ORIGINAL RESEARCH ARTICLE

Factors associated with antenatal care initiation among pregnant women in the Kassena-Nankana Municipality, Upper East Region, Ghana

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Abstract

Maternal mortality remains a concern globally, with 260,000 pregnancy-related deaths annually. In Ghana's Kassena-Nankana Municipality, late antenatal care initiation contributes to poor outcomes. This study aimed to determine factors associated with antenatal care initiation among pregnant women attending Community-based Health Planning and Services zones. A cross-sectional study was conducted among 360 pregnant and nursing mothers. Results showed that women aged 26-35, married, and those with secondary or tertiary education were less likely to initiate antenatal care late. In contrast, women who spent more on transportation, had larger family sizes, or travelled over two hours to access antenatal care services were more likely to initiate antenatal care late. Healthcare provider-patient relationships were also a predictor of late antenatal care initiation. Targeted interventions are needed to improve antenatal care utilisation and reduce maternal mortality. Healthcare providers should prioritise timely antenatal care initiation, improve accessibility, and implement community-based initiatives to raise awareness about antenatal care services. *(Afr J Reprod Health 2026; 30 [22]: 62-71).*

Keywords: Community-Based Service Delivery, Ghana, Maternal Mortality, Women's Service Utilisation, Late Initiation of Antenatal Care

Résumé

La mortalité maternelle demeure une préoccupation à l'échelle mondiale, avec 260 000 décès liés à la grossesse chaque année. Dans la municipalité de Kassena-Nankana, au Ghana, un recours tardif aux soins prénatals contribue à des résultats de santé défavorables. Cette étude visait à déterminer les facteurs associés au moment du recours aux soins prénatals chez des femmes enceintes fréquentant les zones desservies par les services de planification et de santé communautaires (Community-based Health Planning and Services – CHPS). Une étude transversale a été menée auprès de 360 femmes enceintes ou allaitantes. Les résultats indiquent que les femmes âgées de 26 à 35 ans, mariées, ou ayant un niveau d'instruction secondaire ou supérieur, étaient moins susceptibles de commencer leurs soins prénatals tardivement. À l'inverse, les femmes confrontées à des frais de transport plus élevés, ayant une famille nombreuse, ou devant voyager plus de deux heures pour accéder aux services de soins prénatals, étaient plus susceptibles de débuter ces soins tardivement. La qualité de la relation entre le personnel soignant et la patiente s'est également révélée être un facteur prédictif d'un recours tardif aux soins prénatals. Des interventions ciblées sont nécessaires pour améliorer le recours aux soins prénatals et réduire la mortalité maternelle. Les prestataires de soins de santé devraient favoriser un recours précoce aux soins prénatals, en améliorer l'accessibilité et mettre en œuvre des initiatives communautaires visant à sensibiliser la population aux services de soins prénatals. *(Afr J Reprod Health 2026; 30 [22]: 62-71).*

Mots-clés: prestation de services communautaires, Ghana, mortalité maternelle, recours des femmes aux services de santé, recours tardif aux soins prénatals

Introduction

Maternal mortality remains a significant global health concern, with approximately 260,000 women dying from pregnancy-related complications in 2023, disproportionately affecting low- and middle-income countries (LMICs).[1, 2] In Ghana, regional disparities persist, and the Upper East Region experiences high rates of birth complications, and Kassena-Nankana is one of two districts.[3]

Antenatal care is a crucial component of maternal healthcare, aimed at optimising pregnancy outcomes through skilled healthcare professionals' care and promotion of healthy behaviours.[4.] Research has consistently shown that ANC enables women to acquire knowledge on healthy practices during pregnancy, recognise warning signs, and reduce maternal and neonatal morbidity and mortality.[5.] The World Health Organization (WHO) recommends a minimum of eight antenatal care contacts during pregnancy, with the initial contact occurring within the first trimester.[4.] However, the region's remote and rural location, inadequate healthcare infrastructure, and limited access to healthcare services exacerbate maternal health challenges,[6] which are further compounded by cultural and socio-economic factors, such as poverty and limited education.[6,7] Late initiation of antenatal care emerges as a significant concern, as it can lead to delayed detection and management of pregnancy complications, increased risk of maternal and foetal morbidity and mortality, and poor birth outcomes. Studies have shown that women who initiate antenatal care late are more likely to experience adverse pregnancy outcomes, including preterm births, low birth weight, and stillbirths.[8],[9] In Ghana, late antenatal care initiation is common, with many women attending their first antenatal care visit after the first trimester.[10]

