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Examining the Multifaceted Determinants of Antenatal Care Utilization through Structural Equation Modelling: Insights for Maternal Health Interventions

Napoleon Bellua Sam, MSc, PhD
Department of Medical Research and Innovation, School of Medicine, University for Development Studies, Tamale, Northern Region, Ghana
Thomas Aboyine, MBChB
Tamale Teaching Hospital, Tamale, Northern Region, Ghana
Theresah Tackie-Otoo, BSc
Dohini Health Centre, Tamale, Northern Region, Ghana

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Abstract

Scope and Aims: Maternal and newborn mortality remain critical global public health challenges, especially in underdeveloped countries. One of the most effective strategies for reducing these mortality rates is the proper utilization of antenatal care (ANC). This study investigates the factoras influencing ANC utilization and aims to predict the demographic characteristics that impact ANC attendance using Structural Equation Modeling (SEM). **Methods**: A descriptive cross-sectional survey was conducted with 254 pregnant women at St. Lucas Hospital in Ghana. Data were collected using a structured questionnaire. Structural Equation Modeling (SEM) and Chi-square analysis were employed to model and examine the factors influencing antenatal care utilization. **Results**: The findings reveal that the majority (72%) of postpartum mothers had four or more ANC visits during their most recent pregnancy, with 47.6% initiating ANC attendance in the first trimester. Significant demographic factors associated with ANC utilization included maternal education level (P = 0.000), occupational status (P = 0.000), age (P = 0.030), marital status (P =

0.034), religious affiliation (P = 0.000), husband's education (P = 0.000), and husband's occupation (P = 0.000). Additionally, SEM analysis indicated that health provider factors (P = 0.000) and community factors (P = 0.005) play a critical role in ANC utilization, while individual factors (P = 0.067) and quality of care factors (P = 0.079) were not statistically significant. **Conclusion**: This study emphasizes the importance of health provider and community factors in the utilization of ANC services. The findings also highlight that nearly all demographic characteristics, including both the mother's and husband's education and occupation, are crucial determinants of ANC attendance.

Keywords: Antenatal care utilization, maternal and newborn mortality, postpartum mothers, trimester, structural equation modeling

Introduction

The World Health Organization projected that about 303,000 women died between 1990 and 2015 (WHO, 2016). Regardless of race, education, marital status, or occupation, women of childbearing age face the risk that pregnancy may lead to the loss of the mother (Senah, 2003). Many researchers argue that there is no single method for reducing maternal mortality (Alvarez et al., 2009). Although significant advancements were made in regions such as North Africa and Asia between 1990 and 2015, the global Maternal Mortality Ratio (MMR) decreased by only 2.3% annually over this period (WHO, 2016).

Available data indicate that approximately 529,000 maternal deaths are recorded annually (Ronsmans & Graham, 2006). Around 585,000 women die each year due to pregnancy-related complications, with developing nations—particularly Sub-Saharan Africa—accounting for 99% of these deaths (UNICEF, 2019). Women face numerous challenges, including pregnancy complications, that often result in maternal mortality (Ikhtiar, 2015). Poor nutrition, poverty, inadequate sanitation, lack of education, and limited access to healthcare significantly impact women's health during pregnancy and delivery, making them more vulnerable (Ronsmans & Graham, 2006). Maternal mortality began to decline more rapidly starting in 2000, reaching a reduction rate of 5.5% (WHO, 2016). There has been extensive international collaboration to reduce maternal mortality significantly (WHO, 2016).

Antenatal care (ANC) is crucial for reducing maternal morbidity and mortality and ensuring a positive pregnancy experience (Bolarinwa et al., 2021). The health of pregnant women and their unborn children is paramount, and as United Nations Secretary-General Ban Ki-moon stated in an overview of WHO guidelines on antenatal care, "To achieve every

Woman Every Child vision and the Global Strategy for Women's, Children's, and Adolescents' Health, we need innovative, evidence-based approaches to antenatal care" (WHO, 2016). Maternal health, with a focus on ANC, is a priority for public health organizations, the World Health Organization, the Ghana Health Service, and non-governmental organizations as they strive to improve life in communities, regions, countries, and globally. The death of a pregnant woman poses a significant burden and loss to the family and community, as two lives are at risk. Therefore, maternal health issues, particularly antenatal care, require prompt attention in health and research fields.

