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Association of National Health Insurance Scheme Card Validity and Socio-demographic Characteristics with Recommended Antenatal Care Contacts among Postpartum Women in Kassena-Nankana Municipality: A Facility-Based Cross-Sectional Study

Mubaric Yakubu

myakubu@utas.edu.gh

University of Technology and Applied Sciences

Simon Sagindini Alhassan

University of Technology and Applied Sciences

Atibire Emmanuella

University of Technology and Applied Sciences

Christiana Laari Talikyarl

University of Technology and Applied Sciences

Saviour Avoka Atakadugu

University of Technology and Applied Sciences

Yula Salifu

University of Ghana

James Akazili

University of Technology and Applied Sciences

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Abstract

Background

Antenatal care is a key intervention for enhancing pregnancy outcomes as maternal health remains a public health concern in sub-Saharan Africa. Although Ghana's National Health Insurance Scheme offers free maternal healthcare services to eliminate financial obstacles, ANC attendance in rural areas like Kassena-Nankana Municipal remains below ideal levels. This study assessed the association of national health insurance scheme card validity and socio-demographic characteristics with recommended antenatal care contacts among postpartum women in kassena-nankana municipality

Methods

The study employed a facility-based cross-sectional design among 290 postpartum women who had given birth in the previous 12 months prior to the study. A structured questionnaire was used to gather data with the aid of electronic kobo collect app. Descriptive statistics, Fisher's exact tests, chi-square tests, and binary logistic regression were used to analyze the data using SPSS version 27.

Results

The study revealed that only 46.9% of women in Kassena-Nankana Municipal achieved the WHO-recommended minimum number of ANC visits (8 times or more). Even though almost all the participants (97.6%) possessed valid NHIS cards, having a valid card was associated (unadjusted) with completing the recommended visits (p = 0.016): NHIS validity, and all women with invalid cards failed to meet the required visits. After adjusting for confounders, wealth status and educational level emerged as the predictors of ANC completion. Women with no formal education were 96% lower odds of completing the recommended ANC visits compared to those with tertiary education [AOR = 0.04; 95% CI: 0.02–0.12, p = 0.001], while women from rich households were 3.72 times more likely to complete the recommended number of visits than those from poor households [AOR = 3.72; 95% CI: 3.05–5.14, p = 0.001]

Conclusion

Less than half of expectant mothers completed the WHO-recommended minimum of eight or more ANC visits. NHIS enrolment alone did not ensure optimal ANC attendance, as socio-demographic factors have a major impact on ANC attendance. Socio-economic barriers must be addressed with targeted interventions focusing on disadvantaged women to improve equitable access to maternal healthcare services in Ghana

Introduction

Maternal mortality remains a serious public health concern worldwide, and Ghana is no exception. According to latest estimates, about 260,000 women died from pregnancy-related complications in from 2000–2020, translating to roughly 700 women daily (WHO, UNICEF, UNFPA, World Bank Group, UNDESA/Population Division, 2025). These alarming statistics call for more efforts to mitigate the situation, as highlighted in the Sustainable Development Goals (SDG 3.1), which seeks to reduce global maternal mortality ratio to fewer than 70 per 100, 000 live births by 2030 (UNICEF, 2019; WHO, 2019). One of the methods to overcome this challenge in Sub-Saharan Africa is the timely use of antenatal care services (Okedo-Alex et al., 2019).

According to Apanga & Kumbeni (2021), antenatal care provides a unique opportunity to identify and treat pregnancy-related complications, as pregnant women may develop health complications such as pre-eclampsia, gestational diabetes, stillbirth and miscarriage (WHO, 2016). The World Health Organization recommends at least eight antenatal care visits throughout pregnancy, acknowledging the essential contribution of these visits to maternal and newborn health, including prevention of stillbirth (de Jongh et al., 2016; WHO, 2016). These appointments offer timely interventions to ensure optimal health outcomes and should start ideally in the first trimester to maximize their effectiveness (WHO, 2016)

In many low-income countries, financial constraints, particularly, out-of-pocket expenditures continue to impede access to maternal health services (Debie et al., 2025). To address this challenge, several countries have instituted the Health Insurance Scheme to cater for the health needs of the population. In 2004, the Government of the Republic of Ghana implemented the National Health Insurance Scheme (NHIS), extending comprehensive medical coverage to pregnant women at no cost (Dalinjong et al., 2017).

