


Interplay of sociodemographic factors and antenatal care attendance with free maternal care policy: a case study of Ghana

Caleb Boadi ,¹ Emmanuel Osei Bonsu,² Sylvester Reuben Okeke,³ Elijah Frimpong Boadu,⁴ Isaac Yeboah Addo³

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¹University of Ghana, Legon, Ghana

²Department of Epidemiology and Biostatistics, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

³University of New South Wales, Sydney, New South Wales, Australia

⁴Department of Civil Engineering, Kumasi Technical University, Kumasi, Ashanti, Ghana

Correspondence to
Mr Caleb Boadi;
cboadi002@st.ug.edu.gh

ABSTRACT

Introduction The Free Maternal Care Policy (FMCP) was introduced in Ghana around 2008 as part of the government's efforts to improve maternal and child health outcomes in the country. The policy was aimed at increasing access to antenatal care (ANC) services and reducing financial barriers to antenatal healthcare utilisation. Despite the expected success of the FMCP, there is limited evidence regarding its impact on the frequency of ANC visits across different sociodemographic groups of women in Ghana. This study examined associations between sociodemographic and health-related factors and the frequency of ANC attendance while considering the implementation period of the FMCP in Ghana as a fundamental reference point.

Methods This quantitative study used Ghana's Demographic and Health Survey datasets on pregnant women's ANC visits for 2003, 2008 and 2014 (N=15 408). Logistic regression and descriptive analyses were conducted using Stata/SE V.14.

Results Findings showed a slight fluctuation in the level of ANC visits before and after the introduction of the FMCP in Ghana. This fluctuation may indicate that ANC service cost as a barrier to ANC visits may not be the only factor affecting ANC utilisation among pregnant women in Ghana. Our results showed that women's lack of autonomy to make health-related decisions affected their ANC service utilisation, particularly in 2008. In addition, we found that educational attainment, being wealthy and urban residency were also significantly associated with ANC service utilisation among pregnant women in Ghana, particularly, in 2003. Women's anaemic levels were significantly associated with their likelihood of attending ANC services in 2003 and 2014.

Conclusions Our findings suggest that the FMCP may have had a discernible effect on the utilisation of ANC services in Ghana. However, other significant confounding factors may be influencing the ongoing use of ANC services in this setting.

INTRODUCTION

Antenatal care (ANC) is a critical and specialised healthcare service that is provided to

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Previous studies have shown that the Free Maternal Care Policy (FMCP) has had a positive impact on maternal and child health outcomes. However, it has also faced some challenges such as variations in care accessibility, quality of care and policy sustainability.

WHAT THIS STUDY ADDS

⇒ The study finds that there is a slight fluctuation in the level of antenatal care (ANC) visits before and after the introduction of the FMCP, indicating that cost may not be the only factor affecting utilisation. Specifically, this study highlights a significant association between women's autonomy, educational attainment, wealth and residency with their utilisation of ANC across different years. The variations in these associations across specific years indicate potential shifts or changes in factors influencing ANC utilisation over time.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ These results suggest that relying solely on the FMCP to address the barriers to ANC utilisation may not be sufficient, and that other social and confounding factors such as women's empowerment and education need to be considered. These results also indicate that there may be inequities in access to ANC services among different groups of women, and that further research is needed to understand the underlying causes and potential solutions. These results also call for continuous policy impact analysis and review to ensure that the FMCP is effective, efficient and responsive to the changing needs of the target population.

pregnant women.¹ Studies have shown that adequate ANC is key to preventing the development of complications during pregnancy, maintaining optimal health for pregnant women and their developing babies, identifying and managing high-risk pregnancies,