In Ghana, the situation is similar, as antenatal coverage has declined over the years due to factors beyond biological and individual influences, including education, wealth, and ethnicity (Ministry of Health, 2016). The provision of basic obstetric and antenatal care in Ghana is managed by key players within the health system, including Community-based Health Planning and Services (CHPS), health centers, private faith-based facilities, and private midwifery homes (Witter et al., 2009). The Ghana Health Service (GHS) operates district and regional hospitals, as well as tertiary hospitals, which provide emergency and comprehensive obstetric care. Many mission health facilities are located in remote areas of the country. In some cases, Traditional Birth Attendants (TBAs) are trained to assist in deliveries and refer complex cases to hospitals (Witter et al., 2009). It is recommended that a pregnant woman attend the hospital eight times for antenatal care (WHO, 2016). Ghana has adopted the WHO recommendation, and through the National Health Insurance Scheme (NHIS), it provides for at least four visits (NHIS, 2017).

A study by Moos et al. (2008) confirmed the relationship between antenatal care utilization and positive maternal outcomes. Antenatal care helps in planning for a safe delivery, which is essential for maternal health, and aids women in detecting potential risks and complications (UNESCO, 2013). Nevertheless, findings from a study noted that a lack of antenatal care visits limits the detection of high-risk factors (Flenady et al., 2011). Numerous studies report that low rates of ANC visits are associated with a 63% higher risk of pregnancy complications (Coria-Soto et al., 1996; Magadi et al., 2000). These researchers emphasize that while antenatal care alone may not prevent all obstetric emergencies, the successful management of pregnancies and the well-being of the child largely depend on the information provided by antenatal care providers (Coria-Soto et al., 1996; Magadi et al., 2000).

Although limited studies on antenatal care service use have been conducted in Ghana, none have extensively applied Structural Equation Modeling to investigate the factors influencing ANC utilization among

pregnant women, particularly in northern Ghana. This knowledge gap can hinder the planning and delivery of effective reproductive and maternal healthcare services. Thus, understanding the determinants affecting ANC utilization could be a vital step in developing strategies to improve ANC service usage at both the local and national levels in Ghana. This study aims to explore the factors associated with ANC service utilization among postpartum mothers, intending to contribute to policies that reduce maternal deaths and improve neonatal outcomes.

Methods

Participants and Setting

A cross-sectional study was conducted to evaluate the impact of antenatal care utilization among women. The study took place in Yesobsa Central, a suburb of the Wiaga sub-district, located in the Builsa North district of the Upper East Region, Ghana. All postpartum clinic attendees between the ages of 15 and 49 were included, while women who were not interested in participating were excluded. This study recruited 254 mothers through purposive sampling. A structured questionnaire with four sections was used. The first section focused on identifying demographic factors such as age, marital status, religion, and occupation that could affect ANC utilization. The second section examined individual/patient factors, including educational level, income level, health status, and pregnancy intention, to assess their impact on antenatal care service use. The third section looked at community factors, such as family support and cultural influences, that affect ANC use. The final section focused on service provider characteristics, such as facility accessibility, medication availability, and healthcare professional attitudes, that impact ANC utilization. The level of antenatal care utilization was used as the dependent variable, while factors such as patient, health system, socio-cultural influences, and quality of care were considered independent variables.

Data Analysis

Data were collected, coded, and entered into Excel, then transferred to the Statistical Package for Social Sciences (SPSS) Version 22 and STATA Version 14 for statistical analysis. Descriptive statistics were used for continuous variables; data not normally distributed were presented as median and interquartile range (IQR). The Chi-square test was also used to explore relationships among variables. Additionally, a Structural Equation Model (SEM) was employed to test the hypothesis that patient, health system, socio-cultural factors, and quality of care directly impact antenatal care utilization. The significance threshold for associations between variables was set at ($p < 0.05$).