While national-level studies show a positive association between NHIS and ANC attendance (Angko et al., 2023), antenatal care attendance in rural areas like Kassena-Nankana Municipal remains low. Analysis of the 2022 Ghana Demographic and Health Survey data revealed that only 42.0% of women in the Upper East Region met the required eight or more antenatal care contacts (Ghana Statistical Service (GSS) and ICF, 2024). The number of women completing the prescribed number of ANC appointments in the Northern part of Ghana falls far below the national targets, and maternal health outcomes remain poor and highest in the country (Aboagye et al., 2024). The discrepancy between NHIS policy aims and antenatal care attendance raises serious questions in Kassena-Nankana Municipal.

The existing literature has limited evidence that quantitatively assess the association between socio-demographic characteristics, NHIS card validity, and ANC attendance while considering the unique socioeconomic and geographical influences of a low resource setting like Kassena-Nankana Municipal. Therefore, it remains unclear whether enrolment in the scheme translates into antenatal care utilization in Kassena-Nankana Municipal, which is important for the achievement of Universal Health Coverage in Ghana. Therefore, this study is aimed at assessing the association between socio-demographic

characteristics, NHIS card validity, and optimal ANC attendance among postpartum women in Kassena-Nankana Municipal.

Materials and methods

Study area

The study was conducted in Kassena-Nankana Municipal in the Upper East Region of Ghana. The Municipal population is 99,895 (Ministry of Local Government, 2022), with the majority residing in rural areas. The population is dominated by Kassena and Nankana ethnic groups, with agriculture as the main economic activity. Most of the residents are subsistence farmers, with high rates of poverty and low educational attainment, among women. The choice of Kassena-Nankana as the study setting is justified by the low-resource, documented low ANC, high poverty and the limited studies examining the association between NHIS membership and ANC attendance.

Study design and population

A facility-based cross-sectional study was conducted among 290 postpartum women aged 15–49 years who delivered in the past year before the study and attended ANC at selected health facilities. Women who were critically ill, had cognitive impairments, and were non-residents were excluded.

Sample size and sampling technique

The sample size was calculated using the Cochran formula ($n = Z^2pq/d^2$) for a cross-sectional study estimating proportions procedure, where n = the required sample size, z=standard normal deviation at 95% confidence level (1.96), p=proportion of women completing recommended ANC visits, q = 1-p, and d=margin of error set (0.05). A sample size of 350 was estimated for the study with a response rate of 82.9%. A multi-stage sampling was employed: health facilities were stratified by the level of care and randomly selected, followed by systematic random sampling from postnatal registers.

Instruments and data collection process

A structured questionnaire adapted from the Ghana Demographic and Health Survey (2022) was used. The English questionnaire was translated independently into Kasem and Nankani by two native speakers who are fluent in English. Two different translators then back-translated the local language versions into English. The original and back-translated versions were compared by a third bilingual expert. Discrepancies were resolved through consensus discussion. The questionnaire was pretested on approximately 5% of the total sample size (about 17 participants) who were not included in the study. This sample was sufficient to assess the overall clarity, consistency, and flow. Data was gathered across the selected health facilities for a period of 3 weeks.

Three trained research assistants with in-depth experience in community-based research and fluency in the local languages were recruited and trained to help in data collection. They received training which covered the study objectives, ethics, interview skills, and administration of questionnaires. Each research assistant was supervised by the lead investigator. Ten percent of all interviews were observed by the supervisor for quality and consistency. Interviews were conducted privately within the health facilities to ensure confidentiality. Weekly field debriefing meetings were used to review data completeness, address challenges, and ensure adherence to the protocol.

Measurement of variables

The dependent variable was ANC attendance (completed ≥ 8 visits = 1, < 8 visits = 0). The independent variable was NHIS card validity during pregnancy and socio-demographic characteristics such as age, education, wealth status, occupation, and marital status.