providing appropriate care management and in extreme cases, minimising maternal and infant mortality and morbidity.²⁻³ The WHO recommends that pregnant women should receive at least four ANC visits before delivery to ensure optimal health outcomes for both the mother and the baby.^{4,5} However, despite the benefits of ANC, many women in low-income and middle-income countries, including Ghana, do not receive adequate ANC.⁶ To improve maternal and child health outcomes, Ghana launched a national free maternal care policy (FMCP) in 2008.⁷ The FMCP provides free registration for all pregnant women through the National Health Insurance Scheme, thus eliminating financial barriers to accessing ANC services, facility delivery and postnatal care service for nursing mothers with their newborn babies for up to 90 days.⁷ The policy guarantees a 'Maternal Benefit Package' for all women, encompassing six free antenatal visits, any extra medically necessary visits recorded as outpatient department visits, free delivery at a healthcare facility, including all childbirth-related complications, two postnatal visits within 6 weeks, and care for the newborn for up to 3 months.^{8,9} The policy was initially introduced in 2003 in parts of the country's disadvantaged regions: Northern, Upper East, Upper West and Central, after which it was nationally extended to the remaining six regions in 2005 and 2008.^{7,9}

Several studies have evaluated the impact of the FMCP in Ghana.¹⁰⁻¹² Evidence shows that while the introduction of the FMCP has had a relatively positive impact on maternal and child health outcomes, some challenges remain. Notable among these challenges are variations in care accessibility, issues relating to the quality of care provided and the sustainability of the policy.¹⁰⁻¹² Notwithstanding the contributions of these previous studies, there is a paucity of studies examining the continuous impact of the policy.¹³⁻¹⁵ Continuous policy impact analysis and reviews are critical in ensuring that policies are consistently effective, efficient and responsive to changing circumstances. Examining continuous impact could help policy-makers and other stakeholders identify areas for improvement, address unintended consequences and ensure that policies remain relevant and responsive to the evolving needs of target communities.¹³⁻¹⁵

Thus, research gaps regarding FMCP remain. One significant research gap is the lack of studies examining the interplay of the FMCP impact on the frequency of ANC attendance across different women's sociodemographic characteristics. We believe that understanding the variations in ANC visits across different women's sociodemographic characteristics within the periods before and after the implementation of the FMCP is essential for multiple reasons. First, it can enable the identification of vulnerable groups of women who are still facing social barriers to accessing ANC services, allowing policy-makers to develop targeted interventions. Second, understanding variations can highlight potential inequities in access to ANC services and identify underlying structural issues or social determinants that require

addressing. Third, examining variations in the policy effectiveness for different groups can provide valuable insights into policy-making, allowing for modifications or targeted interventions to ensure effectiveness for all women. Using the 2003, 2008 and 2014 Ghana Demographic and Health Surveys (GDHS), this study aimed to address these gaps by examining the relationships between sociodemographic and health-related factors and frequency of ANC attendance. We considered the implementation period of the FMCP in Ghana as a key reference point.

MATERIALS AND METHODS

This research article followed the STROBE reporting guidelines for quality improvement studies.¹⁶ Patients or the public are not directly involved in the design, conduct, reporting or dissemination of this study.

Study setting

Ghana is an Anglophone West African country and covers an area of about 238 533 km². It shares borders with three francophone countries: Burkina Faso to the north, Togo to the east and Cote d'Ivoire to the west.¹⁷ The country is divided into three ecological zones: the Savannah zone, the Forest zone and the Sandy Coastline, which is supported by the coastal plains (coastal zone).¹⁸ Fifty-one per cent of Ghana's population resides in urban areas and 49% in rural areas.¹⁹ Ghana has 3217 functional health facilities, including 4 teaching hospitals, 9 regional hospitals, 3 psychiatric hospitals, 11 polyclinics, 59 Christian Health Association of Ghana hospitals, 10 Islamic hospitals, 96 government hospitals, 156 private hospitals and 22 quasi-government hospitals. The country also has 389 maternity homes, and 379 Community-based Health Planning and Services compounds.¹⁹

Overview of GDHS

The GDHS is a representative national survey that produces reliable findings on family planning, maternal and child health, child mortality and morbidity, fertility, and nutrition.²⁰ It is conducted every 5 years using the standard DHS model questionnaire developed by the MEASURE DHS programme.^{17,19} The survey is conducted by the Ghana Statistical Service and the Ghana Health Service with technical support provided by MEASURE DHS.¹⁹ The primary focus of the GDHS is on child and maternal health and it is designed to gather comprehensive data to monitor the population and health situation in Ghana. Specifically, the GDHS collects data on various demographic and health issues such as fertility, contraceptive use, child health, nutrition, malaria, HIV and AIDS, family planning, health insurance, and maternal health including ANC, delivery care, and postnatal care.¹⁹

Sources of data

This study used data from the most recent GDHS conducted in 2003, 2008 and 2014. These years were

selected as they contain all the relevant variables in line with the objectives of this study.