Ethical Considerations and Approval

Ethical clearance was obtained, and permission was granted by the hospital to conduct the study. Participants provided written informed consent by signing or thumbprinting the consent form after receiving detailed information about the study. Patient privacy and confidentiality were assured.

Results

Socio-demographic and socio-economic characteristics of respondents

The main characteristics are detailed in Table 1. The majority of respondents were between the ages of 26–30 years, accounting for 100 (39.4%) of the sample, followed by those aged 18–25 years at 70 (27.6%), ages 31–35 at 49 (19.3%), and those over 35 years at 35 (13.8%). Most respondents had a body mass index (BMI) classified as overweight, with 137 (53.9%), while 84 (33.1%) had a healthy weight, and 33 (13.0%) were classified as obese. A large proportion of respondents were married, totaling 247 (97.2%), with the highest education level being Junior High for 107 (42.1%), and 67 (26.4%) having no formal education.

In terms of employment, most respondents were self-employed (115 or 45.3%), followed by traders (67 or 26.4%), unemployed individuals (43 or 16.6%), and government workers (29 or 11.4%). Table 1 also shows that the majority of respondents identified as Christians, with 206 (81.1%), while 31 (12.2%) were Muslims, and 17 (6.7%) practiced traditional religions. Most husbands were traders, with 146 (57.5%), while 47 (18.5%) were unemployed. Regarding education, the highest educational attainment among partners was tertiary or beyond for 80 (31.5%), and 67 (26.4%) had no formal education.

Table 1: Socio-demographic characteristics of respondents

VARIABLES		FREQUENCY	PERCENTAGE
Ages	18- 25	70	27.6
	26-30	100	39.4
	31-35	49	19.3
	>35	35	13.8
BMI	Healthy weight	84	33.1
	Overweight	137	53.9
	Obese	33	13.0
Marital Status	Married	247	97.2
	Single	7	2.8
Educational Level of Mother	No education	42	16.5
	Primary	76	29.9
	Junior high	107	42.1
	Senior high	29	11.4
Occupation of Mother	Unemployed	43	16.9
	Trader	67	26.4

	Self-employed	115	45.3
	Government worker	29	11.4
Educational Level of Husband	No education	67	26.4
	Primary	53	20.9
	Junior high	13	5.1
	Senior high	41	16.1
	Tertiary and above	80	31.5
Occupation of Husband	Unemployed	47	18.5
	Trader	146	57.5
	Self employed	29	11.4
	Government worker	32	12.6
Religious Affiliation	Christian	206	81.1
	Islam	31	12.2
	Traditional	17	6.7

Individual, Community and Health provider's factors influencing utilization of ANC

Table 2 below presents the various individual factors influencing respondents' use of antenatal care (ANC) services. The majority of respondents strongly agreed (207 or 81.5%) that their educational level played a role in determining their likelihood of utilizing ANC, with 34 (13.4%) agreeing, 7 (2.8%) feeling neutral, and 6 (2.4%) disagreeing. Most respondents also agreed (167 or 65.7%) that a woman's income influenced their participation in ANC services, with 29 (11.4%) strongly agreeing, 53 (20.9%) feeling neutral, and 5 (2.0%) disagreeing. Additionally, 161 (63.4%) strongly agreed that the overall health status of the mother influenced their use of ANC, 74 (29.1%) agreed, 8 (3.1%) felt neutral, and 6 (2.4%) disagreed. A large majority also agreed (128 or 50.4%) and strongly agreed (109 or 42.9%) that a woman's pregnancy intention affected their use of ANC, while 12 (4.7%) were neutral, 4 (1.6%) disagreed, and 1 (0.4%) strongly disagreed. It is evident that most mothers (94.9%) believed their educational level influenced their utilization of ANC.