Late antenatal care initiation is prevalent in the Kassena-Nankana Municipality, contradicting the Ministry of Health's directive aiming for at least 80% of pregnant women to attend early antenatal care clinics.[11] Compliance with WHO recommendations on antenatal care timing, frequency, and content significantly reduces adverse birth outcomes like low birth weight and preterm delivery. Despite existing studies in Ghana[12,13] none have investigated late antenatal care initiation in the Kassena-Nankana Municipal. This study aims to fill this gap by establishing the determinants of late antenatal care initiation among pregnant women in the Kassena-Nankana Municipality, providing crucial findings for the Municipal Health Management Team and Ghana Health Service to address the issue and improve maternal health outcomes.

This paper aims at determining factors associated with antenatal care initiation among pregnant women in the Community-Based Health Planning and Services zones in the Kassena-Nankana Municipality.

Methods

Study setting

This study was conducted in the Kassena-Nankana Municipal (KNM) of the Upper East Region, Ghana. The municipality has a population of 99,895 people, according to the 2022 annual report of the KNM Health Directorate. Geographically, Kassena-Nankana Municipality is situated between latitudes 10°3' and 11°10' North and longitude 10°1' West.[14]

Study design

This study utilised a cross-sectional design to determine the factors associated with antenatal care service utilisation.

Sample size determination

The sample size for this study was determined using Cochran's formula (1977), which is suitable for estimating a single population proportion.[15] The calculation was based on a prevalence of late ANC initiation of 70%, as reported in the Builsa North district.[16] A 95% confidence level (Zα/2 = 1.96) and a 5% margin of error (d = 0.05) were employed. Additionally, a 10% non-response rate was accounted for to ensure adequate representation. The sample size calculation was performed using the formula n = (Zα/2) ^2 * p(1-p) / d^ 2. By substituting the values, the initial sample size was calculated to be 323. Accounting for a 10% non-

response rate, the final sample size was determined to be 355.

Table 1: The number of pregnant women per zone, 2024

Sub-District	Community-Based Health Planning and Service Programme zone	Antenatal care registrants	Year
Wuru	Wuru Community-Based Health Planning and Service Programme	101	2023
	Korania Community-Based Health Planning and Service Programme	44	2023
	Pinda Community-Based Health Planning and Service Programme	61	2023
Manyoro	Manyoro Community-Based Health Planning and Service Programme	140	2023
	Nayagnia Community-Based Health Planning and Service	62	2023
Navrongo East	Programme		
	Doba Community-Based Health Planning and Service Programme	124	2023
	Naaga Community-Based Health Planning and Service	111	2023
Kologo	Programme		
	Zoongo Community-Based Health Planning and Service Programme	22	2023
	Zou Community-Based Health Planning and Service Programme	33	2023

Sampling method

A multi-stage sampling methodology was employed to select the study participants. The Kassena-Nankana Municipality was first stratified into seven zones. Four out of the seven zones were randomly selected. A proportionate allocation of the sample size was determined based on the number of pregnant women registered for antenatal care services in the selected zones. Systematic sampling was used to select individual participants from the antenatal care registers in each selected zone. Participants were interviewed at either the health facility or their homes, using their addresses and contact numbers provided in the antenatal care register. In cases where a selected participant was unavailable, unreachable, or refused to participate, a replacement was made to ensure adequate representation. Table 1

Ethics approval and consent to participate

We obtained ethical approval for this study on 19th December 2023 from the Navrongo Health Research Centre, Ghana. Institutional Review Board with a reference number NIIRCIRB567. A signed informed consent form that provided full study disclosures was obtained from the participants before the interviews. The privacy and confidentiality of the participants were strictly maintained during and after the interviews. Participant information is stored as the participant ID instead of personal information.

Data collection

In March 2023, a comprehensive training session was conducted for three fieldworkers and one supervisor. The training encompassed lectures, demonstrations, and hands-on practice sessions, focusing on the research instrument and study guides. Data collection utilised an interviewer-administered questionnaire via Kobo Collect, featuring both open-ended and closed-ended questions adapted from Tola et al. (2021)[17] and supplemented with researcher-developed questions.