Data analysis

Data were analysed using SPSS version 27. Descriptive statistics, chi-square/Fisher's exact tests, and binary logistic regression were employed. Statistical significance was set at < 0.05. Descriptive statistics were used to describe participants' characteristics and were presented as frequencies and percentages. The association between ANC visits and the independent variables were assessed using the Pearsons' Chi-square/Fishers' Exact tests. Multicollinearity was assessed in the independent variables using the variance inflation factor (VIF). Variables with VIF < 10 were considered not to have collinearity issues. Variables with VIF < 10 were included in a bivariable logistic regression model. Qualified variables were included in the multiple logistic regression model and adjusted for confounders, and were presented as adjusted odds ratios (aOR) with their corresponding 95% CI. Variables with p-values ≤ 0.05 (both sides) were considered significant determinants. NHIS card validity was assessed using Fisher's exact test because of the small number of participants with invalid NHIS cards. Because only seven participants had invalid cards, the variable was not included in the multivariable logistic regression model to avoid unstable estimates associated with sparse data and complete separation.

Results

Socio-demographic characteristics of participants

The **Table 1** below highlights the socio-demographic characteristics of the respondents. The mean age of the participants was 28.79 years. Majority were married (84.5%), had no formal education (34.5%), were unemployed (35.5%), and belonged to the middle wealth category (49. 7%). Most were Christians (81.0%) and of Kassena ethnicity (58.3%)

Table 1: Socio-demographic characteristics of participants

Variable	Frequency (n)	Percentage (%)
Age group		
<25 years	54	18.6
25-29 years	119	41.0
30-34 years	81	27.9
≥35 years	36	12.4
Marital status		
Married	245	84.5
Cohabiting	23	7.9
Single	21	7.2
Divorced	1	0.3
Educational level		
No formal education	100	34.5
Primary	24	8.3
JHS	44	15.2
SHS	66	22.8
Tertiary	56	19.3
Occupation		
Unemployed	103	35.5
Trader	92	31.7
Farmer	25	8.6
Formal employment	46	15.9
Others	24	8.3
Wealth status		
Poor	49	16.9
Middle	144	49.7

Rich	97	33.4
Religion		
Christianity	235	81.0
Islam	50	17.2
Traditional	5	1.7
Ethnicity		
Bulsa	11	3.8
Dagaati	10	3.4
Dagomba	5	1.7
Kassena	169	58.3
Nankana	48	16.6
Others	47	16.2

Prevalence of ANC Completion

The prevalence of completing the WHO-recommended eight ANC visits was 46.9%, while 53.1% did not complete the required visits. The results are presented in figure 1.

Figure1 Prevalence of Completion of Recommended ANC Visits

Proportion of women with valid NHIS cards

All participants were enrolled in NHIS. However, 97.6% had valid cards during pregnancy, while 2.4% had invalid cards. **(Table 2)**.

Table 2: Proportion of Women with Valid NHIS Card

Variable	Frequency (n)	Percentage (%)
Registered under NHIS	290	100
Had a valid NHIS card	283	97.6
Had invalid NHIS card	7	2.4

Association between NHIS and ANC attendance

A Fisher's Exact showed a significant association between validity of NHIS and recommended ANC attendance with a p-value of 0.016. Among participants who completed recommended ANC visits, 48.1% had their NHIS card valid, while all those whose NHIS cards were invalid did not complete the recommended ANC attendance. (table 3).

Table 3: Association between NHIS card Validity and completion of Recommended ANC visits

Variable	Category	Completed ANC visits n(%)	Did not complete ANC visits n(%)	Test statistic	P-value
Card validity	Yes	136 (48.1)	147 (51.9)	Fisher's Exact test	0.016
	No	0 (0.0)	7 (100.0)		

Socio-demographic factors influencing ANC completion

Educational level, occupation, and wealth status were significantly associated with ANC completion ($p<0.05$). ANC completion increased with education (from 19% with no formal education to 83.9% with tertiary education), formal employment (71.7% vs 28% among farmers), and wealth status (from 25% among poor to 72.2% among rich). (table 4).