Sampling

The GDHS uses a two-stage sampling design to select all respondents. In the first stage, enumeration areas are used as clusters. The second stage uses a systematic sampling method to select respondents in their households. In this study, the sample included a total of 34315 women. Permission to use the GDHS dataset was obtained from MEASURE DHS following the assessment of a concept note. Further sampling details are reported in the following previous reports.^{17 18 20–22}

Inclusion and exclusion criteria

The study included all respondents who were pregnant at the time of the survey and/or had previous experience with ANC attendance. Conversely, individuals who were either pregnant or not, but had never attended ANC, were excluded from the study.

Measures

This study analysed 10 sociodemographic independent variables based on their theoretical significance to 'ANC attendance' in the literature. The primary outcome variable, frequency of ANC attendance, was categorised based on WHO guidelines: less than 4 visits, 4–7 antenatal visits and more than 8 antenatal visits, which are considered required ANC visits.⁵ The ANC attendance variable was subsequently recoded into two categories: inadequate antenatal attendance, with a value of 0 for less than 4 visits, and adequate antenatal attendance, with a value of 1 for 4–7 visits and more than 8 visits combined.

The predictor variables were categorised as follows: age group (1=15–19, 2=20–24, 3=25–29, 4=30–34, 5=35–39, 6=40–44, 7=45–49), educational level (1=no education, 2=primary education, 3=secondary education, 4=tertiary education), marital status (1=married, 2=not married, where cohabiting, widowed and never married were classified as not married), wealth index (1=poor, 2=middle, 3=wealthy), residence (1=urban, 2=rural), duration of pregnancy (1=first trimester, 2=second trimester, 3=third trimester), ever terminated pregnancy (1=no, 2=yes), anaemia level (1=severe anaemia, 2=moderate anaemia, 3=not anaemic), birth weight (1=less than 2.5 kg, 2=2.5–4.0 kg, 3=more than 4.0 kg) and decision on health (1=autonomous, decision made on one's own health, 2=not autonomous, decision made by husband, parent, friend and/or other). These independent variables were selected based on their reported significance in the literature as determinants of maternal care. To assess the associations between ANC attendance and the predictor variables, logistic regression analysis was performed, and the results were reported as ORs) with 95% CIs).

Data management and analysis

The survey data were analysed using Stata/SE V.14. Sample weights were applied to the GDHS dataset, and weighted percentages were used to describe categorical

variables. We employed the complete case analysis method to handle missing values. This approach involved excluding cases with any missing data from the analysis. We chose this method as it simplified the analysis process and is suitable in this context as the proportion of missing data were relatively small and was missing completely at random. Binary logistic regression was used to assess the association between the outcome variable (ANC attendance) and the independent variables. To compare the associations between antenatal attendance and free maternal health services before and after their initiation, three adjusted models were fitted.

Model 1 assessed the association between antenatal attendance and education, wealth index, residence, ever-terminated pregnancy, duration of pregnancy, anaemia level and health decision. Model 2 examined the association between antenatal attendance and education, residence, duration of pregnancy, ever-terminated pregnancy and health decisions. Model 3 assessed the association between antenatal attendance and education, wealth index, residence, ever-terminated pregnancy, anaemia level and decision on health after the initiation of the FMCP. The selection of variables was based on empirical studies,^{17 18 20–22} and the 'force-entry method' was used to include variables that were not collinear with the outcome variables. The inclusion of the literature-based variables in the logistic regression model is well founded and enhances the model's validity and relevance. These variables have been identified in prior research as significant determinants of the outcome, providing a strong theoretical and empirical basis for their inclusion. By incorporating them, we tap into existing knowledge and insights, ensuring that the model comprehensively accounts for established factors and relationships. This approach not only aligns with established theoretical frameworks but also enhances the model's interpretability and predictive power within the context of prior research findings.