Table 2 also shows the results of a univariate analysis of health provider factors influencing ANC utilization. Most mothers strongly agreed (213 or 83.9%) that the availability of healthcare facilities influenced their ANC use. A significant proportion also agreed (175 or 68.9%) that affordability affected their decision to utilize ANC. Many respondents (172 or 67.7%) agreed that the accessibility of ANC influenced their decision, with 2 (0.4%) disagreeing and 12 (4.7%) feeling neutral. Furthermore, 150 (59.1%) agreed and 94 (37.0%) strongly agreed that the quality of care influenced their decision to use ANC services, while 2 (0.8%) disagreed.

Additionally, Table 2 includes a univariate analysis of community factors affecting ANC utilization. Cultural beliefs and practices surrounding pregnancy and childbirth were strongly agreed upon as influencing ANC use

by 209 (82.3%), while 34 (13.4%) agreed, 2 (0.8%) were neutral, 2 (0.8%) disagreed, and 7 (2.8%) strongly disagreed. Social support from family and community members was strongly agreed to be influential by 160 (63.0%), with 78 (30.7%) agreeing, 8 (3.1%) feeling neutral, 6 (2.4%) disagreeing, and 2 (0.8%) strongly disagreeing. A large majority (226 or 89.0%) strongly agreed that a woman's beliefs and attitudes toward pregnancy and childbirth influenced her use of ANC, with 23 (9.1%) agreeing, 1 (0.4%) feeling neutral, 3 (1.2%) disagreeing, and 1 (0.4%) strongly disagreeing. Moreover, 183 (72.0%) strongly agreed that men's involvement and support in promoting ANC influenced whether a woman utilized antenatal care services, with 59 (23.2%) agreeing, 8 (3.1%) feeling neutral, and 4 (1.6%) disagreeing.

Table 2: Individual, Community and Health provider's factors influencing ANC utilization

Characteristics	Response	Frequency	Percentage
Individual Factors			
A woman's educational level influences her likelihood of seeking and utilizing antenatal care services.	Disagree	6	2.4
	Neutral	7	2.8
	Agree	34	13.4
	Strongly agree	207	81.5
A woman's income affects her decision to access antenatal care visits.	Disagree	5	2.0
	Neutral	53	20.9
	Agree	167	65.7
	Strongly agree	29	11.4
It is believed that a woman's health status plays a role in her decision to utilize antenatal care services	Disagree	6	2.4
	Neutral	8	3.1
	Agree	74	29.1
	Strongly agree	161	63.4
A woman's pregnancy intention is in determining her utilization of antenatal care services.	Strongly disagree	1	0.4
	disagree	4	1.6
	Neutral	12	4.7
	Agree	128	50.4
	Strongly agree	109	42.9
Health Provider Factors			
The availability of healthcare facilities and trained healthcare providers influences the utilization of antenatal care services,	Strongly disagree	1	0.4
	Disagree	2	0.8
	Neutral	4	1.6
	Agree	34	13.4
	Strongly agree	213	83.9
The affordability of antenatal care services affects a woman's decision to seek and utilize care.	Disagree	1	0.4
	Neutral	22	8.7
	Agree	175	68.9

	Strongly agree	56	22.0
It is believed that the accessibility of antenatal care services affects women's utilization of care.	Disagree	2	0.8
	Neutral	12	4.7
	Agree	172	67.7
	Strongly agree	68	26.8
The quality of antenatal care services is in determining whether or not women seek and utilize care.	Disagree	2	0.8
	Neutral	8	3.1
	Agree	150	59.1
	Strongly agree	94	37.0
Community Factors			
Cultural beliefs and practices surrounding pregnancy and childbirth affect women's utilization of antenatal care services.	Strongly disagree	7	2.8
	Disagree	2	0.8
	Neutral	2	0.8
	Agree	34	13.4
	Strongly agree	209	82.3
Social support from family and community members influences a women's decision to seek and utilize antenatal care services.	Strongly disagree	2	0.8
	Disagree	6	2.4
	Neutral	8	3.1
	Agree	78	30.7
	Strongly agree	160	63.0
It is believed that women's beliefs and attitudes towards pregnancy and childbirth affect their utilization of antenatal care services.	Strongly disagree	1	0.4
	Disagree	3	1.2
	Neutral	1	0.4
	Agree	23	9.1
	Strongly agree	226	89.0
Men's involvement and support in promoting antenatal care utilization is in determining whether or not women access and utilize care.	Disagree	4	1.6
	Neutral	8	3.1
	Agree	59	23.2
	Strongly agree	183	72.0

