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Predictors of Antenatal Care Utilization in the East Akim Municipality of Ghana

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Abstract

Background: Maternal and neonatal mortality rates continue to be high in sub-Saharan African countries, including Ghana. Timely and regular antenatal care (ANC) during pregnancy are essential for the early identification and management of potential risk factors associated with poor pregnancy outcomes. The purpose of this study was to investigate the uptake of ANC services in the East Akim Municipality of Ghana and identify factors influencing ANC utilization.

Methods: A cross-sectional study that employed stratified sampling methodology to select 310 women of reproductive age (15-49 years) in East Akim Municipality was conducted. A structured questionnaire was used to investigate the determinants of ANC utilization among respondents. Data were managed using Microsoft Excel 2016 and analysed using Stata version 14. Descriptive, bivariate and multivariable logistic regression analyses were performed. **Results:** ANC attendance, at least once during pregnancy, was almost universal (98.4%), with 83.5% making 4+ visits. However, only 58% of respondents made ANC visits in the first trimester and 61% attended all scheduled visits. Employment status, distance to health facility and pregnancy intention were significantly associated with regular ANC attendance.

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Self-employed women were 2.4 times more likely to attend ANC regularly (AOR: 2.42, 95% CI: 1.20-4.88) than unemployed women; those who lived <5 km to a health facility were 3.2 times more likely to attend ANC regularly than those who lived >10 km (AOR: 3.24, 95% CI: 1.20-8.72); and women with intended pregnancies were 2.5 times more likely to attend all ANC scheduled visits than those with unintended pregnancies (AOR: 2.46, 95% CI: 1.32-4.57).

Conclusion: Although ANC utilization in East Akim is high, socioeconomically disadvantaged women with unintended pregnancies, who were unemployed and who lived >10 km from a health facility did not attend ANC regularly. Interventions to ensure equitable access to ANC services at the community level for women are needed to improve timely and regular ANC attendance. Strengthening of community-based health centers to provide ANC through outreach services to women in remote locations, coverage of family planning services within national health insurance scheme and improvements in socioeconomic conditions in which people live are warranted.

Keywords: Antenatal Care; Unintended Pregnancy; Equity; Maternal Health; Health Services Utilization.

1. Introduction

High maternal and neonatal mortality rates in developing countries remain major public health concerns, despite significant global reduction efforts, which began with the Safe Motherhood Initiative in 1987 [1]. The United Nations Millennium Development Goal (MDG) 5, which aimed at reducing maternal mortality by three–quarters of the 1990 rates and achieving universal access to reproductive health services by 2015, did not achieve the set targets [2]. In 2017, approximately 810 women worldwide died daily from pregnancy-related complications [3]. Ninety-four percent (94%) of these deaths occurred in developing countries and were attributed to hemorrhage, puerperal sepsis, obstructed labor, hypertensive disorders and unsafe abortions [3,4]. In Ghana, the Maternal Health Survey of 2017 estimated the maternal mortality ratio at 310 deaths per 100,000 live births, which is far from the SDG 3.1 target of 70 per 100,000 live births expected to be achieved by 2030 [5]. Women's vulnerability to such adverse health outcomes could be minimized through appropriate maternal healthcare, especially during pregnancy and childbirth. However, due to limited access to healthcare and poor health-seeking behaviors, these complications are often not promptly detected and managed, resulting in poor pregnancy outcomes [6,7]. Antenatal care (ANC) during pregnancy provides opportunities for preventing and treating obstetric complications, preparing for emergencies, providing family planning services, and attending to the nutritional, social and emotional needs of the woman and the foetus [8-11]. ANC services create the opportunity for service providers to establish contact with the pregnant woman, to identify and manage current and potential risks and problems during pregnancy, and to establish a delivery plan based on her needs, resources and circumstances [11-13]. Women can access ANC either by visiting a health facility where interventions such as tetanus toxoid immunization, deworming, iron and folic acid supplementation and counseling on maternal health are available or from health workers during their community visits [14]. The WHO recommends at least four ANC visits during pregnancy. The first visit is to be made within the first trimester of pregnancy (i.e. gestational age of less than 12 weeks), followed by a minimum of three subsequent visits until delivery. The first trimester visit (early antenatal care), which is essential to identify and evaluate the