To assess multicollinearity, the variable inflation factor was calculated and any variable with a value exceeding 10 was removed from the final model. A significance level of $p < 0.05$ was considered statistically significant.

RESULTS

Table 1 presents the number of ANC visits profiled by demographic and health variables. A total of 15408 mothers visited antenatal clinics in 2003, 2008 and 2014. The majority (22.14%) of pregnant women aged 25–29 years went to ANC less than four times, while the same age group had the highest (26.51%) ANC attendance for more than eight times. The majority (67.03%) of pregnant women with no formal education attended ANC less than four times. The study found more than half (52.92%) of pregnant women with secondary education to have attended ANC more than eight times. Most (85.56%) married pregnant women attended ANC less than four times, and for pregnant women who attended ANC more than eight times, 86.77% were married. 82.10% of pregnant women with a poor wealth

Table 1 Number of ANC visits by demographic and health variable

Variables	<4 visits N (%)	4–7 visits N (%)	8+ visits N (%)
Age group			
15–19	20 (3.14)	551 (5.16)	119 (3.01)
20–24	124 (19.47)	2082 (19.49)	576 (14.09)
25–29	141 (22.14)	2607 (24.41)	1084 (26.51)
30–34	120 (18.84)	2201 (20.60)	1042 (25.48)
35–39	103 (16.17)	1850 (17.32)	801 (19.58)
40–44	89 (13.97)	970 (9.08)	351 (8.58)
45–49	40 (6.27)	421 (3.94)	116 (2.84)
Educational level			
No education	427 (67.03)	4246 (39.75)	843 (20.62)
Primary	139 (21.82)	2321 (21.73)	816 (19.96)
Secondary	71 (11.15)	3916 (36.66)	2164 (52.91)
Tertiary	0 (0.00)	199 (1.86)	266 (6.51)
Marital status			
Not married	92 (14.44)	1411 (13.21)	541 (13.23)
Married	545 (85.56)	9271 (86.79)	3548 (86.77)
Wealth			
Poor	532 (82.10)	6246 (58.47)	1263 (30.89)
Middle	77 (12.09)	1999 (18.72)	767 (18.76)
Rich/wealthy	37 (5.81)	2437 (22.81)	2059 (50.35)
Residence			
Urban	87 (13.66)	3472 (32.50)	2251 (55.05)
Rural	550 (86.34)	7210 (67.50)	1838 (44.95)
Duration of current pregnancy			
First trimester	12 (18.46)	319 (29.40)	133 (34.28)
Second trimester	29 (44.62)	408 (37.60)	153 (39.43)
Third trimester	24 (36.92)	358 (33.00)	102 (26.29)
Ever terminated pregnancy			
No	549 (86.46)	8723 (81.69)	3076 (75.23)
Yes	86 (13.54)	1955 (18.31)	1013 (24.77)
Birth weight			
<2.5 kg	3 (3.65)	473 (9.62)	221 (7.90)
2.5–4.0 kg	69 (84.15)	4108 (83.56)	2378 (84.96)
4+ kg	10 (12.20)	335 (6.82)	200 (7.14)
Anaemia level			
Severe	47 (11.75)	395 (6.51)	62 (2.74)
Moderate	311 (77.75)	4337 (71.46)	1443 (63.82)
Not anaemic	42 (10.50)	1337 (22.03)	756 (33.44)
Decision on health			
Autonomous	175 (31.08)	2219 (23.52)	987 (27.31)

Continued

Table 1 Continued

Variables	<4 visits N (%)	4–7 visits N (%)	8+ visits N (%)
Not autonomous	388 (68.92)	7217 (76.48)	2627 (72.69)
Total observation	15 408		

Notes: 'N' represents the sample size or the total number of observations, % represents percentage and the p value represents the significant levels. ANC, antenatal care.

index attended ANC less than four times, and over half (50.35%) of pregnant women who attended ANC more than eight times were classified as wealthy. The majority (44.62%) of pregnant women in their second trimester attended ANC fewer than four times. Again, most (39.43%) of pregnant women in their second trimester visited ANC more than eight times. About 84.15% and 84.96% of pregnant women with a child birth weight of 2.5–4.0 kg visited the ANC less than four times and more than eight times, respectively. Concerning anaemia level, the majority (77.75%) of pregnant women who were moderately anaemic attended ANC less than four times, and 63.82% of pregnant women who were moderately anaemic attended ANC more than eight times. Most (68.92%) of pregnant women who attended ANC less than four times did not have autonomy over their own health. Further details can be found in [table 1](#).

