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Analysing the Factors Affecting Prenatal Visits in Guinea: A Secondary Study of the 2018 Demographic and Health Survey (DHS)

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Abstract

Background: Despite persistent efforts to improve maternal health through various interventions, Guinea faces challenges in achieving adequate antenatal care coverage (ANC). This study aims to identify the key factors influencing prenatal consultation in Guinea. **Methods:** A secondary analysis was conducted on Guinea's 2018 Demographic and Health Survey (DHS) data. The study sample comprised women aged 15 - 49 who participated in the survey. Logistic regression was employed to identify the determinants of ANC utilisation. **Results:** Most women in the sample (59.1%) were aged between 18 and 30, resided in rural areas (69.8%), had no formal education (71.0%), had low incomes (43.4%), were married (91.4%), relied on the radio for information (63.4%), and were employed at the time of the survey (68.0%). The study identified several factors acting as barriers to meeting the recommended four ANC visits, including low education levels, with odds ratios (OR) of 0.43 (p = 0.011) for those with no schooling and 0.48 (p = 0.046) for those with primary-level education. Lack of radio access also negatively influenced ANC utilisation with an OR of 0.72 (p = 0.012). Additionally, delayed timing of the first ANC visit in the second trimester had an OR of 0.36 (p < 0.001), while in the third trimester, the OR was 0.04 (p < 0.004). On the other hand, factors that facilitated achieving the recommended four ANC visits included having an average wealth quintile with an OR of 1.63 (p = 0.002) and being wealthy with an OR of 2.30 (p < 0.001). **Conclusion:** This study underscores the negative association between low education level and poverty with ANC utilisation among pregnant women in Guinea. These findings emphasise the need for targeted interventions to address the barriers faced by

vulnerable populations and improve maternal healthcare access and utilisation in the country.

1. Introduction

One of the critical targets of Sustainable Development Goal 3 (SDG 3) is to reduce the rates of maternal and newborn deaths to below 70 per 100,000 and 12 per 1000 live births, respectively [1]. Antenatal consultations (ANC) constitute a crucial component of safe motherhood to minimise maternal and neonatal morbidity and mortality [2] [3]. Achieving this objective relies, in part, on ensuring adequate prenatal care coverage [4].

ANCs play a vital role in preventing, diagnosing, and treating potential morbidities during pregnancy [5]. The World Health Organization (WHO) recommends a minimum of four ANC visits during pregnancy, with developed countries achieving approximately 98% compliance. At the same time, the rate remains below 70% in developing countries, despite facing high maternal mortality rates [1].

In many sub-Saharan African countries, ANC coverage needs to improve its quality and quantity. The prevalence of unattended or poorly monitored pregnancies varies considerably across different regions. For example, in Morocco (2020), 73.4% of women reported not receiving ANC during their last pregnancy [6]. In Kenya, the rate of unattended pregnancies was 32% [7], while in the Democratic Republic of Congo (DRC), only 27% of pregnant women had at least four ANC visits [8]. Similarly, in Cameroon (2018), 47.3% of pregnant women received between four and seven ANC visits [5], and in Mali (2018) [9], 19% of pregnant women did not receive ANC. In Côte d'Ivoire (2017), the ANC dropout rate was 57.55% [10].

Despite efforts by the state and partners to implement critical interventions aimed at improving maternal health, Guinea continues to face a high maternal death ratio, ranking among the highest in Sub-Saharan Africa, with 550 maternal deaths per 100,000 live births (MICS 2016). ANC coverage remains low, with only 35% of pregnant women having undergone at least four ANC visits, and in 29% of cases, the first ANC visit occurs after the fourth month of pregnancy as of 2018 [11].

Given this context of limited resources and persistently high maternal and perinatal mortality rates associated with low ANC follow-up rates [11], it becomes crucial to identify the determinants influencing ANC continuation in Guinea. Thus, the present study aims to investigate the factors influencing the utilization of ANC services in Guinea.