risk factors usually present before pregnancy [11,15], is often poorly patronized [16]. Although global coverage of early antenatal care has improved in the last 2 decades, increasing from approximately 40.9% in 1990 to 58.6% in 2013, substantial inequalities between regions and income groups remain. In 2013, less than half (48.1%) of all women in developing countries received early antenatal care compared to 84.8% in developed regions; and 24.0% in low-income countries compared to 81.9% in high-income countries [16]. Addressing inequities in early ANC uptake will require an understanding of the contextual factors that influence ANC utilization, including service availability and access. Even in settings where ANC services are available, uptake by pregnant women is often far from universal [17]. Timely and regular ANC visits are expected to provide opportunities for delivering interventions to improve pregnancy outcomes and impact maternal and newborn health outcomes [11,18]. Although evidence from several low- and middle-income countries indicate a considerable increase in ANC attendance in recent times, the percentage of women receiving all routine ANC interventions remains low, ranging from 10% in Jordan to approximately 50% in Nigeria, Nepal, Colombia and Haiti, and interventions provided in the care package may be suboptimal [19]. Thus, understanding the factors that influence ANC utilization in various settings is critical for developing appropriate interventions for increasing uptake, assuring equitable access, improving timeliness and ensuring safe pregnancies and outcomes. This study aimed to investigate the extent of antenatal care utilization in the East Akim Municipality of Ghana and the factors that influence timely and regular ANC visits during pregnancy.

2. Methods

The study was conducted in the East Akim Municipality, which is one of the twenty-six administrative districts in the Eastern region of Ghana with Kyebi as its municipal capital. The East Akim Municipal Assembly has a population of 167,896, of which 51.3% are females, according to the 2010 Population and Housing Census [20]. Nearly 40% of the population is rural and predominantly engaged in agriculture, fishing, forestry, crafts and trading. The municipality has two hospitals, four health centres, twelve CHPS compounds and two maternity homes that provide maternal health services.

2.1. Data collection methods and tools

A structured questionnaire guided by the research questions and objectives of this study was developed and administered by trained field assistants. The questionnaire documented the respondents' demographic characteristics and utilization of ANC services during pregnancy. Pretesting of the questionnaire was done with 10 women from Fanteakwa, a nearby district with similar socio-demographic characteristics as the target population. Completed questionnaires were checked for completeness. Other data obtained in the municipality included health system characteristics such as the distribution of health facilities and cost of maternity services. The study sample size was determined using an estimated population of women of reproductive age of approximately 41,601 with a 5% margin of error. Using the Epi info sample size calculator, the estimated sample size was 310 assuming a non-response rate of 8%. A stratified sampling technique was used to select the required sample for the study. The communities within the East Akim Municipality were stratified into two groups: urban and rural strata with nine (9) and eleven (11) major communities, respectively. A simple random sampling methodology was used to select a total of four communities from both rural and urban strata. Three

hundred and ten respondents (310) respondents were drawn from the 4 randomly selected communities according to their population proportion. Women of reproductive age (15-49 years) residing in the selected communities who had experienced pregnancy and child birth in the last two years prior to the study were considered eligible for the study. Those who consented to participate during a household survey were enrolled in the study as participants and interviewed using a structured questionnaire. All households were visited until the required number of respondents for each community was achieved.

2.2. Ethical consideration

Ethical approval was obtained from the Ethical Review Board of the Ghana Health Service through the East Akim Health Directorate. Informed consent was read to each participant, and approval was obtained before data collection. Respondents were also assured of confidentiality, and anonymity was assured by using assigned codes instead of respondent names on the questionnaires. Study participants were informed of their right to opt out of the study at any time.

2.3. Data analysis

The data collected were managed using Microsoft Excel 2016 and analyzed using STATA statistical software version 14. Univariate analysis of sociodemographic and other variables was performed for descriptive purposes. Bivariate analysis was used to investigate the association between women's socio-demographic characteristics, individual and health system factors and regular antenatal visits at a 95% confidence interval and a statistical significance level of 5%. Multivariate logistic regression modeling was employed to determine the predictors of regular ANC attendance during pregnancy.

3. Results

Three hundred ten (310) participants completed questionnaires, yielding a response rate of 100%. Analysis was therefore performed on all 310 completed questionnaires.

