



FACTORS ASSOCIATED WITH LATE ANTENATAL CARE INITIATION FOR PREGNANT WOMEN AGED 15-49 YEARS IN SIERRA LEONE USING THE 2019 DEMOGRAPHIC HEALTH SURVEY

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ABSTRACT: Background: Antenatal care (ANC) is acknowledged as a critical maternal service in improving a wide variety of health outcomes for women and children as a result of better awareness of the importance of women being braced physically, mentally, and even logistically for delivery. Therefore, the timely initiation of ANC is critical to women. **Objective:** This study seeks to identify the factors affecting the timely initiation of ANC among women aged 15-49 in Sierra Leone. **Methodology:** This study adopted an analytical cross-sectional study using secondary data from the Sierra Leone Demographic and Health Survey. Frequencies and percentages were used to describe the explanatory variables. A multivariate logistic regression was conducted to identify the factors influencing the timely initiation of ANC in Sierra Leone. **Results:** The prevalence of timely initiation of antenatal care was 55.42%. Women residing in the northern ($aOR=1.51$, 95%CI 1.09-2.09), northwestern ($aOR=1.87$, 95%CI 1.33-2.61), southern ($aOR=1.64$, 95%CI 1.22-2.20) and western regions ($aOR=2.00$, 95%CI 1.38-2.89) had a high likelihood of starting antenatal late compared to those residing in the eastern region. Furthermore, women from the Limba ($aOR=3.10$, 95%CI 1.25-7.69), Sherbo ($aOR=2.80$, 95%CI 1.02-7.69) and Korankoh ($aOR=2.79$, 95%CI 1.13-6.85) ethnic groups had a higher likelihood of starting antenatal late compared to women from the creole ethnic group. Women who had no problem seeking for permission from their husbands for healthcare ($aOR=0.71$, 95%CI 0.55-0.89) and women who took healthcare decisions together with their husbands ($aOR=0.83$, 95%CI 0.70-1.00) had a lower likelihood of late initiation of antenatal care compared to those who had a big problem seeking for permission from their husbands for healthcare and respondents who took healthcare decisions alone. **Conclusion:** Findings from this study reveal that the timely initiation of antenatal care among women aged 15-49 years in Sierra Leone is low. Also, region of residence, ethnicity, husband's authorization for seeking healthcare and decision making on healthcare are the factors influencing the timely initiation of antenatal care in Sierra Leone among women aged 15-49. It is recommended that women empowerment programs be organized regularly to educate women on the need to make their personal healthcare decisions. Government must also build more health facilities in the other regions of the country, with more skilled maternal healthcare training in the country to ensure equal distribution of health workers.

KEYWORDS: Antenatal services, timely start, early initiation.



INTRODUCTION

Background

Pregnancy occurs naturally in women of reproductive ages. Unfortunately, most women die or develop complications during pregnancy, labor, and the postpartum period for a variety of causes [1]. Sustainable development goal 3.1 calls for every country to reduce its mortality rate by two-thirds from its 2010 baseline [2]. However, it has been established that developing nations account for about 99% of all maternal fatalities, which is quite alarming [3]. According to the World Health Organization, in 2017, countries in sub-Saharan Africa recorded 542 deaths for every 100,000 live births, compared to 216 deaths for every 100,000 live births globally [4]. A study indicates that Sierra Leone recorded an overall maternal mortality ratio of 510 deaths per 100,000 live births and a neonatal mortality rate of 31.1 deaths per 1,000 live births between 2019 and 2020, which were among the highest worldwide [5]. Maternal obstetric fatalities risk can be reduced with access to various maternal health services such as antenatal care.

Antenatal care is an essential part of maternal health, which includes a variety of operations like nutrition counseling, tetanus vaccination, malaria prophylaxis, human immune virus (HIV) testing, and counseling. Antenatal care is acknowledged as a critical maternal service in improving a wide variety of health outcomes for women and children as a result of better awareness of the importance of women being braced physically, mentally, and even logistically for delivery [6]. Therefore, the World Health Organization (WHO) updated Focused Antenatal Care (FANC) model recommends at least 4 ANC visits for uncomplicated pregnancies, with the first visit beginning before 16 weeks of gestation [7]. However, studies show that the great majority of mothers in sub-Saharan Africa begin antenatal care far later than is recommended [8].