2. Methodology

2.1. Study Framework

Guinea is located in West Africa, with an estimated population of 12 million in 2019, 51.5% of whom are women. Most of our study population lives in rural areas (64%), and 44% lives below the national poverty line [12]. The public health system is organized into three levels: the primary level, which includes 407 rural and urban health centres, 26 district hospitals and nine communal health centres; the second level comprises seven regional hospitals; and the tertiary level comprises three national hospitals. The seven (7) administrative regions and the capital Conakry of the Republic of Guinea, served as a framework for the realisation of this study.

2.2. Study Setting

This study conducted an analytical study through secondary analysis of the DHS-2018 data, one of the country's most comprehensive cross-sectional studies. The fifth demographic and health survey (DHS 2018) conducted in Guinea since 1999 provided the data used in this study.

2.3. Population

This study focused on women in their reproductive age. The participants were limited to women aged between 15 and 49 years who resided in one of the selected enumeration areas (ZDs) during the data collection period and consented to participate. Women who refused to participate or were absent during the survey were excluded from the study.

2.4. Sampling

The DHS-2018 utilized a stratified cluster sampling approach at two levels. The sampling frame was based on the General Housing Population Census conducted in 2014 (RGPH, 2014), which identified 9679 enumeration areas (EAs). A total of 401 EAs were randomly selected at the first level, with 138 in urban areas and 263 in rural areas. At the second level, 8020 households were selected, with 2760 in urban areas and 5260 in rural areas.

2.5. Study Variable

Dependent Variable: The primary outcome of interest was the number of ANC visits, coded as 1 if the pregnant woman performed at least four ANC visits and 0 if she had less than four ANC visits.

Independent Variables: The study considered several independent variables, including age in years, region, residence (rural or urban), education level, number of people in the household, exposure to media, wealth quintile, marital status, employment status, relationship to the head of household, sex of the head of household, age of the head of household, number of children born, number of living children, spouse's level of education, number of prenatal consultations,

desire for pregnancy, and place of delivery.

2.6. Data Collection

The study utilized several questionnaires, including the household, women's, men's, and biomarker questionnaires, adapted based on the DHS Program models to address Guinea's specific demographic and health challenges. For this investigation, data was collected from the individual women's questionnaire available on DHS website (https://dhsprogram.com/). This questionnaire captured information on various aspects related to women eligible for DHS, including their sociodemographic characteristics, maternal healthcare, breastfeeding, children's nutritional status, as well as their spouse's characteristics and the wife's employment/activity.

2.7. Data Processing

Descriptive statistics such as mean, standard deviation, and proportions were used to summarize the variables. The association between the dependent variable (number of ANC visits) and explanatory variables was evaluated using appropriate statistical tests, including chi-square, Fisher, or Student tests. Variables with a p-value less than 0.05 were selected for inclusion in the multivariate logistic regression model. The significant variables from the regression analysis were further analyzed using the Classification and Regression Tree (CART) method.

3. Statistical Analysis

The statistical analyses were performed using software version 4.1.1 of RR (year and date). Logistic regression was used to identify the factors associated with ANC utilization, and the significance threshold was set at 0.05 for all analyses.

3.1. Ethical Consideration

Data for this study was obtained from the DHS through their dedicated online platform, ensuring anonymity and confidentiality of the participants. Compliance with ethical standards was maintained throughout the data extraction and utilization process, adhering to the confidentiality criteria enforced by MEASURE DHS.

3.2. Results

A total of 2068 women were enrolled in the study, with the majority (59.1%) belonging to the 18 - 30 age group, and the median age was 18 years. The participants were predominantly from rural areas (69.8%) and represented various regions, with Kindia (17.6%), Kankan (16.5%), and N'zérékoré (14.7%) being the most represented. Most participants were married (91.4%), and a significant proportion lacked formal education (71.0%). Radio was the primary source of information for the participants (63.4%), followed by television (42.1%). Additionally, 43.4% of the women were categorized as living in poverty, while 68.0%

Table 1. Distribution according to characteristics of 2068 participants of the EDS Guinea 2018.

