencies and percentages, while normally distributed continuous variables were expressed as means and standard deviations (SD).

Cross-tabulation and Pearson's chi-squared test (χ^2) were used to examine associations between ANC adherence and the independent variables. All statistical analyses were two-tailed, and significance was set at $p < 0.05$.

Results

Table 1 presents the distribution of participants by age group, marital status, and education level, and their respective associations with antenatal care (ANC) adherence, as assessed using the chi-squared test.

Women aged 21-30 years had the highest average number of ANC visits (5.0 ± 1.8) and the highest proportion of moderate adherence (38%). Conversely, participants aged over 40 had the lowest average number of consultations (2.5 ± 1.3), with all classified as having low adherence. However, the association between age group and ANC adherence was not statistically significant ($p = 0.255$). Regarding marital status, married women reported a slightly higher mean number of visits (4.7 ± 1.9) compared to single (4.6 ± 1.4) and divorced participants (3.0 ± 1.0). Still, no statistically significant association was found between marital status and adherence ($p = 0.121$).

In contrast, a significant association was found between education level and ANC adherence ($p = 0.004$). Women with higher education had the highest mean number of visits (7.7 ± 1.5), with 100% achieving moderate adherence. Illiterate women had

the lowest average (2.5±0.8), with all classified as low adherence. Those with secondary education showed intermediate values (mean=5.0±1.5), with 41% moderate adherence. These findings suggest that education is a critical determinant of ANC adherence,

highlighting the importance of maternal education in promoting health service utilization. Although age and marital status did not reach statistical significance, lower adherence trends among older and divorced women point to potential vulnerabilities that

merit attention in future maternal health strategies. Table 1

Table 1: Distribution of antenatal care (ANC) adherence by age group, marital status, and education level among postpartum women (n=81)

Variable	Subtotal n (%)	Low Adherence (≤5 visits) n (%)	Moderate adherence (≤5 visits) n (%)	Mean (SD) of ANC visits	χ^2	p value
Age group (years)					4.06	0.255
<20	19 (23.4)	15 (79.0)	4 (21.0)	4.7 (1.0)		
21-30	40 (49.3)	25 (62.5)	15 (37.5)	5.0 (1.8)		
31-40	18 (22.2)	14 (77.8)	4 (22.2)	4.3 (1.7)		
>40	4 (4.9)	4 (100.0)	0 (0.0)	2.5 (1.3)		
Marital status					2.44	0.121
Single	31 (38.3)	24 (77.4)	7 (22.6)	4.6 (1.4)		
Divorced	3 (3.7)	3 (100.0)	0 (0.0)	3.0 (1.0)		
Married	47 (58.0)	31 (66.0)	16 (34.0)	4.7 (1.9)		
Education level					13.53	0.004**
Illiterate	6 (7.5)	6 (100.0)	0 (0.0)	2.5 (0.8)		
Primary (1st cycle)	45 (55.5)	36 (80.0)	9 (20.0)	4.5 (1.4)		
Secondary (2nd cycle)	27 (33.3)	16 (59.3)	11 (40.7)	5.0 (1.5)		
Higher education	3 (3.7)	0 (0.0)	3 (100.0)	7.7 (1.5)		

Note: Statistical analysis performed using the chi-square test. Significance level set at p<0.05.

Table 2 explores the relationship between ANC adherence and residence, occupation, and monthly household income.

Table 2: Distribution of antenatal care (ANC) adherence by residence, occupation, and monthly household income (n=81)

Variable	Subtotal n (%)	Low Adherence (≤5 visits) n (%)	Moderate Adherence (≤5 visits) n (%)	Mean (SD) of ANC visits	χ^2	p value
Residence					13.95	<0.001**
Urban	42 (51.8)	22 (52.4)	20 (47.6)	5.5 (1.5)		
Peri-urban	39 (48.1)	36 (92.3)	3 (7.7)	3.7 (1.3)		
Occupation					15.35	0.018
Farmer	5 (6.1)	5 (100.0)	0 (0.0)	3.2 (0.4)		
Street vendor	22 (27.1)	18 (81.8)	4 (18.2)	4.3 (1.2)		
Domestic worker	22 (27.1)	16 (72.7)	6 (27.3)	4.4 (0.8)		
Nurse	1 (1.2)	1 (100.0)	0 (0.0)	5.0 (0.0)		
Student	17 (20.9)	12 (70.6)	5 (29.4)	5.0 (1.4)		
Unemployed	3 (3.7)	3 (100.0)	0 (0.0)	3.0 (1.0)		
Teacher	11 (13.5)	3 (27.3)	8 (72.7)	6.2 (1.4)		
Household income					14.74	0.001**
<50,000 Kz	64 (79.0)	52 (81.3)	12 (18.7)	4.2 (1.5)		
50,000-100,000 Kz	8 (9.8)	2 (25.0)	6 (75.0)	6.0 (1.9)		
>100,000 Kz	9 (11.1)	4 (44.4)	5 (55.6)	6.3 (1.9)		

Note: Statistical analysis performed using the chi-square test. Significance level set at p<0.05.