Table 4: Socio-demographic factors influencing ANC completion

Variable	Category	Completed ANC visits (%)	Did not complete ANC visits (%)	Test statistic	χ^2 /**F**	P-value
Age	<25 years	37 (42.5)	50 (57.5)	Chi-Square test	1.04	0.794
	25-29 years	41 (47.7)	25 (52.3)			
	30-34 years	35 (50.0)	35 (50.0)			
	≥35 year	23 (48.9)	24 (51.1)			
Marital status	Cohabiting	9 (39.1)	14 (60.9)	Fisher's Exact test	2.27	0.527
	Divorced	0 (0.0)	1 (100)			
	Married	119 (48.6)	126 (51.4)			
	Single	8 (38.1)	13 (61.9)			
Educational level	No formal education	19 (19.0)	81 (81.0)	Chi-Square test	68.74	0.001
	Primary	10 (41.7)	14 (58.3)			
	J.H.S	19 (43.2)	25 (56.8)			
	S.H.S	41(62.1)	25 (37.9)			
	Tertiary	47 (83.9)	9 (16.1)			
Occupation	Farmer	7 (28.0)	18 (72.0)	Chi-Square test	21.7	0.001
	Formal employment	33 (71.7)	13 (28.3)			
	Others	16 (66.7)	8 (33.3)			
	Trader	36 (39.1)	56 (60.9)			
	Unemployed	44 (42.7)	59 (57.3)			
Ethnicity	Bulsa	6 (54.5)	5 (45.5)	Fisher's Exact test	4.89	0.431
	Dagaati	5 (50.0)	5 (50.0)			
	Kassena	83 (49.1)	86 (50.9)			
	Nankana	17 (35.4)	31 (64.6)			
	Others	24 (51.1)	23 (48.9)			

Religion	Christianity	111 (47.2)	124 (52.8)	Fisher's Exact test	1.35	0.571
	Islam	24 (48.0)	26 (52.0)			
	Traditional	1 (20.0)	4 (80.0)			
Wealth status	Poor	12 (25.0)	36 (75.0)	Chi-Square test	40.01	0.001
	Middle	53 (36.8)	91 (63.2)			
	Rich	70 (72.2)	27 (27.8)			

Socio-demographic predictors of ANC completion

After adjusting for confounders, educational level and wealth status remained independent predictors of ANC completion. Women with no formal education were 96% less likely to complete ANC compared to those with tertiary education [AOR=0.04; 95% CI: 0.02-0.12, p=0.001]. Women from rich households were 3.72 times more likely to complete ANC compared to the poor [AOR=3.72; 95% CI: 3.05-5.14, P=0.001]. (table 5)

Table 5: Socio-demographic predictors of ANC completion

Variable	Category	AOR	CI (95%)	P-value
Educational level	J.H.S	0.14	0.09-0.39	0.001
	No formal education	0.04	0.02-0.09	0.001
	Primary	0.13	0.04-0.43	0.001
	S.H.S	0.32	0.12-0.84	0.020
	Tertiary	Ref	Ref	
Occupation	Farmer	1.12	0.38-3.32	0.84
	Formal employment	1.06	0.42-2.68	0.896
	Others	1.59	0.53-4.75	0.404
	Trader	1.31	0.68-2.51	0.419
	Unemployed	Ref	Ref	
Wealth status	Poor	Ref	Ref	
	Middle	1.75	0.84-3.65	0.137
	Rich	3.72	3.05-5.14	0.001

AOR= Adjusted odds ratio, JHS= Junior High School, SHS= Senior High School, CI= Confidence Interval, Ref= Reference category

Discussion

The study examined the association between socio-demographic characteristics, NHIS card validity, and ANC attendance among pregnant women in Kassena-Nankana Municipal, Navrongo. The study found a prevalence of 46.9% for achieving the recommended ANC visits, which is slightly above the regional prevalence of 42% (Ghana Statistical Service (GSS) and ICF, 2022) which demonstrates that meeting the updated WHO-recommended minimum of eight ANC contacts remains a substantial challenge. The observed differences could be attributed to differences in study population and sampling design used in the respective studies. However, this findings is consistent with current data showing that a significant number of women in Sub-Saharan Africa do not meet the WHO-recommended minimum of eight ANC appointments (Worku et al., 2025). More than half of pregnant women failing to achieve the recommended ANC visits raises the risk of maternal and neonatal mortality by failing to detect potentially fatal conditions including preeclampsia and anaemia.