Features	N = 2068
Age	
[15 - 18]	168 (8.1%)
[19 - 30]	**1222 (59.1%)**
[31 - 40]	575 (27.8%)
[41 - 49]	103 (5.0%)
Median [IQRT]	**28 (22, 3)**
Region	
Boke	233 (11.3%)
Conakry	**207 (10.0%)**
Faranah	256 (12.4%)
kankan	**342 (16.5%)**
Kindia	**363 (17.6%)**
Labe	231 (11.2%)
Mamou	131 (6.3%)
N'Zérékoré	**305 (14.7%)**
Residence	
Rural	**1444 (69.8%)**
Urban	624 (30.2%)
Education	
University	71 (3.4%)
No schooling	**1468 (71.0%)**
Primary	262 (12.7%)
Secondary	267 (12.9%)
Number of people in the household	
[02 - 04]	642 (31.0%)
[05 - 09]	**1057 (51.1%)**
[10 - 38]	369 (17.9%)
paperdiary	
Access	150 (7.3%)
No access	**1917 (92.7%)**
Radio	
Access	**1312 (63.4%)**
No access	755 (36.6%)
Television	
Access	871 (42.1%)

Continued

No access	**1197 (57.9%)**
Wealth quintile	
Average	402 (19.4%)
Poorer	**897 (43.4%)**
Rich	769 (37.2%)
Marital status	
Bachelor	178 (8.6%)
Married	**1890 (91.4%)**
Currently working	**1407 (68.0%)**
Relationship with head of household	
Indirect link	314 (15.2%)
Direct link	**1754 (84.8%)**
Gender of the head of household	
Women	244 (11.8%)
Male	**1824 (88.2%)**
Age of head of household	
[16 - 25]	80 (3.9%)
[26 - 40]	**875 (42.3%)**
[41 - 60]	**845 (40.8%)**
[61 - 91]	268 (13.0%)
Number of children born	
[1 - 2]	380 (18.4%)
[3 - 4]	**777 (37.6%)**
[5 - 7]	**692 (33.5%)**
[7 - 14]	219 (10.5%)
Number of living children	
0	439 (21.2%)
[1 - 2]	444 (21.5%)
[3 - 4]	**702 (33.9%)**
[5 - 7]	439 (21.2%)
[8 - 13]	44 (2.2%)
Spouse's level of education	
Superior	169 (8.2%)
Unschooled	**1447 (70.0%)**
Primary	151 (7.3%)
Secondary	301 (14.5%)
Period for the prenatal consultation	

Continued

First trimester	675 (32.6%)
Second trimester	**1188 (57.5%)**
Thirdtrimester	205 (9.9%)
Number of antenatal consultations	
<4	**1211 (58.6%)**
≥4	857 (41.4%)
Desire for pregnancy	
Later	271 (13.1%)
Never	53 (2.7%)
Now	**1744 (84.2%)**
Place of birth	
Public	**1720 (83.2%)**
Home	254 (12.3%)
Private	94 (4.5%)

[1]Median (IQR); not (%).

were employed. Moreover, the study revealed that 58.6% of women had received less than four antenatal care (ANC) visits, and 83.2% delivered their babies in public healthcare facilities (Table 1).

In the univariate analysis (Table 2), the completeness of antenatal care (ANC) varied across regions, with the highest proportion of completing all four ANC visits recorded in the Kindia region (21.8%, p-value < 0.001). Rural residents were more likely to achieve less than four ANC visits (59.2%, p-value < 0.001). Among women with no education, the majority had less than 4 ANC (77.3% vs 62.0%, p-value < 0.001). Access to information through paper newspapers, radio, and television was associated with differences in the proportion of completing all four ANC visits (p-value < 0.001). Wealthy women were more likely to complete all four ANC visits (52.0%, p-value < 0.001), and women with educated spouses were also more likely to achieve all four ANC visits (p-value < 0.001). Additionally, women who started ANC during the first and second trimesters had higher proportions of completing all four ANC visits (49.0% and 50.0%, respectively, with p-value < 0.001).