A statistically significant association was observed for place of residence ($p < 0.001$). Urban residents had a higher mean number of ANC visits (5.5 ± 1.5), with a balanced distribution between low (52%) and moderate (48%) adherence. Women in peri-urban areas demonstrated markedly lower adherence (mean = 3.7 ± 1.3), with 92% falling under the low adherence category. No significant association was found between occupation and ANC adherence ($p = 0.891$), although disparities were noted. Teachers reported the highest average visits (6.2 ± 1.4) and a predominance of moderate adherence (73%), while farmers and unemployed women had exclusively low adherence, with means of 3.2 ± 0.4 and 3.0 ± 1.0 visits, respectively.

Household income showed a strong association with ANC adherence ($p = 0.001$). Participants earning below 50,000 Kz per month had predominantly low adherence (81%) and a mean of 4.2 ± 1.5 visits. In contrast, those earning between 50,000-100,000 Kz and over 100,000 Kz reported higher adherence, with means of 6.0 ± 1.9 and 6.3 ± 1.9 visits, respectively. These results underscore the substantial influence of socioeconomic conditions—especially residence and income on ANC adherence, emphasizing the need for equity-focused public health policies targeting underserved populations. (Table 2)

Table 3 examines ANC adherence in relation to obstetric history, pregnancy planning, complications during pregnancy, and family support.

Table 3: Association between prenatal care adherence and obstetric history, pregnancy planning, complications, and family support (n=81)

Variable	Subtotal n (%)	Low Adherence (≤ 5 visits) n (%)	Moderate adherence (≥ 6 visits) n (%)	Mean (SD) of ANC visits	χ^2	p value
Number of pregnancies					0.01	0.917
<i>Primiparous</i>	17 (20.9)	12 (70.6)	5 (29.4)	5.0 (± 1.7)		
<i>Multiparous</i>	64 (79.1)	46 (71.9)	18 (28.1)	4.5 (± 1.6)		
Pregnancy planning					0.41	0.522
<i>Yes</i>	23 (28.3)	15 (65.2)	8 (34.8)	4.9 (± 1.7)		
<i>No</i>	58 (71.6)	43 (74.1)	15 (25.9)	4.5 (± 1.6)		
Complications during pregnancy					7.88	0.005**
<i>Yes</i>	36 (44.5)	31 (86.1)	5 (13.9)	3.8 (± 1.5)		
<i>No</i>	45 (55.5)	27 (60.0)	18 (40.0)	5.3 (± 1.5)		
Family support					7.83	0.005**
<i>Yes</i>	47 (58.0)	28 (59.6)	19 (40.4)	5.2 (± 1.5)		
<i>No</i>	34 (41.9)	30 (88.2)	4 (11.8)	3.9 (± 1.3)		

Note: Statistical analysis performed using the chi-square test. Significance level set at $p < 0.05$.

Discussion

This study demonstrates that sociodemographic, obstetric, and social support factors significantly influence antenatal care (ANC) adherence among pregnant women in Angola. The key variables associated with lower adherence included place of residence, household income, educational attainment, maternal

No statistically significant association was observed for number of pregnancies ($p = 0.917$). Primigravida women had a mean of 5.0 ± 1.7 visits, with 29% showing moderate adherence, while multigravidas (79.1% of the sample) had a mean of 4.5 ± 1.6 visits, with 28% moderate adherence. Similarly, pregnancy planning was not significantly associated with adherence ($p = 0.522$). Women with planned pregnancies had a slightly higher mean number of visits (4.9 ± 1.7) compared to those with unplanned pregnancies (4.5 ± 1.6).

In contrast, complications during pregnancy were significantly associated with ANC adherence ($p = 0.005$). Women reporting complications had a lower mean number of visits (3.8 ± 1.5), with 86% showing low adherence. Those without complications had a higher average (5.3 ± 1.5), with 40% demonstrating moderate adherence. Family support also showed a significant association with adherence ($p = 0.005$). Participants with family support had an average of 5.2 ± 1.5 visits, with 40% achieving moderate adherence. In comparison, those without support averaged 3.9 ± 1.3 visits, with 88% classified as low adherence.