Quality Care Factors and Level of ANC utilization

Table 3 presents the results of a univariate analysis of antenatal care (ANC) utilization among respondents. A majority of respondents, 140 (55.1%), rated the quality of antenatal care they received as satisfactory, 113 (44.5%) rated it as excellent, and 1 (0.4%) rated the quality as poor. Regarding communication between healthcare providers and patients, most respondents (166 or 65.4%) were very satisfied, while 88 (34.6%) found the services merely satisfactory.

Table 3 also shows that 127 (50%) of respondents had at least four ANC visits, while the other half did not. Among them, 183 (72.0%) had four or more visits, 37 (14.6%) had 0–1 visits, and 34 (13.4%) had 2–3 visits in their previous pregnancy. A significant number, 121 (47.6%), had their first visit within the first three months, 106 (41.7%) had theirs between the fourth and sixth months, and 27 (10.6%) had their first visit in the seventh to ninth months. Additionally, 137 (53.9%) responded positively to having their first visit in the first month, while 117 (46.1%) did not have their first visit in the first trimester. Of the respondents, 137 (53.9%) had their first visit between weeks 1 and 12, 76 (29.9%) had it between weeks 13 and 24, and 41 (16.1%) had it between weeks 25 and 36.

Furthermore, 228 (89.8%) of respondents received all the recommended antenatal services, while 26 (10.2%) did not. Most respondents (126 or 49.6%) visited an antenatal care facility more than four times, 82 (32.3%) visited an ANC facility 2–3 times, and 46 (18.1%) visited an ANC facility 0–1 times.

Table 3: Quality of Care and Level of Antenatal utilization

Characteristics	Responses	Frequency	Percentage
Level of Antenatal Care			
How many antenatal care visits did you have during your previous pregnancy?	0-1 times	37	14.6
	2-3 times	34	13.4
	4 and above times	183	72.0
When did you first visit an antenatal care facility during your current pregnancy?	1-3 months	121	47.6
	4-6 months	106	41.7
	7-9 months	27	10.6
Did you have your first antenatal care visit in the first trimester of your pregnancy?	Yes	137	53.9
	No	117	46.1
How many weeks pregnant were you when you had your first antenatal care visit?	1-12 weeks	137	53.9
	13-24weeks	76	29.9
	25-36 weeks	41	16.1
Did you receive all of the recommended antenatal care services during your pregnancy?	Yes	228	89.8
	No	26	10.2
How many times have you visited an antenatal care facility during your current pregnancy?	0-1 times	46	18.1
	2-3 times	82	32.3
	4 and above times	126	49.6
Quality Care Factors			
How would you rate the overall quality of the antenatal care you received during your pregnancy?	Poor	1	0.4
	Satisfactory	140	55.1
	Excellent	113	44.5
How satisfied were you with the communication between you and your healthcare provider during your antenatal care visits?	Satisfactory	88	34.6
	Very Satisfactory	166	65.4
Have you had at least four antenatal care visits	Yes	127	50

during your current pregnancy?