Statistical analysis

Descriptive statistics were calculated and presented in tables and figures. Bivariate analysis using chi-square tests examined associations between categorical variables. Binary logistic regression

analysis determined the relationship between outcome and predictor variables, with odds ratios

and 95% confidence intervals calculated. Variables with p-values < 0.05 were included in a multivariable logistic regression model to determine adjusted odds ratios, minimising confounding effects. A significant level of 5% (p-value < 0.05) was considered statistically significant.

Results

Background Characteristics

The socio-demographic characteristics of the 360 participants are presented in Table 1. Most participants had one child (30.3%), followed by two children (27.2%), and 16.1% had no children. The majority were Christians, and the Kassenas were approximately 65%, the Nankanas 33%, and the rest belonged to other ethnic groups.

Bivariate Analysis of Women's Late ANC Initiation

Table 2 presents the bivariate analysis showing the gestational age at which antenatal care services are accessed, categorised by the socio-demographic characteristics of the participants, without the confounding influence of other socio-demographic variables. The findings indicated that women within the 26-35 age group exhibited a lower propensity to commence antenatal care at a delayed stage. Also, married women demonstrated a reduced likelihood of initiating antenatal care late. In addition, women possessing a tertiary-level education certificate were comparatively less likely to begin antenatal care late.

Multivariable Analysis of Women's Late ANC Initiation

Table 3 shows that several factors significantly reduced late antenatal care initiation: Women aged 26-35 years were less likely to initiate antenatal care late compared to those aged 15-25 years (AOR = 0.39, 95% CI: 0.16-0.97, p = 0.043). Married women had a reduced likelihood compared to single women (AOR = 0.09, 95% CI: 0.02-0.47, p = 0.004) to initiate antenatal care late. Women with secondary education (AOR = 0.23, 95% CI: 0.07-0.71, p = 0.010) and tertiary education (AOR =

Table 2: Socio-demographic characteristics of female respondents in the Kassena-Nankana Municipal of northern Ghana, 2024

Variable	Number (%)
Number of children	
One	109 (30.28)
Two	98 (27.22)
Three	62 (17.22)
Four or more	33 (9.17)
None	58 (16.11)
Religion	
Muslim	23 (6.39)
Christian	334 (93.78)
Traditional	3 (0.83)
Ethnicity	
Kasem	233 (64.72)
Nankam	120 (33.43)
Others	7 (1.94)
Occupation	
Unemployed	78 (21.67)
Farmer	60 (16.67)
Trader	1219(33.61)
Government employee	37 (10.28)
Others	64 (17.74)
Means of transport	
Walking	172 (47.78)
Bicycle/Motor	188 (52.22)
Time from home to facility (hours)	
1	264 (73.33)
2	82 (22.78)
3	11 (3.06)
4	3 (0.86)
Cost of transportation	
0-10	343 (95.28)
11-20	14 (3.89)
21-30	3 (0.83)
Money provider for antenatal care services	
Husband	249 (69.17)
Mother-in-law	11 (3.06)
Father-in-law	4 (1.11)
Self	90 (25.00)
Others	6 (2.64)
Husbands' occupation	
Farmer	156 (43.33)
Trader	59 (16.39)
Government Employee	88 (24.44)
Unemployed	23 (5.39)
Others	34 (9.44)
Husbands' educational level	

None	60 9 (16.67)	Secondary School	96 (26.67)
Primary School	142 (39.44)	Tertiary	62 (17.22)

Table 3: Bivariate analysis of women's late antenatal care initiation, by selected characteristics (n=360), Kassena-Nankana Municipal, 2024

Gestation age at booking of antenatal care	**Crude odds ratios95% Confidence Interval**
Age	
15-20	**1**
26-35	**0.35 (0.18-0.69)*** **
36-45	0.57 (0.29-1.13)
46-55	0.65 (0.32-1.33)
Number of children	
One	1
Two	0.96 (0.56-1.6)
Three	0.85 (0.45-1.6)
Four or more	1.82 (0.82-4.01)
None	1.56 (0.82-2.96)
Marital Status	
Single	1
Married	**0.34 (0.12-0.97) ***
Religion	
Islam	1
Christian	0.47 (0.21-1.15)
Traditional	0.27 (0.02-3.41)
Ethnicity	
Kasem	1
Nankam	0.96 (0.62-1.50)
Others	6.59 (0.78-55.63)
Educational Level	
None	1
Primary School	0.74 (0.36-1.51)
Secondary School	0.58 (0.27-1.26)
Tertiary	**0.29 (0.11-0.81)****
Means of Transportation	
Walking	1
Bicycle/Motor	0.94 (0.62-1.42)
Time from home to facility	
1	1
2	1.26 (0.77-2.08)
3	0.66 (0.19-2.29)
4	
Cost of transportation	
0-10	1
11 – 20	2.83 (0.87-9.19)
21 – 30	2.26 (0.20-25.17)
Family size	
1	1
2	1.53 (1.00-2.36)
3+	2.57 (0.46-14.36)
Husbands's educational level	
None	1
Primary School	1.13 (0.62-2.07)
Secondary School	0.94 (0.49-1.8)
Tertiary	0.77 (0.38-1.58)
Wealth Index	
Poorest	1