Women who have 7 or more children make less of the 4 recommended ANC than those who have less than 7 children (9.8% vs 11.2%, p-value < 0.029).

Lastly, women who gave birth in public hospitals had the highest proportion of completing all four ANC visits (77.6%, p-value < 0.001).

In the multivariate analysis (Table 3), several factors were found to limit or facilitate the achievement of the four (4) ANCs. primary-level, on-schooled women (OR = 0.43, p-value = 0.011) or had primary education (OR = 0.48, p-value = 0.046) were less likely to achieve the four ANCs. Lack of access to the

Table 2. Distribution according to the characteristics of the 2068 participants of the DHS Guinea 2018 according to the realization of the ANC.

Features	<4, N = 1.211	≥4, N = 857	p-value²
Age			0.3
[15 - 18]	106 (8.7%)	63 (7.3%)	
[19 - 30]	693 (57.2%)	530 (61.8%)	
[31 - 40]	349 (28.9%)	226 (26.4%)	
[41 - 49]	63 (5.2%)	38 (4.5%)	
Median [IQRT]	28 (23, 3)	28 (22, 3)	0.13
Region			<0.001
Boke	151 (12.5%)	82 (9.6%)	
Conakry	73 (6.0%)	134 (15.6%)	
Faranah	167 (13.8%)	88 (10.3%)	
kankan	188 (15.5%)	154 (18.0%)	
Kindia	176 (14.5%)	187 (21.8%)	
Labe	131 (10.8%)	101 (11.8%)	
Mamou	80 (6.6%)	52 (6.1%)	
N'Zérékoré	245 (20.3%)	59 (6.8%)	
Residence			<0.001
Rural	937 (77.4%)	507 (59.2%)	
Urban	274 (22.6%)	350 (40.8%)	
Education			<0.001
University	18 (1.5%)	54 (6.3%)	
No schooling	937 (77.3%)	531 (62.0%)	
Primary	145 (12.0%)	116 (13.5%)	
Secondary	111 (9.2%)	156 (18.2%)	
Number of people in the household			0.4
[02 - 04]	363 (30.0%)	279 (32.6%)	
[05 – 09]	638 (52.7%)	420 (49.0%)	
[10 - 38]	210 (17.3%)	158 (18.4%)	
paperdiary			<0.001
Access	54 (4.5%)	97 (11.3%)	
No access	1.157 (95.5%)	760 (88.7%)	
Radio			<0.001
Access	714 (59.0%)	598 (69.8%)	
No access	497 (41.0%)	259 (30.2%)	
Television			<0.001
Access	429 (35.4%)	442 (51.6%)	

Continued

No access	782 (64.6%)	415 (48.4%)	
Wealth quintile			<0.001
Average	238 (19.7%)	164 (19.1%)	
Poorer	649 (53.6%)	248 (28.9%)	
Rich	324 (26.7%)	445 (52.0%)	
Marital status			0.3
Bachelor	97 (8.0%)	81 (9.5%)	
Married	1114 (92.0%)	776 (90.5%)	
Currentlyworking	818 (68%)	589 (69%)	0.6
Relationship with head of household			0.7
Indirect link	181 (14.9%)	133 (15.5%)	
Direct link	1030 (85.1%)	724 (84.5%)	
Gender of the head of household			0.6
Women	139 (11.5%)	105 (12.3%)	
Male	1072 (88.5%)	752 (87.7%)	
Age of head of household			0.4
[16 - 25]	53 (4.4%)	26 (3.0%)	
[26 - 40]	500 (41.3%)	376 (43.9%)	
[41 - 60]	495 (40.9%)	351 (41.0%)	
[61 - 91]	163 (13.4%)	104 (12.1%)	
Number of childrenborn			<0.029
[1 - 2]	196 (16.2%)	184 (21.5%)	
[3 - 4]	470 (38.8%)	306 (35.7%)	
[5 - 7]	409 (33.8%)	283 (33.0%)	
[7 - 14]	136 (11.2%)	84 (9.8%)	
Number of living children			0.10
0	237 (19.6%)	203 (23.7%)	
[1 - 2]	259 (21.4%)	185 (21.6%)	
[3 - 4]	416 (34.4%)	285 (33.4%)	
[5 - 7]	275 (22.6%)	164 (19.1%)	
[8 - 13]	24 (2.0%)	20 (2.2%)	
Spouse's level of education			<0.001
Superior	61 (5.0%)	108 (12.6%)	
Unschooled	910 (75.1%)	536 (62.5%)	
Primary	87 (7.2%)	64 (7.5%)	
Secondary	153 (12.7%)	149 (17.4%)	
Period for the prenatal consultation			<0.001