In Sierra Leone, antenatal care coverage of four or more ANC contacts slowly increased from 76% in 2013 to 79% in 2019 [9]. To guarantee that every expectant mother, child, and newborn receives quality care and, as a result, has improved maternal and child health outcomes, Sierra Leone joined the Global Quality of Care Network in 2018. As stated in the Sierra Leone National Reproductive, Maternal, Neonatal, Child and Adolescent Health (RMNCAH) strategy (2017-2021), the Sierra Leone Ministry of Health and Sanitation (MOHS) adopted the new WHO ANC model in 2017. Goals further set forth by this strategy include lowering the maternal mortality rate to 650 per 100,000 live births and the neonatal mortality rate to 23 per 1,000 live births [4]. The use of antenatal care services is frequently restricted or delayed for several factors. Studies on the factors that influence antenatal care usage have been conducted worldwide but findings vary.

It is against this background that we investigate the timely antenatal care (ANC) practice among women aged 15-49 living in Sierra Leone. Also, data on the factors determining the utilization and timely initiation of antenatal care services in Sierra Leone are limited with inconsistent findings. In light of this, this research was done to determine the various sociocultural, socioeconomical, obstetric and institutional factors influencing the timely start of antenatal care services in Sierra Leone.



METHODS

Data Source

This study employed the use of the Sierra Leone Demographic and Health Survey (SLDHS) which was implemented in 2019. The SLDHS was a nationally representative cross-sectional survey that Statistics Sierra Leone (Stats SL) carried out with technical support from an ICF intern via the DHS Program and was financed by the US Agency for International Development (USAID). The data was acquired from the DHS program website at <http://dhsprogram.com/data/available-datasets.cfm>.

Study Sampling and Participants

A stratified, two-stage cluster sampling strategy was used to choose the 2019 SLDHS samples, with Enumeration areas (EA) as the first unit of the sampling stage. The enumeration areas (EAs) from the EA population census frame served as the foundation for the principal sampling unit (PSU), also known as a cluster. By dividing districts into urban and rural regions, stratification was accomplished, and a total of 31 sample strata were formed. 578 EAs were chosen in the first stage with a probability proportionate to the EA size, or the number of households within the EA. DHS uses a variety of surveys. A representative sample of 13,872 households was selected for the study. While the women's questionnaire (IR) gathers information on women's reproductive health, domestic violence, and nutrition indicators, the household questionnaire gathers information on the household environment, assets, and basic demographics of household members.

Women aged 15 to 49 who had a live birth during the three years before the survey and who either lived permanently in the selected home or had spent the previous night there were included in the secondary analysis for this study. From the total sample size of 15,574 women in the individual record file, 7,326 women who had a live birth during the five years before the survey and were permanent residents or were at their homes on the night of the survey were the target population. Women with missing ANC initiation data or who were not aware of the time of the start of ANC were dropped. A total of 7,180 women aged 15-19 were included in the logistic regression analysis. The five-year period was used to ensure good accountability and to increase the accuracy of the study.

Variables

Dependent Variable

The dependent variable was the time of initiation of ANC. It was measured by the gestational month at which a woman began ANC services. Women who started ANC in their 1-3 months (first trimester) were grouped as early initiation of ANC whereas those who commenced ANC in the 4th month and above were grouped as late initiation of ANC.

Independent Variables

This study included socioeconomic and demographic determinants, obstetric factors, institutional factors and sociocultural factors of ANC timely initiation based on evidence from available literature and data. The socioeconomic and demographic variables were used: (1) maternal age, (2) residence, (3) region, (4) type of residence (urban/rural), (5) sex of household



head, (6) marital status, (7) educational level, (8) wealth index, (9) internet exposure, (10) exposure to newspaper, (11) exposure to radio, (12) exposure to television, and (13) household size. The obstetric and institutional factors employed: (1) Parity (2) Distance to the healthcare facility. The sociocultural variables included were: (1) Religion, (2) Ethnicity, (3) Decision maker on healthcare, and (4) Permission from the husband to go to a health facility.