3.1. Demographic characteristics of study participants

The demographic characteristics of the respondents are presented in Table 1. The average age of respondents was 27 ($\pm$6.57) years, ranging from 16 to 42 years. A high proportion of the respondents (88.4%) had formal education, with 11.6% having no formal education. More than half of the respondents (50.6%) had attained middle or junior high school (JHS) education, 24.2% had primary education and 5.2% had tertiary or higher education. Despite the relatively high number of women with formal education, only 7.1% were formally employed, 47.1% were informally employed and 45.8% were unemployed. More than a third of the respondents (41%) had no stable income, with very few (3%) earning a relatively high monthly income above Ghc1000 (~ USD 250). Respondents were predominantly rural residents (63.2%), with 36.8% residing in urban areas. Most of the respondents were Christian (93.6%). Approximately 35.4% of the respondents were married, 22.3% were single mothers and 42.3% were cohabiting, that is, living with a partner without formal marriage. Almost 60% of the respondents had up to two births, and 40.3% had three or more births.

Table 1: Demographic characteristics of respondents

Characteristics	Frequency (n)	Percentage (%)
Age (years)		
16-22	95	30.7
23-28	115	37.1
29-34	54	17.4
35-43	46	14.8
Parity		
1-2 children	185	59.7
3-8 children	125	40.3
Education		
No Formal Education	36	11.6
Primary	75	24.2
Middle/JSS/JHS	157	50.6
SSS/SHS/Vocational	26	8.4
Tertiary/Polytechnic	16	5.2
Religion		
Christian	290	93.6
Muslim	15	4.8
No Religion	5	1.6
Marital status		
Married	110	35.5
Co-habiting	131	42.3
Single	69	22.2
Employment status		
Formal/Salary workers	22	7.1
Informal/self-employed	146	47.1
Unemployed	142	45.8
Income status		
High Income (>GHC 1000 (~US$250))	9	3.0
Low-to-medium (<GHC1000 (~US$250))	174	56.0
No income	127	41.0
Residence		
Rural	196	63.2
Urban	114	36.8

3.2. Individual characteristics associated with the use of maternity services

Table 2 presents data on some individual respondent characteristics associated with the use of maternity services. Most (69%) of the respondents had a previous childbirth prior to their current child or the last birth at the time of the study, with the remaining 31% having no previous childbirth experience. Additionally, a high proportion of pregnancies (63.2%) were unintended, with only 36.8% being intended. Less than a third (28.1%) of respondents had a history of pregnancy complications, with 18.7% of the women reporting difficulties with their last childbirth. The most common delivery mode experienced by the mothers was vaginal (85.8%), with approximately 14% having either emergency or planned caesarean delivery. Decision-making power among women in this community was low, with almost half of the respondents (46.1%) having low or no decision-making power concerning their pregnancy and childbirth. However, family support for women during pregnancy and childbirth was rather high at 78.7%. Only 21.3% of the respondents indicated that they did not receive any support from their families during their last pregnancy. Supportive family members include partners, parents and in-laws. More than half of the respondents (53.9%) indicated that they obtained information about pregnancy and childbirth-related issues from the media. Among the types of media mentioned

were television by 50% of the respondents, radio (29%), 12% indicated they received information from both radio and television and 9% mentioned internet or social media.

Table 2: Individual characteristics associated with the use of maternity services

Individual characteristics	Frequency (n)	Percentage (%)
Previous childbirth		
Yes	214	69.0
No	96	31.0
Mode of delivery		
Vaginal	266	85.8
Emergency Caesarean	38	12.3
Planned Cesarean	6	1.9
Intended pregnancy		
Yes	114	36.8
No	196	63.2
Complications with index pregnancy		
Yes	87	28.1
No	223	71.9
Difficulties with previous pregnancy		
Yes	58	18.7
No	252	81.3
Family structure		
Nuclear Family	205	66.1
Extended Family	105	33.9
Availability of family support		
Yes	244	78.7
No	66	21.3
Pregnancy-related decision-making power		
High	63	20.3
Medium	104	33.6
Low	143	46.1
Health status during pregnancy		
Fair	33	10.6
Good	172	55.5
Very Good	105	33.9
Access to pregnancy-related information through media		
Yes	167	53.9
No	143	46.1
Media for accessing pregnancy-related information		
Television only	155	50.0
Radio only	90	29.0
Both television and radio	37	12.0
Social media/internet/phone	28	9.0

3.3. Health system characteristics associated with the use of maternity services

Table 3 shows the health system factors associated with the use of maternity services. The majority of the mothers (88.7%) admitted to the availability of maternity services within their community. More than half of the respondents (56.4%) lived within 5 to 10 kilometers to the nearest health facility, and 34.2% lived less than 5 kilometers to the closest health facility. Only 9.4% of the respondents lived more than 10 kilometers from the nearest health facility. Maternal health care was largely financed through health insurance (83.5%), which was corroborated by evidence of a high proportion of respondents (95.8%) having an active health insurance card. Other means of payment for maternal health care included out-of-pocket (12.6%) and family support (3.9%).