ANC visits in Ghana before, during and after FMCP

[Figure 1](#) compares the trend of antenatal attendance before, during and after the FMCP was initiated. Before the free maternal health policy was initiated in 2003, 7.89% of pregnant women visited antenatal less than four times. Pregnant women who attended ANC less than four times decreased from 3.91% in 2008 to 3.07% in 2014 after the FMCP was implemented.

Before the FMCP was implemented in 2003, 69.78% of pregnant women attended ANC 4–7 times, 71.55% attended ANC 4–7 times in 2008 and that number decreased slightly to 68.09% after the policy was implemented. It is interesting to know from the findings that in 2003, 22.33% of pregnant women attended ANC more than eight times; in 2008, during the initiation of the FMCP, a slight increase to 24.53% attended ANC more than eight times; and 28.84% attended ANC after the policy was implemented in 2014.

Determinant of ANC attendance using logistic regression

The association of ANC attendance with sociodemographic characteristics was assessed using logistic regression. Model 1 presents the adjusted odds ratio (aOR) before the free maternal health policy was initiated, controlling other socio-demographic characteristics. Being educated (aOR 6.50, 95% CI 1.42 to 29.80), being wealthy (aOR 3.65, 95% CI 1.88 to 7.12), living in a rural area (aOR 0.46, 95% CI 0.26 to 0.82), having moderate anaemia (aOR 0.22, 95% CI 0.08 to 0.54) and not anaemic (aOR 0.11, 95% CI 0.03 to 0.43) were