Maternal age was categorized as: (15-19 years, 20-24 years, 25-29 years, 30-34 years, 35-39 years 40-44 years and 45-49 years). The wealth index is a measure of relative household economic status and was calculated by Urban Development Health Survey (UDHS) from information on household asset ownership using Principal Component Analysis, which was further categorized into poorest, poorer, middle, richer, and richest quintiles. The place of residence was categorized into urban and rural. The region was categorized into five: northern, eastern, southern, western, and northwestern while the level of education was categorized into no education, primary education, secondary and tertiary education. Household size was categorized as less than seven members and seven and above members. The household head was categorized as female and male. Religion was categorized as Muslims and Christians and others; problems seeking permission and distance to health facilities were categorized as a big problem and no big problem while exposure to mass media and internet use (TV, radio, and newspapers) were categorized as no and yes. In the questionnaire, seeking permission to access healthcare and distance to health facilities were characterized as a big problem and not a big problem.

Statistical Analysis

The DHS dataset has a multistage sample design; thus, STATA 17 statistical software's complex samples package was utilized to account for it. The variables included in the analysis plan were the individual sample weight, sample strata for sampling errors/design, and cluster number. To account for the uneven probability sampling in the various strata and to guarantee the representativeness of the survey results at the national and regional levels, an analysis based on the weighted count was conducted.

A descriptive method was first used to explore and present the distribution and percentages of the dependent variables based on the timing of ANC. A bivariable logistic regression was employed to individually evaluate each independent variable for its relationship with the outcome variable. The crude odds ratio (COR), 95% confidence interval (CI), and p-values were then presented. The final multivariable logistic regression model was constructed to examine the independent effects of each variable on the timing and frequency of ANC. It also included independent variables with a p-value of 0.05 at the bivariable level and those that were not strongly collinear with other independent variables. With the statistical significance threshold set at a p-value of 0.05, adjusted odds ratios (AOR), 95% confidence intervals (CI), and p-values were computed.



RESULTS

Table 1 presents the demographic characteristics of participants. The age group 25-29 has both the highest proportion of timely start (26.69%) and late start (25.78%) of ANC respectively, followed by the age group 20-24 where 21.06% of respondents had an early start, whereas 22.79% had a late start of ANC. The majority of mothers resided in the rural areas of Sierra Leone with 63.74% initiating ANC early and 61.56% initiating late ANC healthcare respectively. Out of the women who started ANC service early, 26.71%, 20.77%, 15.47%, 20.47% and 16.68% were from the eastern, northern, northeastern, southern and western regions respectively. In terms of education and early initiation of ANC care, 52.73% had received no education, 14.67% had received primary education, 29.34% had received secondary education and 3.27% had received tertiary education respectively. From the wealth index, 21.45% of mothers were rated poorest, 22.43% were on the poorer scale and 14.91% were rated the richest.

The sociocultural characteristics of women aged 15-49 are presented in **Table 2**. The majority of women were Islamic. 77.81% of women who initiated ANC care early were Islamic while 79.42% of women who initiated ANC care late were Islamic. Most mothers who started ANC in the first trimester were from the Mende ethnic group (36.73%) whereas, in the late ANC group, the Temne ethnic group had the highest proportion (30.57%). Most mothers had husbands/partners being the decision makers of their healthcare-seeking (55.88% in the early ANC group and 58.26% in the late ANC group). About 72.98% of the women who started their ANC early did not have a problem getting permission from their husbands before seeking healthcare. However, 25.09% of women who had a late start of ANC had a problem getting permission from their husbands before seeking healthcare.

The obstetrics and institutional characteristics of women are presented in **Table 3**. About 40.34% of women who initiated ANC early had a parity of 4 or more while 23.14% had a parity of 1 respectively. Mothers who found a big problem with the distance to health facilities in the late ANC initiation group were 46.67% whereas those in the early ANC start group were 48.67% respectively.