Approximately 12% of respondents rated the cost of maternity services as high, 27.4% as moderate and 9% as low. More than half of the mothers (51.6%) could not rate the cost of maternity care because they believed they did not incur any extra cost above the insurance coverage. Most of the respondents described the attitude of health workers as excellent (33.8%) or very good (39.7%), with 10.7% describing it as fair or poor.

Table 3: Health system characteristics associated with the use of maternity services

Health system characteristics	Frequency (n)	Percentage (%)
Maternity services available in community		
Yes	275	88.7
No	35	11.3
Distance to the nearest facility		
< 5 kilometers	106	34.2
5 to 10 kilometers	175	56.4
> 10 kilometers	29	9.4
Attitude of health workers		
Excellent	105	33.8
Very Good	123	39.7
Good	49	15.8
Fair	17	5.5
Poor	16	5.2
Having active health insurance		
Yes	297	95.8
No	13	4.2
Sources of healthcare financing		
Health insurance	259	83.5
Out of pocket	39	12.6
Family support	12	3.9
Cost of maternity services		
High	37	12.0
Moderate	85	27.4
Low	28	9.0
Don't know	160	51.6

3.4. Antenatal care attendance among respondents

Antenatal care utilization in East Akim was found to be high, with 98.4% of respondents who had a birth in the two years preceding the study having at least one ANC visit during pregnancy (Table 4). The majority of women (83.5%) had four or more visits as recommended by the WHO, and only 1.6% did not make any ANC visits during their pregnancy. However, among the women who attended ANC, 61% made regular ANC visits without missing an appointment. The remaining 39% missed at least one appointment. The average number of

ANC visits by respondents was 6 ± 2.3 with a range of 1 to 11 visits. ANC was largely accessed from government hospitals or clinics (91.9%). Others accessed their care from health centers (5.8%), with a small proportion (0.7%) accessing services from private facilities. Some respondents (27.7%) reported having difficulty reaching ANC services. Among those respondents, reasons for such difficulties include long distance (24.9%), cost (25.6%) and poor physical and environmental conditions of the facility (29.1%). Other reasons indicated were lack of support from family (15.1%) and time constraints (2.3%), especially for working mothers.

Table 4: Antenatal care attendance among respondents

Variables	Frequency (n)	Percentage (%)
At least one ANC visit		
Yes	305	98.4
No	5	1.6
Number of ANC visits		
None	5	1.6
1-3	51	16.5
4+	259	83.5
Average number of ANC visits	6	SD ± 2.3
Regular ANC attendance		
Yes	189	61.0
No	121	39.0
ANC provider		
Midwife	100	32.3
Nurse	190	61.3
Doctor	15	4.8
None	5	1.6
Place of receiving ANC		
Hospital/Clinic.	285	91.9
Health Center	18	5.8
Private facility	2	0.7
None	5	1.6
Having difficulties accessing ANC		
Yes	86	27.7
No	224	72.3
Type / reason for difficulties (n=86)		
Long distance	24	27.9
Cost	22	25.6
Lack of family support	13	15.1
Poor physical condition (environment)	25	29.1
Lack of time	2	2.3

3.5. Timing and frequency of ANC visits among respondents

Table 5 shows the timing and frequency of ANC visits among respondents. Early ANC visits occurring in the first trimester of pregnancy were relatively high among the respondents (58.0%), ranging from 49.5% among 16- to 22-year-olds to 72.2% among 29- to 34-year-olds. Thus, older mothers seem to access ANC earlier than younger mothers. A higher proportion of mothers in formal employment (72.7%) and urban residence (61.4%) also made early ANC visits compared with 54.7% among the unemployed and 56.0% among rural residents. A high proportion of mothers with secondary level or higher education (71.4%) also accessed ANC in the first

trimester. ANC visits were classified as either adequate - at least four visits (4+) or inadequate - less than four visits (<4). Approximately 83.5% of respondents in this study had at least 4 ANC visits. A high proportion of women in both urban (90.4%) and rural (79.6%) areas had at least 4 visits compared to 9.6% of urban and 20.4% of rural residents who had fewer than four visits. Almost all women in formal employment (95.4%) had at least 4 ANC visits.