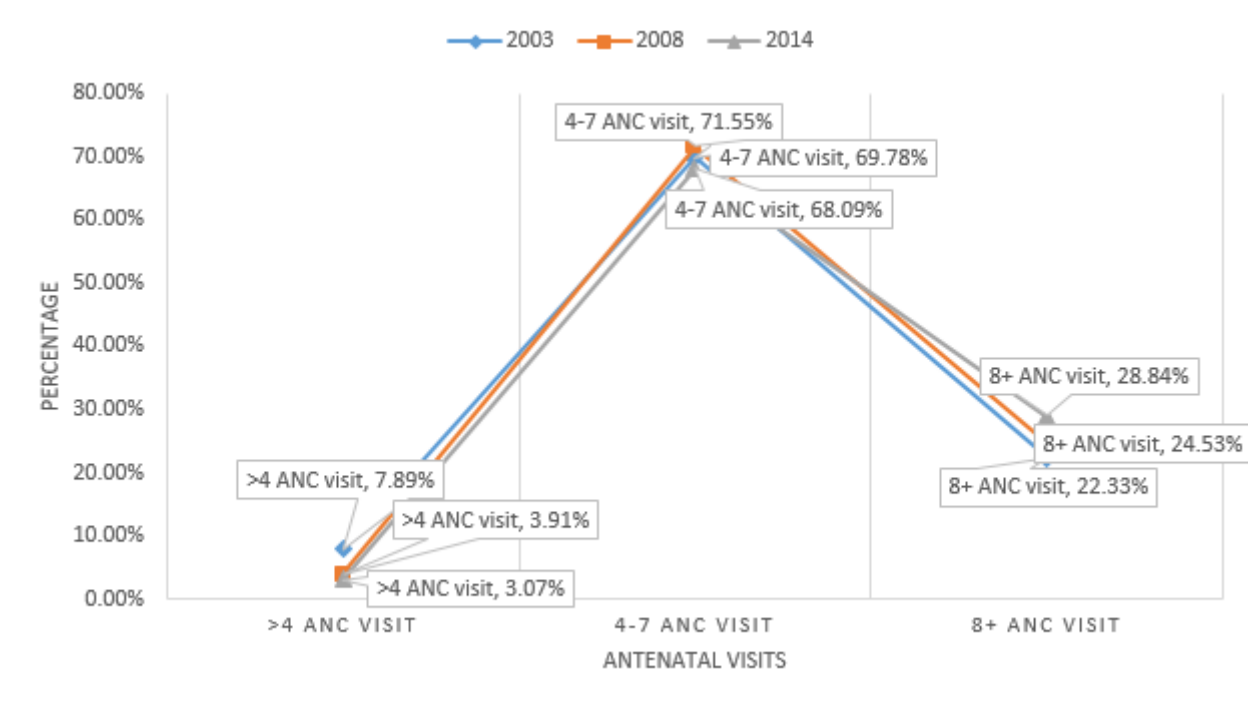


Figure 1 Sequence plot of ANC visits in Ghana before, during and after free maternal care policy. ANC, antenatal care.

significantly associated with antenatal attendance. Model 2 indicates when free maternal healthcare policy was initiated in 2008, and there was a significant association between antenatal attendance and not being autonomous in their own health (aOR 0.07, 95% CI 0.01 to 0.71). Model 3 illustrates the adjusted ratio after the free maternal health policy was initiated, and there was a significant association between moderate anaemia level (aOR 2.07, 95% CI 1.43 to 6.60) and not anaemic (aOR 36.98, 95% CI 4.31 to 42.20), particularly in 2003 and 2014 (table 2).

Discussion of findings

This study was designed to examine the associations between sociodemographic and health-related factors and frequency of ANC attendance, taking into consideration the implementation period of the FMCP in Ghana as a fundamental reference point. It is worth emphasising that while the Ghanaian FMCP was not explicitly incorporated into the DHS data, it served as an important reference point for assessing alterations in the frequency of ANC visits both preceding and following the year of policy implementation. We found a slight fluctuation in the level of ANC visits before and after the introduction of the free ANC policy. Using the WHO benchmark of four ANC visits,⁴ our result showed a slight increase in the number of women attending at least four ANC visits from 69.8% in 2003 (before the free ANC policy) to 71.6% in 2008 when the free ANC policy was launched nationally. However, we found a slight dip in the number of women attending more than four ANC visits from 71.6% in 2008 to 68.1% in 2014. This dip may be indicative of the fact that addressing cost as a barrier to ANC visits may not be effective if other barriers are not identified and

addressed as well. While cost has been identified as a constraint against ANC visits in low-income and middle-income countries^{23 24} including Ghana,^{25 26} it is important to address other structural factors that may also be affecting ANC utilisation. Understanding and addressing these other constraints is important as less than four ANC visits have been associated with adverse pregnancy outcomes in Ghana.²⁷

Some of the possible constraints are obvious in the results of our study. For instance, in a largely patriarchal society, pregnant women in Ghana may not have the autonomy to make health-related decisions including maternal health-related decisions. Our study showed that 74% of women in the dataset may lack the required autonomy to make decisions pertaining to their health and health service utilisation. This result supports a large number of evidence that women in settings where traditional culture is predominant may lack the autonomy to make maternal health service utilisation decisions.^{28 29} Against this backdrop, it is essential to develop, implement and continually evaluate strategies to address constraints relating to women's autonomy in making maternal and overall health-related decisions. These strategies may also include policies that may mandate male partners and other family members not to interfere, discourage or coerce pregnant women from seeking maternal health services.

Our results also showed how educational attainment may also be affecting maternal health service utilisation among pregnant women in Ghana. Our analysis in support of previous evidence³⁰ reveals that women with higher educational status are more likely to report more