These findings highlight the impact of social and clinical factors on ANC utilization. In particular, gestational complications and the absence of family support are key predictors of poor adherence, reinforcing the importance of social support structures and timely clinical monitoring during pregnancy. (Table 3)

age, pregnancy planning, gestational complications, and family support.

Women residing in suburban or peripheral areas showed notably lower adherence, averaging only 3.7 visits compared to 5.5 among urban residents ($p < 0.001$). This pattern is consistent with previous research. Noronha et al., (2012) and Darmont et

al., (2010), which identifies geographic distance, inadequate infrastructure, and transportation limitations as barriers to ANC access [9,10]. More recent studies confirm that geographic disparities remain a major concern in low- and middle-income settings [2,11].

Household income emerged as a strong determinant of adherence ($p=0.001$). Low-income women (<50,000 Kz/month) had an 81% rate of low adherence, whereas those earning over 100,000 Kz attended, on average, six or more consultations. These findings support the notion that socioeconomic vulnerability restricts healthcare access [12]. Additionally, indirect costs—such as transportation and medications—pose further barriers [5,13,14].

Although marital status was not statistically significant ($p=0.121$), married women showed slightly higher ANC utilization. This may reflect the logistical and emotional benefits of spousal support [12,15,16]. In contrast, single and divorced women may experience heightened psychosocial stress and reduced assistance, potentially hindering healthcare engagement.

Family support was positively associated with ANC adherence ($p=0.005$). Women with support averaged 5.2 visits versus 3.9 for those without. These findings align with literature recognizing social support networks as critical enablers of healthcare access, aiding with logistics, motivation, and comprehension of medical advice [1,17,18].

Education level stood out as one of the most impactful factors. All participants with tertiary education adhered to the recommended number of visits, while illiterate women averaged only 2.5. This underscores how educational attainment promotes health literacy and autonomy in navigating healthcare systems [13,19]. Maternal age also influenced ANC adherence. Women over 40 years reported the lowest average visits (2.5), though this was not statistically significant ($p=0.255$). Prior studies suggest that both adolescent and older mothers may face increased barriers due to stigma, perceived risk, or caregiving responsibilities [12,17].

Unplanned pregnancies were not significantly associated with adherence ($p=0.522$), though affected women had slightly fewer visits [15]. This is in line with research linking unintended pregnancies to delayed or infrequent ANC, particularly among multiparous or socioeconomically disadvantaged women [2,14,20]. Parity was also not statistically significant ($p=0.917$). However, primigravidas slightly outperformed multigravidas in visit count. Similar trends in the literature [15], indicate that experienced mothers may deprioritize ANC, perceiving it as redundant. Unexpectedly, women reporting pregnancy-related complications had lower adherence ($p=0.005$). This counterintuitive result may reflect gaps in healthcare system responsiveness or lack of specialized care for high-risk pregnancies [20,21].

Overall, this study highlights the multifactorial nature of ANC adherence and reinforces the need for integrated, equity driven strategies. Interventions should prioritize vulnerable subgroups, including women with limited education, low income, or insufficient support, and embed risk monitoring into standard maternal health services.

Conclusion

This study concludes that sociodemographic factors such as educational level, as well as economic (residential area and household income) and personal variables (pregnancy complications and family support), were significantly associated with antenatal care (ANC) attendance ($p<0.05$). Conversely, other sociodemographic factors (age group and marital status), economic aspects (occupation), and personal variables (number of pregnancies and pregnancy planning) showed no statistically significant association with ANC adherence ($p>0.05$). These findings highlight the need for targeted interventions by the Ministry of Health and multidisciplinary teams to strengthen maternal and child health services and promote greater ANC attendance in Angola.

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Patient and Public Involvement

All participants and/or their legal guardians were informed about the study's objectives and procedures. Written informed consent was obtained from each participant prior to the collection of data and/or blood samples.

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Competing Interests

The authors declare no competing interests. The funders had no role in the design of the study; in the collection, analysis, or interpretation of data; in the writing of the manuscript; or in the decision to submit the manuscript for publication.

Author Contributions

Data curation: ENMS, MMNS; Formal analysis: ENMS, MMNS, CLF; Investigation: ENMS, MMNS, CLF; Project administration: ENMS, MMNS, CLF; Supervision: ENMS, MMNS; Validation: ENMS, MMNS; Writing-original draft: ENMS, MMNS, CLF; Writing-review

& editing: ENMS, MMNS, CLF; All authors have read and approved the final version of the manuscript.

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