Among women included in this facility-based study, 97.6% reported having a valid NHIS card during their most recent pregnancy, with only 2.4% having invalid cards. The current findings from the study are comparable with research conducted in Ghana, which revealed significant NHIS enrollment among pregnant women owing to the free maternity healthcare policy in the country. For example, Ameyaw et al. (2021) found that premium exemption policy extremely increased NHIS registration among pregnant women, enhancing access to maternal healthcare services such as antenatal care. Also, analysis of the Ghana Demographic and Health Survey indicated that NHIS coverage among women in the reproductive age category remains comparatively high compared to several countries in Sub-Saharan Africa.

The high validity seen in the study could also be attributed to improved public awareness of NHIS benefits, ongoing community sensitization by healthcare personnel, and the availability of NHIS registration offices in many districts. Furthermore, health facilities typically encourage women to register or renew their NHIS cards during their first antenatal care appointment, thus improving insurance coverage. Despite the high number of NHIS cards validity, more than half of the participants failed to complete the recommended ANC appointments.

The findings suggest that NHIS card validity was associated with completion of the recommended ANC contacts. This finding particularly supports the primary goal of the National Health Insurance Scheme, which is to promote access to vital healthcare services by eliminating financial obstacles. A valid NHIS card allows pregnant women to obtain antenatal care services without having to pay for the services, encouraging consistent attendance throughout the pregnancy period. Financial protection is especially crucial for women in low-income families, since healthcare expenditures can otherwise delay or restrict access to antenatal care services.

The findings from this study are also consistent with Ghanaian research that showed insured women were more likely to start their ANC appointments and attend more visits than their peers who are uninsured. Women enrolled into NHIS with valid cards had higher chance of seeking preventive healthcare such as ANC services due to anticipation of fewer direct healthcare expenses and greater access to vital services (Kofinti et al., 2022). Although NHIS validity was associate with the recommended ANC attendance, more than half of women with valid NHIS cards did not complete the minimum number of visits, implying that, health insurance alone does not guarantee service utilization. The finding that all women who possessed invalid cards did not complete the necessary ANC visits is especially worrying. This may be explained by out-of-pocket expenses encountered and is consistent with the finding that uninsured pregnant women spend much more compared with insured pregnant women, and insurance status increases the number of ANC visits (Okoroh et al., 2018).

Educational attainment was found to be one of the strongest determinants of optimal ANC attendance and increased progressively with higher educational level, indicating a strong positive association between educational level and ANC utilization. Women with lower educational attainment had lower odds of completing the recommended ANC visits compared to those with tertiary education. This fact is in line with numerous studies carried out in Ghana and other low-and middle-income nations. For

example, Aboagye et al. (2022) found that women with high educational levels were far more likely than those with little or no education to meet the recommended ANC contacts. Likewise, (Raru et al., 2022) reported that women with higher educational attainment were more likely to have optimal ANC attendance compared with those with no education. This observed association could be explained by the fact that education increases women's health literacy, economic prospects, and awareness of pregnancy-related risks. The higher educational level of women enhances their chances of grasping recommendations from healthcare providers, seek prompt medical attention during pregnancy, and recognize the need of early ANC initiation. Furthermore, pregnant women with higher educational attainment are more likely to notice pregnancy-related complications such as pre-eclampsia and gestational diabetes based on health literacy (Tahira et al., 2024)