Table 2 Associations between demographic and health variables and ANC visits

Variables	Model 1: 2003		Model 2: 2008		Model 3: 2014	
	Adjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Educational level						
No education	Ref.		Ref.			
Education	6.50 (1.42 to 29.80)	0.017	3.86 (0.65 to 23.00)	0.137	1.01 (0.59 to 2.10)	0.73
Wealth						
Poor	Ref.		Ref.			
Middle	1.28 (0.45 to 3.16)	0.633			0.81 (0.33 to 1.96)	0.639
Rich/wealthy	3.65 (1.88 to 7.12)	<0.0001			2.92 (0.94 to 9.02)	0.064
Residence						
Urban	Ref.		Ref.			
Rural	0.46 (0.26 to 0.82)	0.010	0.14 (0.13 to 1.51)	0.105	0.44 (0.18 to 1.10)	0.081
Duration of current pregnancy						
First trimester	Ref.		Ref.			
Second trimester	1.05 (0.32 to 3.48)	0.928	0.48 (0.15 to 1.55)	0.220		
Third trimester	0.50 (0.16 to 1.53)	0.214	0.87 (0.18 to 4.16)	0.866		
Ever terminated pregnancy						
No	Ref.		Ref.			
Yes	1.39 (0.68 to 2.87)	0.358	0.95 (0.26 to 3.50)	0.944	1.20 (0.52 to 2.77)	0.663
Anaemia level						
Severe	Ref.		Ref.			
Moderate	0.22 (0.08 to 0.54)	0.002			2.07 (1.43 to 6.60)	0.004
Not anaemic	0.11 (0.03 to 0.43)	0.002			36.98 (4.31 to 42.20)	0.001
Decision on health						
Autonomous	Ref.		Ref.			
Not autonomous	0.85 (0.34 to 2.12)	0.724	0.07 (0.01 to 0.71)	0.025	1.62 (0.80 to 3.26)	0.174

Bold values denote statistical significance at p value less than 0.05
ANC, antenatal care.

than four ANC visits. The implication is that women with lower or without formal education are less likely to engage with ANC services. Therefore, addressing the issue of inadequate attendance of the free ANC policy—without ensuring more equitable strategies to reach less educated pregnant women may lead to these women continually falling through the inequity crack. To this end, there is a need for interventions to ensure the empowerment of the girl child and women without formal education through conventional and adult education, respectively. This educational empowerment is critical for improved health literacy which could enhance the likelihood of increased engagement with maternal health services.

Furthermore, our results showed residential factor as another inequity crack through which some pregnant women may be falling through thereby resulting in inadequate ANC visits. Our result, in line with the findings of a previous study,³¹ suggests that pregnant women in rural areas are less likely to report more than four ANC

visits. While cost could be a barrier to ANC visits among this subpopulation,^{25 26} it is also likely that removing the cost barrier may not be enough to trigger ANC utilisation among this subpopulation especially if there is no adequate availability of services or education about the accessibility of free ANC policy. Compared with urban dwellers, pregnant women in rural areas are less likely to have the required educational grounding and/or health literacy level required to become aware of the free ANC policy and to engage with ANC services.³²

Thus, women with lower levels of education tend to possess limited health literacy information.^{32 33} Consequently, they may encounter challenges in locating, comprehending and applying health-related information, which can, in turn, lead to poorer health outcomes and behaviours.³² While we are not claiming a low level of awareness about the free ANC policy among rural dwellers, we do believe that we cannot dismiss the challenge of getting health information diffused into rural

areas at a level required to trigger behaviour change among this subpopulation.

The transition in the significance of the area of residency as a determinant of ANC accessibility across the years from 2003 to 2008 and 2014 is a noteworthy trend in our analysis. Notably, in 2003, area of residency emerged as a substantial factor influencing ANC access, but its impact appears to have diminished in subsequent years. This transition suggests an encouraging improvement in ANC accessibility across diverse geographic areas. While this change may be attributed to multiple factors, including the implementation of the FMCP, it is evident that a comprehensive assessment of the FMCP's influence is imperative. The FMCP may have played a pivotal role in bolstering ANC accessibility by alleviating financial barriers and enhancing healthcare infrastructure. Nonetheless, disentangling the FMCP's specific contribution within this evolving context requires further in-depth investigation and nuanced analysis. Such research is essential to ascertain the extent of the FMCP's impact on the observed positive transformations in ANC accessibility. This shift underscores the dynamic nature of healthcare policies and their far-reaching implications for healthcare access over time. It is important to flag that the variations in associations across specific years suggest dynamic shifts in factors impacting ANC utilisation over time. These findings imply that the determinants influencing women's access to ANC services might fluctuate periodically, underscoring the necessity for healthcare strategies that are flexible and customised to address these evolving dynamics. Contributory factors such as changes in healthcare financing, improvements in healthcare facilities and evolving healthcare guidelines may have synergistically shaped the landscape of ANC accessibility, warranting continued exploration.^{34–36}