Table 5: Timing and frequency of ANC visits among respondents

Characteristics of respondents	ANC Timing (N=305)		No. of ANC Visits (N=310)	
	Early n (%)	Late n (%)	4+ visits n (%)	<4 visits n (%)
Age group				
16-22	45 (49.5)	46 (50.5)	72 (75.8)	23 (24.2)
23-28	66 (57.9)	48 (42.1)	96 (83.5)	19 (16.5)
29-34	39 (72.2)	15 (27.7)	52 (96.3)	2 (3.7)
35-43	27 (58.7)	19 (41.3)	39 (84.8)	7 (15.2)
Residence				
Rural	107 (56.0)	84 (44.0)	156 (79.6)	40 (20.4)
Urban	70 (61.4)	44 (38.6)	103 (90.4)	11 (9.6)
Education				
None	21 (60.0)	14 (40.0)	28 (77.8)	8 (22.2)
Primary to JHS	126 (55.3)	102 (44.7)	191 (82.3)	41 (17.7)
Secondary of Higher	30 (71.4)	12 (28.6)	40 (95.2)	2 (4.8)
Parity				
1-2	106 (57.6)	78 (42.4)	154 (83.2)	31 (16.8)
>2	71 (58.7)	50 (41.3)	105 (84.0)	20 (16.8)
Employment status				
Formal/salary worker	16 (72.7)	6 (27.3)	21 (95.4)	1 (4.6)
Informal/self employed	86 (58.9)	60 (41.1)	126 (86.3)	20 (13.7)
Unemployed	75 (54.7)	62 (45.3)	112 (78.9)	30 (21.1)

3.6. Bivariate analysis of demographic and health system factors associated with regular ANC attendance

Table 6 shows the demographic and health system factors associated with the regular use of ANC services among respondents. Among the demographic factors, age of mothers, educational levels and residence were found to be significantly associated with regular antenatal visits (p-values <0.001, 0.004 and <0.001, respectively). Women's employment status and marital status were also found to be significantly associated with regular antenatal visits with p-values <0.001 and 0.007, respectively. Parity and ethnicity were not significantly associated with regular ANC attendance. Individual factors such as income status, pregnancy intention and decision-making power were found to be significantly associated with regular ANC visits. (p-value <0.05). Interestingly, health status during pregnancy and having active health insurance were not significantly associated with regular ANC visits. Health system factors such as the availability of maternity services in the community and distance to the nearest health facility were also found to be significantly associated with regular ANC visits (p-value <0.050) in the bivariate analyses.

Table 6: Bivariate analysis of demographic and health system factors associated with regular ANC attendance

Variables	Regular ANC attendance		
	Yes	No	
	n (%)	n (%)	P-value
Age			
≤28 years	113 (59.8)	97 (80.2)	0.001*
≥29 years	76 (40.2)	24 (19.8)	
Education			
None	23 (12.2)	13 (10.7)	0.004*
Primary/JSS	131 (69.3)	101 (83.5)	
Secondary or High	35 (18.5)	7 (5.8)	
Religion			
Christian	177 (93.7)	113 (93.4)	0.107
Muslim	11 (5.8)	4 (3.3)	
None	1 (0.5)	4 (3.3)	
Residence			
Rural	105 (55.6)	91 (75.2)	<0.001*
Urban	84 (44.4)	30 (24.8)	
Employment status			
Formal/salary worker	18 (9.5)	4 (3.3)	<0.001*
Informal/self-employed	108 (57.2)	38 (31.4)	
Unemployed	63 (33.3)	79 (65.3)	
Marital status			
Cohabitation	76 (40.2)	55 (45.5)	0.007*
Married	79 (41.8)	31 (25.6)	
Single	34 (18.0)	35 (28.9)	
Parity			
1-2	109 (57.7)	76 (62.8)	0.368
>2	80 (42.3)	45 (37.2)	
Health status during pregnancy			
Fair	20 (10.6)	13 (10.8)	0.321
Good	99 (52.4)	73 (60.3)	
Very good	70 (37.0)	35 (28.9)	
Decision-making power			
High	43 (22.7)	20 (16.5)	0.017*
Low	75 (39.7)	68 (56.2)	
Medium	71 (37.6)	33 (27.3)	
Income status			
High	30 (15.9)	12 (9.9)	<0.001*
Low to Medium	99 (52.4)	41 (33.9)	
No Income	60 (31.7)	68 (56.2)	
Intended pregnancy			
No	101 (53.4)	95 (78.5)	<0.001*
Yes	88 (46.6)	26 (21.5)	
Distance to health facility			
<5 kilometers	64 (33.9)	42 (34.7)	<0.001*
5 to 10 kilometers	117 (61.9)	58 (47.9)	
>10 kilometers	8 (4.2)	21 (17.4)	
Availability of maternity services			
No	16 (8.5)	19 (15.7)	0.050*
Yes	173 (91.5)	102 (84.3)	