Association between demographic characteristics and utilization of ANC

Table 4 presents the association between various socio-demographic variables and the utilization of antenatal care (ANC) visits, categorized into three groups: 0-1 visits, 2-3 visits, and more than 4 visits. The variables examined include age, BMI, marital status, educational level, occupation, husband's educational level, husband's occupation, and religious affiliation.
There is a statistically significant association between age and the number of ANC visits ($X^2 = 13.957$, df = 6, p = 0.030). Women aged 26-30 had the highest number of ANC visits (>4), indicating that women in this age group are more likely to utilize ANC services. Marital status also shows a significant association with ANC utilization ($X^2 = 4.476$, df = 1, p = 0.034). Married women are significantly more likely to have higher ANC visits compared to single women, highlighting the role of marital support in ANC attendance.

The educational level of the mother has a strong and significant association with ANC utilization ($X^2 = 50.960$, df = 6, p = 0.000). Mothers with junior high and senior high education levels are more likely to have more than 4 ANC visits, suggesting that higher education correlates with better ANC attendance. The occupation of the mother is significantly associated with ANC utilization ($X^2 = 43.971$, df = 6, p = 0.000). Government workers and self-employed mothers are more likely to have more than 4 ANC visits, indicating that employment status and possibly income stability are key factors in ANC utilization.

The educational level of the husband is also significantly associated with ANC utilization ($X^2 = 79.865$, df = 8, p = 0.000). Women whose husbands have tertiary education or higher are more likely to have more than 4 ANC visits, suggesting that a husband's education positively influences ANC attendance. The occupation of the husband shows a significant association with ANC utilization ($X^2 = 54.972$, df = 6, p = 0.000). Women whose husbands are traders are more likely to have 2-3 ANC visits, while those with husbands who are government workers are more likely to have more than 4 ANC visits.

Religious affiliation is significantly associated with ANC utilization ($X^2 = 24.601$, df = 4, p = 0.000). Christian women are more likely to have more than 4 ANC visits compared to women of other religions, indicating a possible cultural or community support system within religious groups that encourages ANC attendance. Although BMI shows differences in ANC utilization, the association is not statistically significant ($X^2 = 6.510$, df = 4, p = 0.164).

Table 4: Association between socio demographics and utilization of anc.

Variables		Antenatal care visits			X^2	df	P
		0-1	2-3	>4			
Ages	18- 25	14	17	39			
	26-30	19	40	41	13.957	6	0.030
	31-35	3	18	28			
	>35	10	7	18			
BMI	Healthy weight	16	27	41	6.510	4	0.164
	Overweight	27	48	62			
	Obese	3	7	23			
Marital status	Married	43	79	125	4.476	1	0.034
	Single	3	3	1			
Educational level of mother	No education	8	6	28	50.960	6	0.000
	Primary	25	36	15			
	Junior high	10	37	60			
	Senior high	3	3	23			
Occupation of mother	Unemployed	7	5	31	43.971	6	0.000
	Trader	14	34	19			
	Self-employed	24	41	50			
	Government worker	1	2	26			
Educational level of husband	No education	15	27	25	79.865	8	0.000
	Primary	21	25	7			
	Junior high	4	5	4			
	Senior high	5	14	22			
	Tertiary and above	1	11	68			
Occupation of husband	Unemployed	2	9	36	54.972	6	0.000
	Trader	27	69	50			
	Self employed	5	2	22			
	Government worker	12	2	18			
Religious affiliation	Christian	35	60	111	24.601	4	0.000
	Islam	8	8	15			
	Traditional	3	14	0			

Factors influencing utilization of antenatal care using structural equation model

The structural equation model revealed that patient/individual factors ($\beta = -0.114$) and quality care factors ($\beta = -0.103$) had negative effects on antenatal care. However, these effects were not statistically significant (all $P > 0.05$). In contrast, health system factors ($\beta = 0.338$; $P = 0.000$) and socio-cultural factors ($\beta = 0.174$; $P = 0.005$) had significant positive effects on antenatal care (see Appendix A, Table 8, and Fig. 2).