Limitations of the study

This study possesses a notable strength in its capacity to achieve national representativeness, thereby bolstering the sampling power of the analysis. Despite this strength, some limitations need to be considered when interpreting the findings. First, temporal limitations may have influenced the results. The data used for the study were obtained from the most recent GDHS conducted in 2003, 2008 and 2014. However, the data may not accurately reflect current trends in ANC attendance in Ghana. Additionally, participants may have recalled information from periods predating the implementation of the FMCP, during the data collection process leading to temporal gaps. Such a situation imposes constraints that may have repercussions on the precision of the data and the accuracy of individual recollections, ultimately influencing our capacity to accurately evaluate the true impact of the FMCP. It is, however, important to underscore that while these constraints are recognised, it does not imply a lack of consideration for the currency of data during the data collection process. Furthermore, it is important to note that the data used in this study

was not initially collected with a primary emphasis on the FMCP. As a result, we could not execute a specific analysis directly associating ANC with the FMCP. Instead, we inferred potential policy impacts within the time frames covered by GDHS data. Moreover, the study may have been affected by sampling bias. Considering that the study used a cross-sectional design, there is a possibility of recall and social desirability bias in the responses, particularly for women who had their ANC long ago. This may have affected the accuracy of the results. Also, some variables correlated with the outcome variable, and those variables were taken out of the final model. Another limitation is the limited number of variables considered. Although the study analysed 10 variables, these may not be exhaustive enough to explain the complexities of ANC attendance in Ghana. Other important variables, such as cultural beliefs, accessibility to health facilities and perceptions about maternal healthcare, may be relevant but were not considered in the analysis due to data limitations. Additionally, the study did not consider the quality of care received by pregnant women during antenatal visits, which may be an important determinant of ANC attendance in Ghana. This limits the interpretation of the findings.

Lastly, the study did not assess the relationship between ANC attendance and maternal and fetal outcomes such as maternal morbidity and mortality, stillbirth and neonatal mortality. This may limit the overall understanding of the importance of ANC attendance in Ghana.

CONCLUSION

In conclusion, this study examined the trends and determinants of ANC attendance in Ghana before, during and after the implementation of the free maternal health policy. Our findings reveal a reduction in the percentage of pregnant women attending ANC less than four times after the policy was implemented. However, the proportion of pregnant women attending ANC 4–7 times also decreased slightly, while those attending more than eight times increased. Furthermore, our logistic regression analysis identified significant associations between antenatal attendance and various sociodemographic characteristics, including wealth, rural residence, anaemia levels and autonomy in health decision-making. These findings highlight the need for targeted interventions that address the unique barriers to ANC attendance faced by different subgroups of women in Ghana. Overall, this study provides important insights for policy-makers and healthcare providers seeking to improve maternal and child health outcomes in Ghana.

Twitter Sylvester Reuben Okeke @SROkeke

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Contributors IYA and EFB conceived the topic. IYA, SRO and EFB conducted the literature search. Data analysis and interpretation, and methods were handled by CB and EOB. IYA, SRO, EFB did a thorough review of the methodology and analysis

of results. SRO helped with the discussion and conclusion. CB and EOB reviewed the entire work and prepared the manuscript for vital scholarly substance. IYA supervised the entire study. CB is the overall content guarantor for the manuscript. All authors read and approved the final manuscript.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The study used secondary data from the GDHS data, and therefore, no separate ethical approval was required. This is because we did not interact with the study participants in any way. Prior to the study, we registered and requested access to data from the DHS programme and received approval to access and download the GDHS data file. The DHS programme has strict standards for protecting the privacy of participants and details on their ethical considerations can be found at <https://dhsprogram.com/Methodology/Protecting-the-Privacy-of-DHS-Survey-Respondents.cfm>.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available in a public, open access repository. Data are available on reasonable request. Data available at www.dhsprogram.com.

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ORCID iD

Caleb Boadi <http://orcid.org/0000-0001-8925-838X>

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