* **p-value <0.05: measure is significant; n represents frequencies and %, percentages**

3.7. Predictors of regular ANC attendance

Table 7: Multivariate logistic regression of variables associated with regular ANC attendance

Variables	P- value	OR (95%)	P-Value	AOR (95%CI)
Age				
28 and below	Ref	1	Ref	1
29 and above	0.0002	2.72(1.57, 4.70)	0.162	1.64(0.82, 3.27)
Education				
None	Ref	1	Ref	1
Primary/JHS	0.4028	0.73(0.35,1.521)	0.987	1.0(0.44, 2.37)
Secondary/ higher	0.0514	2.83(0.95, 8.43)	0.237	2.48(0.55, 11.14)
Residence				
Rural	Ref	1	Ref	1
Urban	0.0005	2.42(1.45, 4.06	0.126	1.62(0.87, 3.01)
Employment status				
Unemployed	Ref	1	Ref	1
Informal/self-employ	0.001	3.56(2.12, 6.00)	0.013	2.42(1.20, 4.88)*
Formal work	0.0011	5.64(1.74, 18.28)	0.488	1.94(0.30, 12.62)
Marital status				
Single	Ref	1	Ref	1
Cohabiting	0.2388	1.42(0.79, 2.56)	0.864	0.94(0.46, 1.93)
Married	0.0024		0.682	0.83(0.36, 1.95)
Distance to facility				
More than 10 km	Ref	1	Ref	1
5 to 10 kilometers	0.0001	5.29(2.13, 13.18)	0.074	2.56(0.91, 7.17)
Less than 5 kilometers	0.0018	4.00(1.56, 10.25)	0.020	3.24(1.20, 8.72)*
Available maternity service				
No	Ref	1	Ref	1
Yes	0.0499	2.01(0.99, 4.11)	0.125	2.04(0.82, 5.06)
Decision power				
Low	Ref	1	Ref	1
High	0.0350	1.95(1.04, 3.37)	0.841	1.084(0.50, 2.37)
Medium	0.0127	1.95(1.14, 3.32)	0.287	1.42(0.75, 2.69)
Income status				
No income	Ref	1	Ref	1
High income	0.0058	2.83(1.31, 6.14)	0.160	0.45(0.15, 1.37)
Low to medium	0.0001	2.74(1.63, 4.60)	0.790	1.10(0.54, 2.23)
Intended pregnancy				
No	Ref	1	Ref	1
Yes	<0.001	3.18(1.86, 5.45)	0.005	2.46(1.32, 4.57)*

OR-unadjusted odds ratio, AOR-adjusted odds ratio, CI-Confidence interval, α<0.05 (significance level)

Table 7 presents adjusted odds ratios of variables that were found to be significantly associated with regular ANC attendance in the bivariate analysis to determine the likelihood of a woman having a regular ANC visit. After adjusting for confounders, employment status was found to be a significant predictor of regular ANC utilization. Women who were engaged in informal employment were approximately 2.4 times more likely to have regular ANC visits than unemployed women (AOR: 2.42, 95% CI: 1.204-4.488). Additionally, women in formal employment were almost two times more likely to fulfil all their antenatal appointments than those not employed (AOR: 1.94, 95% CI: 0.298-12.615). However, this association was not statistically significant (p-value, 0.488). Distance to the health facility was found to be a significant predictor of regular ANC utilization after adjusting for age, education, marital status and residence. Compared to those who lived more than 10

kilometers to a health facility, women who lived less than 5 kilometers were 3.2 times more likely to have regular ANC attendance (AOR: 3.24, 95% CI: 1.20-8.72). Pregnancy intention was also significantly associated with regular ANC visits (AOR: 2.46, 95% CI: 1.32- 4.57. Thus, mothers whose pregnancies were intended were approximately 2.5 times more likely to have regular ANC visits compared to those whose pregnancies were unintended.