Continued

First trimester	254 (21.0%)	421 (49.0%)	
Second trimester	763 (63.0%)	425 (50.0%)	
Thirdtrimester	194 (16.0%)	11 (1.0%)	
Desire for pregnancy			0.4
Later	159 (13.1%)	112 (13.1%)	
Never	36 (3.0%)	18 (2.1%)	
Now	1016 (83.9%)	727 (84.8%)	
Place of birth			<0.001
Public	1055 (87.1%)	665 (77.6%)	
Home	119 (9.8%)	136 (15.9%)	
Private	37 (3.1%)	56 (6.5%)	

[1]Median (IQR); not (%). [2]t-test adapted to complex survey samples: Wald test of independence for complex survey samples.

Table 3. Multivariate analysis of the achievement of the 4 ANCs according to the characteristics of the participants in the Guinea 2018 DHS.

Features	OR[1]	95% CI[1]	p-value
Education			
University	-	-	
No schooling	**0.43**	**0.22, 0.83**	**0.011**
Primary	**0.48**	**0.23, 0.99**	**0.046**
Secondary	0.69	0.34, 1.38	0.3
Radio			
Access	-	-	
No access	**0.72**	**0.56, 0.93**	**0.012**
Wealth quintile			
Poorer	-	-	
Average	**1.63**	**1.19, 2.23**	**0.002**
Rich	**2.30**	**1.72, 3.07**	**<0.001**
Place of birth			
Public	-	-	
Home	**1.40**	**1.02, 1.93**	**0.039**
Private	1.46	0.92, 2.31	0.11
Period for the prenatal consultation			
First trimester	-	-	
Second trimester	**0.36**	**0.29, 0.46**	**<0.001**
Thirdtrimester	**0.04**	**0.02, 0.08**	**<0.001**

[1]OR = Odds Ratio, CI = Confidence Interval.

radio was also a limiting factor (OR = 0.72, p-value = 0.012). The timing of ANC initiation was also significant, with women starting in the second trimester (OR = 0.36, p-value < 0.001) or third quarter (OR = 0.04, p-value < 0.004) less likely to achieve the four ANCs. On the other hand, having an average wealth quintile (OR = 1.63, p-value = 0.002) or being wealthy (OR = 2.30, p-value < 0.001) were facilitating factors for achieving the four ANCs.

4. Discussion

The study's methodology ensured the inclusion of diverse regions, demographic groups, and economic quintiles, resulting in a representative sample of the population without selection bias. The adequate sample size enabled precise estimates and the detection of group differences. The multivariate analysis accounted for potential confounding factors and identified the factors associated with ANC completion in pregnant women in Guinea. However, this quantitative study did not provide insights into the reasons behind why most women did not complete the WHO-recommended four ANC visits.

The predominance of women aged 18 - 30 (59.1%) in rural residences (69.8%) confirms the representativeness of the sample, considering that 64% of the Guinean population resides in rural areas [12]. Communication plays a crucial role in promoting positive health behaviours among people. Our study found that radio was the primary source of media information, consistent with the findings of the Mali 2018 DHS [9] and that of Senegal [13].