Table 4 presents the factors associated with timely antenatal care. Women residing in the northern (aOR 1.51, 95%CI 1.09-2.09), northwestern (aOR 1.87, 95%CI 1.33-2.61), southern (aOR 1.64, 95%CI 1.22-2.20) and western regions (aOR 2.00, 95%CI 1.38-2.89) had a high likelihood of starting antenatal late compared to those residing in the eastern region. Furthermore, women from the Limba (aOR 3.10, 95%CI 1.25-7.69), Sherbo (aOR 2.80, 95%CI 1.02-7.69) and Korankoh (aOR 2.79, 95%CI 1.13-6.85) ethnic groups had a higher likelihood of starting antenatal late compared to women from the creole ethnic group. Women who had no problem seeking permission from their husbands for healthcare (aOR 0.71, 95%CI 0.55-0.89) and women who took healthcare decisions together with their husbands (aOR 0.83, 95%CI 0.70-1.00) had a lower likelihood of late initiation of antenatal care compared to those who had a big problem seeking for permission from their husbands for healthcare and respondents who took healthcare decisions alone.



DISCUSSION

The purpose of this study was to identify the factors that influence the timely initiation of antenatal care (ANC) among women aged 15-49 in Sierra Leone.

The percentage of early initiation of antenatal care in Sierra Leone from this study was low (44.76%) compared to women who initiated antenatal care after the third trimester (55.24%). This finding is consistent with a study in Sierra Leone (55.4%) conducted among women who had birthed in the last three years preceding the survey [10]. However, this study's prevalence of timely initiation of antenatal care is higher than those presented in Nigeria [11, 12], Ethiopia [13, 14] and lower than that reported in Ethiopia (46.8%) in a systematic review [15]. The disparities in the observed prevalence could be due to the variation of study periods, sample size employed and the study designs used respectively. While this study used a nationally representative sample in both rural and urban communities, some other studies were mostly conducted in hospitals mostly located in the country's economic center [16, 17]. Also, this study revealed that the utilization rate of eight or more antenatal care contacts was relatively low (22%). Several factors could account for this finding. The main reason could be due to the timing and non-completion of the implementation of the new ANC policy in Sierra Leone at the time of the start of the DHS survey [10]. Also, structural issues like inadequate roads and transit networks to healthcare institutions may contribute to the low usage of antenatal care.

Women residing in the Northern (aOR 1.51, 95%CI 1.09-2.09), Northwestern (aOR 1.87, 95%CI 1.33-2.61), Southern (aOR 1.64, 95%CI 1.22-2.20) and Western regions (aOR 2.00, 95%CI 1.38-2.89) had a high likelihood of starting antenatal late compared to those residing in the Eastern region. Some previous studies have also demonstrated the significance of regional differences in the timely start of antenatal care and its utilization [18, 19]. This is an unusual finding considering that the Western region of Sierra Leone is the most developed, has the liveliest economy, and has the biggest concentration of trained workers and medical facilities [20]. However, the Western regions are seeing an increase in the number of urban poor, who are unable to get adequate healthcare due to their high level of living and unequal access to social facilities [10]. Additionally, the established staff issues in metropolitan areas, such as inadequate delegation, favoritism, and a lack of autonomy, may have an impact on the level of service provided by public health facilities, which further reduces the number of people who can access healthcare [20]. The trend observed in the eastern region could be attributed to the established processes for the opening, accreditation and closing of health facilities which were carried out across Sierra Leone as part of the National Health Sector Strategic Plan and the free maternal healthcare (2017-2021) [21].

Furthermore, women from the Limba (aOR 3.10, 95%CI 1.25-7.69), Sherbo (aOR 2.80, 95%CI 1.02-7.69) and Korankoh (aOR 2.79, 95%CI 1.13-6.85) ethnic groups had a high likelihood of starting antenatal late compared to women from the creole ethnic group. The creole ethnic group is one of the smallest ethnic groups in Sierra Leone and the majority of them live in the Western region of Sierra Leone [22]. Their lower likelihood of late starting of antenatal care could be attributed to their place or region of residence. As discussed earlier, the western region of Sierra Leone has a high number of health facilities and skilled healthcare workers.