Overall, the model fit statistics (see Appendix B) indicate that the structural equation model fits the observed data well, as shown by the low values for the Root Mean Squared Error of Approximation (RMSEA (P <

0.000), Pclose = 1.000), the Standardized Root Mean Squared Residual (SRMR (P < 0.001)), and the Coefficient of Determination (CD = 15.4%). Additionally, the high values for the Comparative Fit Index (CFI = 1.000) and Tucker-Lewis Index (TLI = 1.000) suggest a good fit. The chi-square statistics also indicate that the model is an excellent fit compared to both the saturated model and the baseline model.

The Akaike Information Criterion (AIC = 1257.046) and Bayesian Information Criterion (BIC = 1327.793) values suggest that the model is reasonably parsimonious, given its fit to the data. This covariance matrix provides important details about the relationships between the latent variables in the structural equation model. The covariances between social culture and quality care, as well as between patient factors and quality care, indicate low associations between these latent variables. Their p-values (P > 0.05) suggest that these covariances are not statistically significant, further supporting the idea of a weak relationship.

However, the covariances between patient factors and health system factors, patient factors and socio-cultural factors, health system and socio-cultural factors, and health system and quality care factors show significant positive associations between the latent variables (all P < 0.05). It should be noted that as one factor increases, the other tends to increase as well. All the details are presented in Table 5 and Figure 1.

Table 5: Summary of the factor loadings

Factors	Standard estimate	*P*	Decision
Patient →ANC Visit	-.1137991	0.067	Not significant
Health System →ANC Visit	.3375756	0.000	Significant
Socio Culture →ANC Visit	.1735345	0.005	Significant
Quality Care →ANC Visit	-.1030693	0.079	Not significant

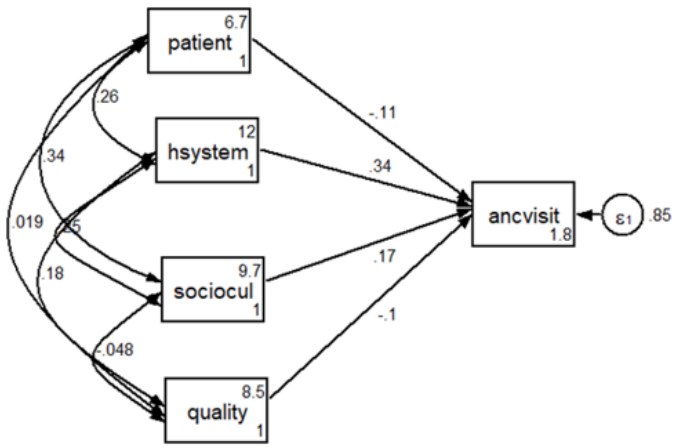

Figure 1: Structure Equation model showing factors influencing the utilization of antenatal care

Discussion

This study examines the factors influencing the utilization of antenatal care (ANC) among women. Regarding individual-level factors, the study found that the majority of respondents strongly agreed that a woman's educational level significantly influences her likelihood of seeking and utilizing antenatal care services. This finding aligns with the study by Simkhada et al. (2008), which also identified educational level as a strong predictor of ANC utilization. The similarity between these studies highlights the critical role education plays in equipping women with the knowledge about the benefits of ANC. Additionally, the study revealed that most respondents agreed that a woman's income affects her decision to access antenatal care visits. This finding is consistent with the research by Adukwu (2015), which concluded that income level significantly influences ANC utilization. Higher income levels often correlate with better access to healthcare services, including ANC.

In terms of healthcare provider factors influencing ANC utilization, the study found that only a few respondents agreed that the availability of healthcare facilities and trained healthcare providers influences the utilization of antenatal care services. This finding contrasts with the study by Owino et al. (2009), which reported that the availability of healthcare facilities significantly influenced ANC utilization. The discrepancy between the two studies may be attributed to differences in the availability and accessibility of healthcare services in the respective study areas.

The study found that the majority of respondents agreed that the affordability of antenatal care (ANC) services significantly affects a woman's decision to seek and utilize care. However, this finding contrasts with the study by Lire (2017), which emphasized that the accessibility of medications plays a more significant role in influencing ANC utilization among women.