The high proportion of poverty among women in Guinea (43.4%) can be attributed to poor governance and limited employment opportunities in the country. Health facilities were the most commonly cited place of delivery, with 83.2% of women giving birth in public health facilities. This suggests that women are more likely to seek medical assistance for childbirth than for ANC services. The study revealed that 58.6% of women completed less than the recommended four ANC visits according to WHO guidelines, a pattern commonly observed across Africa, where prenatal care coverage rates are often low [6] [7] [8]. Several factors have been documented to explain the low coverage of prenatal care in Africa, including educational level, place of residence, exposure to media, social environment, and access to healthcare services [1] [3] [14] [15]. The Ministry of Health and its partners in Guinea have implemented several strategies to improve the situation, including decentralisingcare, training service providers, equipping care centres, raising awareness, implementing a policy of free ANCs, and adopting an advanced strategy that involves training community relays and health workers [11] [14].

Factors such as low education level, lack of access to radio, and late initiation of ANC were found to be associated with limited completion of the four ANC visits. This could be explained by the fact that women with lower education often have limited health education and may face more cultural barriers. They may not fully understand the health benefits of receiving prenatal care or may not

realize its importance for their own health and the health of their foetus [16] [17]. Baldé *et al*. reported in 2016 that low education is a factor in non-compliance with prenatal consultations. The author linked the prevalence of uneducated pregnant women to the overall education level of the Guinean population, where 74% are illiterate, with 85% of them being female [18]. Illiterate women consult less frequently than educated women [19]. Several studies report that the education of both wife and husband is associated with the use of ANC and that educated women and those whose husbands are more likely to use antenatal care services [20] [21] [22]-[27]. According to a systematic review of the use of ANC in developing countries, the education of the mother is the most consistent factor in explaining the use of antenatal care [26].

Women lacking access to the radio are unable to receive crucial awareness messages that could lead to behavioral change. Additionally, initiating the first ANC visit during the third trimester of pregnancy does not provide enough time for a woman to complete all four monthly ANCs, highlighting the need to emphasize the importance of scheduling the first visit between the 10th and 15th week, as recommended by the WHO [28] [29].

Conversely, the study found that being wealthy is a factor that facilitates the completion of the recommended 4 ANCs during pregnancy by the WHO. Ce constat est similaire à celui fait par Simkhada *et al*. [26] qui ont rapporté que le revenu des ménages est facteur affectant le recours aux soins prénatals. This could be explained by the fact that individuals with a higher socioeconomic status generally have higher levels of education and better access to media, which allows for better awareness and understanding of the importance of prenatal care and have more facilities to buy prescriptions and carry out examinations [30].

Women with no schooling and those at the primary level with an OR of 0.43 and 0.48 respectively are less likely to do the 4 ANC than those at the secondary or higher level. The education of the mother and partner has been reported as a factor influencing the use of prenatal care by pregnant women by Simkhada *et al*. [26]. The lack of access to the radio reduces by 28% (OR = 0.72) the chance of achieving 4 or more ANC. The late start of ANC also decreases the chance of doing the 4 ANC and this decrease increases as the delay increases (OR 2nd trimester = 0.36 and OR = 3rd trimester = 0.04). On the other hand, the fact of being rich multiplies by 2.3 the chance of making the 4 CPN or more recommended by the WHO and the fact of having given birth in a private structure multiplies by 1.46 the chances of making 4 CPN or more. For Simkhada *et al*. [26], the factors influencing the use of prenatal consultations are exposure to the media, history of obstetric complications, cultural beliefs, ideas about pregnancy and parity.

5. Conclusion

Addressing the identified barriers, such as improving educational opportunities

and accessibility to information through radio programs, is crucial in enhancing ANC utilization among pregnant women in Guinea. Moreover, focusing on strategies to reduce economic disparities and support women from lower wealth quintiles may increase the uptake of ANC services. A qualitative study could shed further light on the underlying social dynamics and cultural aspects that impact ANC completion, aiding in developing more targeted and effective interventions to improve maternal and perinatal health outcomes in the country.

Conflicts of Interest

The authors declare no conflicts of interest.

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