Women who had no problem seeking permission from their husbands for healthcare (aOR 0.71, 95%CI 0.55-0.89) and women who took healthcare decisions together with their husbands (aOR 0.83, 95%CI 0.70-1.00) had a lower likelihood of late initiation of antenatal care



compared to those who had a big problem seeking for permission from their husbands for healthcare and respondents who took healthcare decisions alone. This may be a representation of cultural ideas and low levels of women's empowerment. Enhancing women's empowerment is crucial, especially in terms of decision-making and access to healthcare, according to studies [23]. Additionally, raising awareness through the media about the value of empowering women to freely access healthcare may be beneficial in promoting behavior change and assuring higher ANC usage. The impact of women's poor decision-making abilities on accessing and seeking ANC has been studied extensively [24, 25].

Limitation

The DHS survey used relies on respondents' self-report based on their memories causing recall bias to be a potential problem. Also, the design of this study, which is cross-sectional makes it impossible to demonstrate a causal relationship between the outcome of interest and these significant independent variables.

CONCLUSION

Findings from this study reveal that the timely initiation of antenatal care among women aged 15-49 years in Sierra Leone is low. Also, region of residence, ethnicity, husband's authorization for seeking healthcare, and decision making on healthcare are the factors influencing the timely initiation of antenatal care in Sierra Leone among women aged 15-49. It is advised that women empowerment activities be undertaken in various communities to educate mothers on the need to make their personal healthcare decisions. Furthermore, government must build more health facilities in the other regions of the country. Also, skilled maternal healthcare training must be increased in the country to ensure equal distribution of health workers.

List of Abbreviations

aOR: Adjusted Odds Ratio

cOR: Crude Odds Ratio

CI: Confidence Interval

WHO: World Health Organization

SLDHS: Sierra Leone Demographic and Health Survey

ANC: Antenatal care



Declarations

Ethics Approval

Ethical approval for the SLDHS 2019 was secured from the Institutional review board of the DHS program. The resulting data obtained were based on anonymous public use data with no identifiable information about the survey respondents.

Consent for Publication

Not applicable

Availability of Data and Materials

The data that support the findings of this study are included in the article as a supplementary file.

Conflicting Interests

The authors declare that they have no conflicting interests.

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APPENDIX

Table 1: Demographic and socio-economic characteristics of women aged 15-49 years based on the time of the start of ANC.

Variable	Early ANC initiation N (%)	Late ANC initiation N (%)
Maternal Age		
15-19	254 (7.91)	335 (8.45)
20-24	677 (21.06)	904 (22.79)
25-29	845 (26.69)	1023 (25.78)
30-34	618 (19.23)	670 (16.88)
35-39	545 (16.95)	657 (16.58)
40-44	185 (5.77)	263 (6.64)
45-15	90 (2.79)	114 (2.88)
Residence		
Urban	1165 (36.26)	1525 (38.44)
Rural	2048 (63.74)	2442 (61.56)
Region		
Eastern	858 (26.71)	674 (17.00)
Northern	657 (20.77)	766 (19.32)
Northwestern	505 (15.70)	860 (21.68)
Southern	658 (20.47)	822 (20.71)
Western	536 (16.68)	844 (21.28)
Household head		
Male	2438 (75.87)	2972 (74.93)
Female	6775 (24.13)	994 (25.07)
Marital status		
Never in union	433 (13.46)	559 (14.09)
Currently in union	2626 (81.72)	3258 (82.14)
Formerly in union	155 (4.82)	149 (3.77)
Educational level		
No education	1695 (52.73)	2082 (52.49)
Primary	471 (14.67)	542 (13.67)
Secondary	943 (29.34)	1232 (31.06)
Tertiary	105 (3.27)	110 (2.79)
Exposure to newspaper/magazine		
No	3030 (94.32)	3752 (94.66)
Yes	182 (5.68)	212 (5.34)
Exposure to radio		
No	1830 (56.94)	2312 (58.31)
Yes	1384 (43.06)	1653 (41.96)
Exposure to television		
No	2509 (78.08)	3000 (75.63)
Yes	705 (21.92)	966 (24.37)