Poorer	1.32 (0.69-2.54)
Poor	0.95 (0.49-1.82)
Less Poor	1.18 (0.61-2.27)
Least Poor	1.06 (0.55-2.04)
What influenced your decision to attend antenatal care	
Advice from family members	1
Husband asked me to go	2.54 (0.16-0.79)**
The health worker told me to report at that time	0.49 (0.37-1.81)
TBA advised that I go for a card at the health facility	0.13 (0.10-13.92)
I was not feeling well, which is why I went	3.04 (0.17-0.68)***
Wanted to obtain a maternal health card	0.32 (0.40-1.94)
Others	0.59 (0.03-9.99)
Does your schedule interact with your antenatal care services	
No	1
Yes	0.82 (0.5-1.36)
Appropriate time to start antennal care services	
0 – 1	1
2 – 3	1.5 (0.94-2.39)
4 – 5	**2.8 (1.41–5.57) *** **
6 – 7	**5.07 (1.03-25.06) ***
Who is your source of information	
Health worker	1
Friends/Relatives	1.06 (0.62-1.82)
Mass Media	1.21 (0.67-2.19)

Table 4: Multivariable analysis of women's late antenatal care initiation, by selected characteristics (n=360), Kassena-Nankana Municipal, 2024

Gestation age at booking of antenatal care	**Adjusted odds ratios [95% Confidence Interval]**
Age	
15–25	1
26-35	**0.39 (0.16–0.97) ***
36-45	1.08 (0.41-2.82)
46-55	1.20 (0.39-3.69)
Number of Children	
One	1
Two	0.92 (0.45-1.89)
Three	0.55 (0.23-1.33)
Four or more	0.91 (0.27-3.08)
None	1.64 (0.71-3.80)
Marital Status	
Single	1
Married	**0.09 (0.02-0.47) *** **
Religion	
Muslim	1
Christian	0.64 (0.21-1.98)
Traditional	0.32 (0.01-22.72)
Ethnicity	
Kasem	1
Nankam	0.63 (0.35-1.12)
Others	10.14 (0.78-131.10)
Educational Level	
None	1

Primary School	0.45 (0.17-1.21)
Secondary School	**0.23 (0.07-0.71) ****
Tertiary	**0.06 (0.01-0.31)*****
Means of Transportation to the Facility	
Walking	1
Bicycle/Motor	0.98 (0.57-1.68)
Time from home to health facility	
1	1
2	0.74 (0.39-1.38)
3+	0.21 (0.04-1.15)
Cost of transportation from home to facility and back	
0-10	1
11-20	**7.84 (1.37-44.57)****
21-30	1.15 (0.07-18.86)
Who provides money for antenatal?	
Husband	1
Mother-in-law	1.74 (0.37-8.26)
Father-in-law	0.69 (0.06-7.43)
Self	**0.37 (0.19-0.70)*****
Others	1.04 (0.08-13.43)
Family size	
1	1
2	1.86 (1.07-3.26) **
3+	2.95 (0.4-21.94)
Average time spent in the facility accessing antenatal care service	
Less than an hour	1
Up to an hour	1.57 (0.57-4.37)
Up to two hours	**25.57 (1.81-36.68) ****
Is language a barrier to accessing antenatal care	
No	1
Yes	0.8 (0.23-2.70)
The general attitude of health staff toward you during antenatal care	
Poor	1
Good	0.57 (0.02-16.44)
Excellent	1.44 (0.05-43.4)
Are health staff available to provide antenatal care in the facility	
No	1
Yes	0.86 (0.16-4.64)
Were you given routine medication during the antenatal care visit	
No	1
Yes	0.61 (0.29-1.27)
Did you pay for the drug and service?	
Yes, always	1
Yes, sometimes	0.93 (0.07-12.03)
Never	0.24 (0.03-2.11)
Don't know	0.44 (0.03-6.75)
How satisfied were you with antenatal care services?	
Completely Satisfied	1
Partially Satisfied	1.02 (0.53-1.98)
Dissatisfied	0.15 (0.00-5.41)
Asset Index	
Poorest	1
Poorer	1.35 (0.59-3.07)
Poor	0.68 (0.28-1.61)
Less Poor	1.29 (0.55-3.070)
Least Poor	0.73 (0.29-1.87)