4. Discussions

The outcome of this study demonstrates a high level of ANC utilization among women in the East Akim municipality (98.4%). This finding is aligned with findings of the 2017 Ghana Maternal Health Survey [5], which reported 98% of mothers surveyed nationally receiving at least one antenatal care. This study also found that a high proportion of mothers (83.5%) made the WHO recommended four or more (4+) ANC visits during pregnancy. This observation also compares well with those by Asundep and his colleagues [21] who reported that 89% of mothers in the Ashanti region of Ghana access 4+ ANC visits; Yeji and his colleagues [22] who found 86.1% of pregnant women in three regions of Ghana receiving 4+ ANC visits; and the Ghana Demographic and Health Survey (GDHS) 2014 [23], which put the proportion of women receiving 4+ ANC visits at 87%. These observations demonstrate that Ghana has been successful at expanding coverage of maternal health services and antenatal care in particular across the country, as indicated in its national strategic plan of 2014 [24], with commensurate policies on health insurance to reduce financial barriers to maternal health care [25]. However, as demonstrated in this study and other national surveys [5,23], although ANC use (at least one visit) is almost universal, disparities in attending 4+ ANC visits persist across the country and differ by socioeconomic parameters such as age, urban/rural residence, mothers' education and income or wealth quintiles. These observations call for critical interventions to reduce disparities and ensure equity in access and utilization of maternal health services in Ghana, since non-utilization of maternal health services has been identified as a critical factor in the persistently high maternal and neonatal mortality rates observed in most developing countries [26]. Towards universal access to health care, the government of Ghana adopted the Community-based Health Planning and Services (CHPS) programme in 1999 [27] as a national health policy initiative to reduce geographical barriers to healthcare and promote universal access to health services in the country. Related initiatives aimed at improving maternal and newborn health outcomes include the training, recruitment and posting of more nurses and midwives to peripheral health facilities, especially in rural communities [27]. A "free maternal health" policy, which was part of the National Health Insurance ACT (650) introduced in 2003, also aimed at removing financial barriers and improving access to maternal and newborn health care [25]. However, the "free maternal health policy" did not include provisions for family planning services. Coverage for family planning services within the national health insurance scheme and "free maternal health" program in particular, is essential to enable women avoid unintended pregnancies, with benefits to society as a whole.

4.1. Timing of ANC visits

With regard to the timing of ANC visits, 58.0% of the respondents in this study had their initial ANC registration within the first trimester of pregnancy. This observation is comparable to the outcome of the 2017

Maternal Health Survey [5], where 64% of mothers had their first ANC visit in the first trimester in line with WHO recommendations [11]. Asundep and his colleagues [21] also reported that 61% of mothers in the Ashanti region of Ghana initiated ANC during the first trimester of pregnancy. Early timing of first ANC visits is required for early detection, treatment and prevention of conditions that may have adverse consequences for the pregnant woman and her unborn baby. Globally, although coverage of early ANC visits has increased over the past two decades from an estimated 40.9% in 1990 to 58.5% in 2013, coverage in sub-Saharan Africa remained low at 24.9% in 2013, increasing from an estimated 17.7% in 1990 [16]. The relatively high patronage of early ANC by approximately two-thirds of mothers in Ghana and in the study area is impressive and commendable, though opportunities for improvement remain. A study conducted among women in southeastern Nigeria showed that women usually report late for ANC due to the belief that there are no advantages to early booking, as ANC is perceived primarily as curative rather than preventive [7] . Further studies are needed to understand the reasons for late ANC attendance, particularly in sub-Saharan African countries and economically disadvantaged communities. Such information is needed to inform the development of appropriate interventions to encourage and support early ANC attendance.

4.2. Determinants of regular ANC attendance

Approximately 61% of respondents in this study attended all regularly scheduled ANC visits, making an average of six (6) ANC visits per woman. A similar observation has been made in Nigeria, where 56.9% of pregnant women were found to be regular ANC attendees [28]. Regular ANC attendance was found to be associated with certain individual, demographic and health system factors, such as age, education, urban/rural residence, employment, income, marital status, decision-making power, availability of maternity services, distance to health facility and pregnancy intention. After adjusting for age, education, income and residence, employment status of the respondents, distance to the nearest health facility and pregnancy intention were found to be significant predictors of regular ANC attendance. Mothers who lived less than 5 kilometers to a health facility were 3.2 times more likely to fulfil all their regularly scheduled ANC appointments (AOR: 3.24, 95% CI: 1.20-8.72) than those who lived more than 10 kilometers from the health facility. Jalal & Shah [29] also found that rural women who lived in far and remote areas were less likely to attend ANC than those who did not. An increase in distance implies paying some cost to travel to the source of care as opposed to undertaking self-care at home. There is a sense that distance adds an extra burden to the monetary cost of care [30]. These concerns were echoed in the present study, where 25.6% of respondents cited cost as a barrier to accessing ANC services. Approximately 27.7% of mothers in this study reported having difficulty reaching ANC services. Among those respondents, more than half cited long distance (24.9%) and cost (25.6%) as the principal reasons for such difficulties. Women who reside >10 km from health facilities complained of muddy and non-motorable roads during the rainy seasons, which is characteristic of deprived, often rural communities in Ghana and other developing countries with inequitable distribution of national resources and infrastructure such as roads. Indeed, poor road conditions have been identified as one of the key factors that prevent women in the Sunamganj district of the Sylhet division of Bangladesh from using healthcare facilities [31]. Public hospitals and clinics were found to be the principal providers of ANC services in the study district (91.9%). Private facilities are less common and thus rarely used by women (0.7%). Interestingly, health insurance cover was not a significant predictor of regular ANC attendance, probably because almost all women (95.8%) were enrolled in the