Moreover, the study revealed that 67.7% of respondents agreed that the accessibility of antenatal care services affects women's utilization of care. This finding aligns with the research by Magadi et al. (2000), which also concluded that the accessibility of ANC services is a crucial factor influencing ANC utilization among women. It is important to note that most maternal deaths occur during childbirth, and the presence of trained medical staff could significantly reduce this number. Antenatal care provides an opportunity to promote the benefits of skilled attendance at birth and to encourage women to seek postpartum care for themselves and their newborns. Additionally, ANC is an ideal time to counsel women on the benefits of child spacing. It offers essential health services, including health promotion, disease prevention, screening, and diagnosis.

The study also examined community-level factors that influence ANC utilization. The findings revealed that 82.3% of respondents strongly agreed that cultural beliefs and practices surrounding pregnancy and childbirth affect women's utilization of antenatal care services. This finding is consistent with the study by Adukwu (2015), which also found that cultural factors significantly influenced ANC attendance among pregnant women. Furthermore, the study showed that 63% of respondents strongly agreed that social support from family and community members influences a woman's decision to seek and utilize antenatal care services. This finding aligns with the research by Mpembeni et al. (2007), which found that a husband's decision significantly impacts a woman's access to ANC services.

Regarding the quality of antenatal care received, 55.1% of respondents rated it as satisfactory, while 44.5% rated it as excellent. This finding differs from the study by Senah (2003), where women expressed dissatisfaction with ANC services. Additionally, most respondents (65.4%) were very satisfied with the communication between healthcare providers and patients. Encouraging pregnant women to attend ANC could play a crucial role in linking them with the health system, which, if functioning well, could be critical in saving their lives in the event of complications during labor and childbirth.

The study examines the demographic factors influencing antenatal care (ANC) attendance among women. It found a significant association between the age of respondents and ANC utilization. This finding is consistent with the study by Mugo et al. (2015), which also identified age as a factor affecting the use of ANC. The similarity between these studies may be attributed to the influence of age on the health-seeking behavior of women in Ghana.

The study also explored the impact of marital status on ANC utilization and found it to be significant. This finding aligns with the research by Tsegay et al. (2013), which revealed that marital status significantly influences ANC visits. The consistency in these findings may be related to the role that family support plays in a woman's decision to utilize ANC services.

Regarding educational level, the study found that both the woman's and her husband's education significantly influence her likelihood of seeking and utilizing ANC services. This finding is in agreement with Al-Zubayer (2024), which also identified educational level as a strong predictor of ANC utilization. The role of education in increasing knowledge about the benefits of ANC likely explains the similarity between the two studies.

Additionally, the study found that the occupational status of both the woman and her husband influences her likelihood of seeking and utilizing ANC services. This finding is consistent with the research by Fotso et al. (2009), which also identified occupational status as a strong predictor of ANC utilization. It is important to note that a woman's occupation may significantly impact the extent to which she uses antenatal services. It is also important to emphasize that care during pregnancy provides a critical opportunity to deliver interventions that improve maternal health and survival during the period immediately preceding and following birth. While preventing complications for mothers and babies depends on a well-functioning continuum of care—including accessible, high-quality services before and during pregnancy, childbirth, and the postnatal period—good nutrition is equally vital throughout these stages.

Conclusion

The study found that, social and cultural factors primarily influence women decision making whether to seek ANC care or not. The study found that at the health facility level, the utilization of ANC among women could be as a result of the health education health workers at the study area continue to do concerning ANC attendance and the quality of ANC care they receive. The implication of this is that, health care providers at the study place could use the findings to provide health education to women to improve their ANC attendance. The study found that, there was significant

association with certain demographic data of respondents and utilization of ANC services. These demographic variables could be utilized by healthcare workers to provide proper ANC education which could lead to an improved ANC use among women.

Human Participants Statement: This study has been approved by St. Lucas Hospital and the principles of the Helsinki Declaration were followed.

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