0.06, 95% CI: 0.01-0.31, p = 0.001) were less likely to delay antenatal care compared to those with no formal education.Women who self-financed antenatal care were less likely to initiate late than those relying on husbands (AOR = 0.37, 95% CI: 0.19-0.70, p = 0.002). Women having two children were more likely to initiate antenatal care late compared to those witha family with1 child.Table 4

Discussion

The study's findings reveal that several factors are significantly associated with antenatal care initiation. One of the key factors is marital status, where unmarried women are more likely to initiate antenatal care late, which is consistent with previous research.[16] This may be attributed to a lack of a support system or social isolation, which can limit their access to information and resources. The absence of a support system can also lead to increased financial burdens, further exacerbating the challenges faced by unmarried women. Studies in Ghana found that unmarried women were more likely to experience unintended pregnancies, which can contribute to late antenatal care initiation.[18,19]

In addition, education plays a crucial role in antenatal care utilisation. Women with limited education were more likely to initiate antenatal care late, highlighting the importance of education in promoting antenatal care utilisation.[20,21] Educated women are more likely to have better health literacy, understand the importance of antenatal care services, and navigate the healthcare system more effectively. This suggests that health education programmes targeting women with limited education may be beneficial in promoting timely antenatal care initiation. A systematic review found that health education interventions can improve antenatal care utilisation and pregnancy outcomes.[22]

Financial support is another critical factor associated with late antenatal care initiation. Women with limited financial support were more likely to initiate antenatal care late, emphasising the need for policies and programmes that address financial barriers to antenatal care access.[23] Financial constraints can limit women's ability to access antenatal care services, particularly in settings where healthcare services are not free or affordable. Therefore, policymakers should consider implementing policies that provide financial support or subsidies for pregnant women, particularly those from low-income backgrounds. A study in Ghana found that the implementation of free maternal healthcare policies improved antenatal care utilisation and reduced maternal mortality.[23,]

Finally, family size is associated with late antenatal care initiation, with multiparous women being more likely to initiate antenatal care late compared to primiparous women, probably due to competing demands on their time and resources.[24,25,26] Women with larger families may have limited time to attend antenatal care services, particularly if they have childcare responsibilities or other family obligations. Healthcare providers should prioritise flexible antenatal care scheduling and provide childcare support services to facilitate antenatal care attendance.

Limitations and Strengths

The findings of this study should be interpreted in light of some limitations. Recall bias may have influenced participants' responses, potentially affecting the accuracy of the data. However, using a 1-year recall period helped reduce any possible memory lapse that arose as a result of this study because it was a relatively shorter period for people to recall events such as the time of initiation of antenatal care. Social desirability bias may also have led participants to provide answers they perceived as socially acceptable rather than their genuine experiences, but study procedure and training protocols were designed to reduce these biases, and those who conducted the interviews were people who had no links to the delivery of health services. Despite these limitations, this study provides valuable insights into the factors associated with late antenatal care initiation in the Kassena-Nankana Municipality.

Conclusion

The study identified key factors contributing to delayed antenatal care initiation in the Kassena-Nankana Municipal, including young, single women with limited education, financial constraints, and long waiting times. To address these issues, recommendations include the Ghana

Health Service prioritising timely antenatal care; targeting vulnerable groups; health professionals implementing health education and community initiatives and reducing waiting times; and the government providing financial support for low-income women.

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Competing interests

The author(s) declare that they have no competing interests.

Authors' contributions

PA conceived and designed the study, performed the data analysis, interpreted the results, and wrote the manuscript. ES and JA contributed to the planning and supervision of all parts of the study and the methodology, data analysis, and the writing of the manuscript. PW, EA, and TW contributed to the planning of the study, data analysis, and the revision of the manuscript. All authors read and approved the final version of the manuscript.

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