government's Free Maternal Health Program and had active health insurance coverage. In this study, women who were unemployed were less likely to access ANC than those in formal employment and those engaged in informal employment were approximately 2.4 times more likely to have regular ANC visits compared to the unemployed. Clearly, economic barriers mitigate regular ANC utilization and reinforce inequities in access to maternal health services. Women in this study whose last pregnancy was intended were more likely to attend all their ANC appointments (AOR: 2.46, 95% CI: 1.32-4.57). Pregnancy intention has been documented by to be significantly associated with an adequate number of ANC visits [32,33]. Unintended pregnancy often induces a lack of motivation to seek ANC and other maternal health services. Other factors reported to be associated with ANC utilization in developing countries include cultural norms such as women's status and decision-making power, access to reproductive health services and information, and intimate partner violence (IPV) [32,33]. Understanding the factors that influence women's use of maternal health services in the context of their sociocultural environment is necessary to inform the development of effective interventions to improve maternal and newborn health outcomes.

5. Conclusion

In East Akim Municipality, a high proportion of mothers make 4 or more ANC visits during pregnancy. However, less than 60% of mothers make their initial ANC visit within the first trimester of pregnancy. Early, timely and regular ANC visits are essential to ensure that mothers receive appropriate WHO recommended interventions for good pregnancy outcomes. Additionally, socioeconomically disadvantaged mothers with unintended pregnancies who were unemployed, and those who lived more than 10 km from a health facility made less frequent use of ANC services. These observations call for critical interventions to reduce disparities and ensure equitable access and utilization of maternal health services in Ghana.

6. Recommendations

Raising awareness about the importance of early, timely and regular ANC visits should be a priority. Access to ANC services can be enhanced by ensuring that community-based health centers are adequately equipped to respond to women's reproductive health needs, including the delivery of outreach services to remote, hard-to-reach locations. Coverage of family planning services by the National Health Insurance Scheme is also essential to increase access to services and enable women to make informed decisions about their fertility and reduce unintended pregnancies. In addition to measures aimed at reinforcing women's autonomy in society including socioeconomic empowerment, strong political will at the highest level of government is needed to ensure adequate and equitable resourcing to honor the right of mothers to quality reproductive health services that are accessible to all women.

7. Strengths and limitations

This study provides useful data on the prevailing pattern of ANC utilization in the East Akim Municipality of Ghana, which provides a basis for strengthening ANC and ensuring equitable access to effective interventions for improving maternal and newborn health outcomes. Experiences from the municipality can inform programs

in other parts of Ghana and other developing countries. The study relied on self-reports from the respondents thus raising the potential for information bias. This potential bias was minimized by verifying the authenticity of information provided in the respondents' Antenatal care booklet.

8. Declarations

8.1. Ethics approval and consent to participate

Ethical approval was obtained from the Review Board of the Ghana Health Service through the East Akim Health Directorate. Informed consent was obtained from the participants before data collection. An Ethical Considerations section is included in the Methods section of the Manuscript.

8.2. Consent for publication

The authors consent to the submission of this manuscript for publication.

8.3. Availability of data and materials

The datasets during and/or analysed during the current study are available from the corresponding author upon reasonable request.

8.4. Competing interests

The authors declare that they have no competing interests.

8.5. Funding

The study was supported by the authors with no external funding.

8.6. Authors' contributions

RDA and JYE designed the study. RDA analyzed the data and drafted the manuscript. IKD and JYE contributed to the data analysis and preparation of the manuscript. All authors worked on revising various drafts of the manuscript and read and approved the final version.

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