Wealth status was also significantly associated with the recommended ANC visits among pregnant women in Kassena-Nankana Municipal. Women who were affluent had the greatest ANC completion rate, while women who were poor recorded lower completion rate. This finding supports previous studies conducted in Sub-Saharan Africa. Compared to women from poor homes, affluent women had a considerably higher likelihood of achieving the WHO recommended minimum of eight antenatal care appointments (Adedokun & Yaya, 2020; Ekholuenetale et al., 2021; Opoku et al., 2026). Richer households are typically better to cover indirect healthcare expenditures, such as transport fares and lost income during ANC attendance, even though ANC services are free of charge under the NHIS. The fact that wealth-related differences still exist despite health insurance suggest that fee elimination alone is insufficient to fully eliminate inequalities in ANC utilization. This evidence supports the idea that, even under universal health coverage policies, social determinants of health, such as poverty, still have an impact on ANC services utilization.

Limitations of the study

Because participants were recruited from health facilities, women who had limited or no contact with health services may have been underrepresented. This may have resulted in selection bias and limits the generalisability of the findings to all women who gave birth in the municipality. The use of cross-sectional study design limited the ability to establish causal relationships. The study relied on self-reported data, which might have been subjected to bias. All participants were enrolled in NHIS scheme which limited the ability to compare the effect of insured and uninsured status on ANC attendance. Future studies should include other Municipalities, employ qualitative methods, and include uninsured women to better understand the determinants of ANC attendance in Ghana.

Conclusion

Less than half of postpartum women in Kassena-Nankana Municipality completed the WHO-recommended minimum of eight ANC contacts. NHIS card validity was significantly associated with ANC completion in the bivariate analysis, while educational attainment and household wealth remained associated with ANC completion after adjustment. These findings suggest that financial protection

through health insurance alone may not be sufficient to achieve equitable ANC utilization. Interventions addressing socioeconomic barriers, particularly among women with lower educational attainment and those from poorer households, may help improve completion of recommended ANC contacts.

Abbreviations

ANC- Antenatal care

AOR- Adjusted Odds Ratio

CI: Confidence interval

GSS- Ghana Statistical Service

JHS- Junior High School

NHIS- National Health Insurance Scheme

NHRCIRB- Navrongo Health Research Centre Institutional Review Board

S.H.S- Senior High School

SDG- Sustainable Development Goal

SPSS- Statistical Package for Social Sciences

UNFPA- United Nations Populations Fund

UNICEF- United Nations Children's Emergency Fund

WHO- World Health Organization

Declarations

Ethical approval and consent to participate

The Declarations of Helsinki revised in 2013 were strictly followed in the conduct of the study. First, the Navrongo Health Research Center Institutional Review Board approved the study protocol and granted ethical approval for the study (NHRCIRB873). Also, permission was sought from the Kassena-Nankana Municipal Health Directorate and the selected health facilities to undertake study. Participants signed a consent form after agreeing to participate and were informed that they could withdraw from the study anytime. Participants were assured of anonymity, privacy, and confidentiality of their responses. For participants younger than 16 years, informed consent was obtained from their parents or legal guardians, alongside the participants' assent where applicable and in accordance with the approved ethical protocol. Participation was voluntary, and participants were informed of their right to withdraw

from the study at any time. Sufficient information regarding the study's goals was given to the respondents. Similarly, they guaranteed data safety and appropriate data usage and storage. The study's respondents were made aware that taking part was completely voluntary and that they may withdraw at any time if they do so choose. All respondents were made aware that the public will have access to the study's findings. Only respondents who consented and met the study inclusion were sampled. All respondents' personal identifiers were deleted from the summarised data, ensuring confidentiality.

Consent for publication

Not applicable.

Clinical Trial Number

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

MY, SSA and JA drafted the research plan. MY, SSA, AE, CLT, and SAA wrote the manuscript. JA, MY, SSA and YS helped to edit and review the manuscript. MY, and SSA conducted statistical analyses and interpretation of the results. MY, JA, YS and SSA proofread the manuscript. All authors contributed to the discussion of the paper, read and approved the final version.

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Authors' Details

[1]Department of Epidemiology and Biostatistics, School of Public Health, University of Technology and Applied Sciences, Navrongo, Ghana

[2]Department of Population, Family, and Reproductive Health, School of Public Health, University of Technology and Applied Sciences, Navrongo, Ghana

[3]Department of Population, Family, and Reproductive Health, School of Public Health, University of Ghana,Accra, Ghana

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Figures

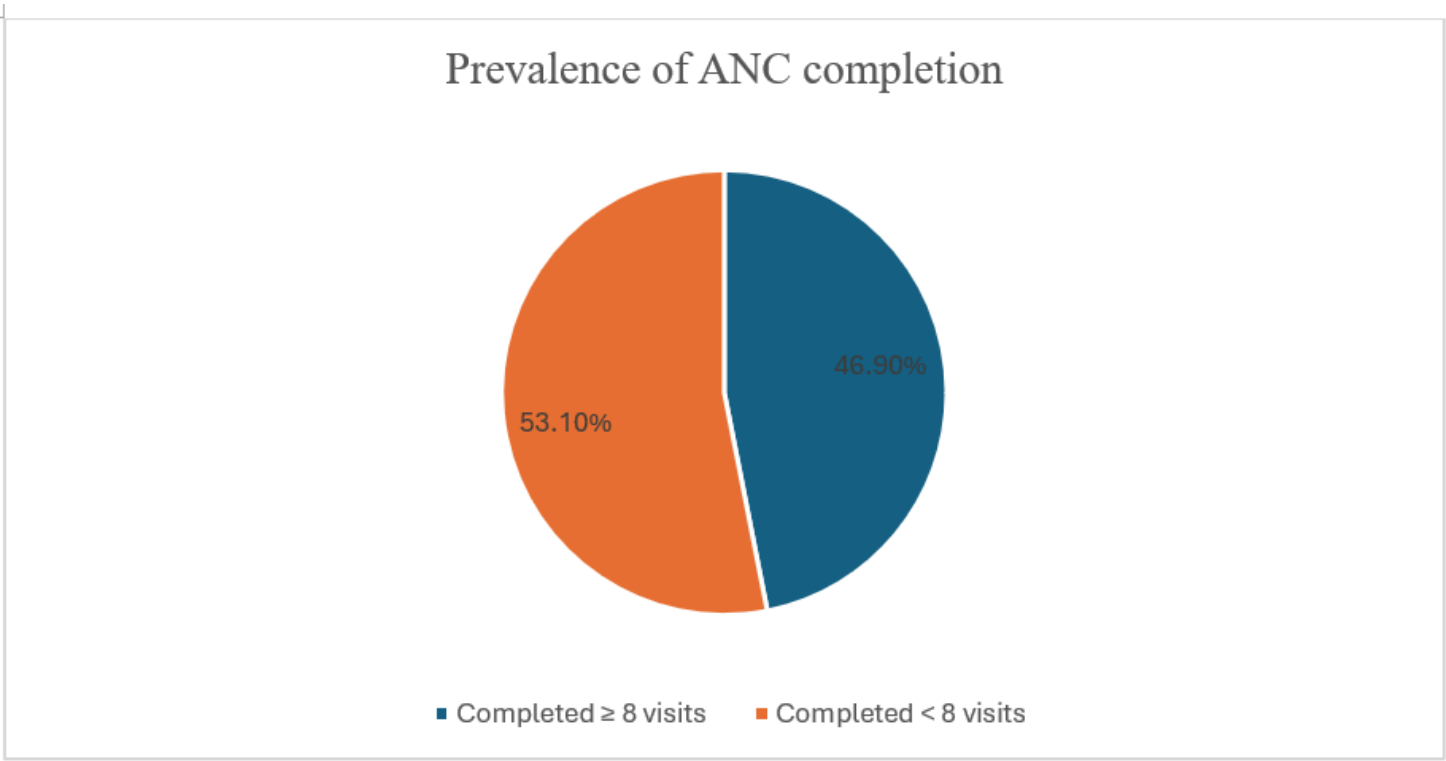


Figure 1

Prevalence of Completion of Recommended ANC Visits

Supplementary Files

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- STROBEStatement.docx
- QUESTIONNAIRE2.docx