Exposure to Internet		
No	2887 (89.85)	3569 (90.00)
Yes	326 (10.15)	3970 (10.00)
Wealth index		
Poorest	689 (21.45)	881 (22.21)
Poorer	721 (22.43)	815 (20.54)
Middle class	676 (21.05)	802 (20.21)
Richer	648 (20.17)	770 (19.42)
Richest	479 (14.91)	699 (17.62)
Working status		
Not working	599 (18.63)	777 (7.77)
Professional/Technical	75 (2.32)	76 (1.91)
Clerical	2 (0.05)	2 (0.05)
Sales	838 (26.09)	1118 (28.20)
Agricultural	1603 (49.87)	1832 (46.20)
Skilled manual	80 (2.50)	141 (3.55)
Unskilled manual	16 (0.50)	17 (0.44)
Other	2 (0.05)	2 (0.05)
Total	3214 (44.76%)	3966 (55.24%)

Table 2: Socio-cultural characteristics of women aged 15-49 based on the time of the start of ANC care

	Early ANC initiation	Late ANC initiation
	N (%)	N (%)
Religion		
Christian	712 (22.16)	815 (20.55)
Islam	2501 (77.81)	3150 (79.42)
Other	1 (0.13)	1 (0.03)
Ethnicity		
Creole	24 (0.75)	16 (0.40)
Fullah	120 (3.74)	87 (2.18)
Kono	153 (4.75)	155 (3.91)
Limba	225 (7.00)	381 (9.60)
Loko	56 (1.76)	67 (1.69)
Mandingo	84 (2.60)	85 (2.14)
Mende	1180 (36.73)	1212 (30.57)
Sherbro	60 (1.86)	100 (2.45)
Temne	949 (29.54)	1563 (39.41)
Korankoh	186 (5.78)	118 (2.99)
Other	161 (5.00)	177 (4.46)
Foreign	16 (0.49)	8 (0.21)

**Decision makers on healthcare**

Mother alone	194 (7.39)	311 (9.56)
Mother and husband/partner	956 (36.39)	1040 (31.93)
Husband/partner alone	1467 (55.88)	1898 (58.26)
Other	8 (0.33)	8 (0.25)

Permission to go get medical help

Big problem	804 (25.02)	995 (25.09)
Not a big problem	2409 (72.98)	2971 (74.91)

Table 3: Obstetric and institutional characteristics of women aged 15-49 years based on the time of the start of ANC

	Early ANC initiation N (%)	Late ANC initiation N (%)
Parity		
1	744 (23.14)	930 (23.45)
2	618 (19.22)	845 (21.31)
3	556 (17.30)	646 (16.29)
4+	1296 (40.34)	1545 (38.95)
Distance to the health facility		
Big problem	1564 (48.67)	1851 (46.67)
Not a big problem	1650 (51.33)	2115 (53.33)

Table 4: Factors associated with timely initiation of antenatal care among women aged 15-19 in Sierra Leone

Variable	COR (95% CI)	P-value	AOR (95% CI)	P-value
Maternal Age				
15-19	Ref		Ref	
20-24	1.01 (0.83-1.23)	0.887	1.00 (0.73-1.37)	0.989
25-29	0.92 (0.75-1.11)	0.388	0.95 (0.68-1.32)	0.764
30-34	0.82 (0.68-1.00)	0.052	0.86 (0.60-1.25)	0.440
35-39	0.92 (0.75-1.12)	0.402	0.94 (0.63-1.38)	0.744
40-44	1.08 (0.83-1.40)	0.578	1.16 (0.76-1.78)	0.489
45-15	0.97 (0.68-1.38)	0.861	1.13 (0.67-1.91)	0.640
Residence				
Urban	Ref		Ref	
Rural	0.91(0.78-1.06)	0.231	0.91 (0.71-1.18)	0.500
Region				
Eastern	Ref		Ref	
Northern	1.48 (1.15-1.92)	0.003	1.51 (1.09-2.09)	0.013
Northwestern	2.17 (1.70-2.77)	0.000	1.87 (1.33-2.61)	0.000
Southern	1.59 (1.26-2.01)	0.000	1.64 (1.22-2.20)	0.001
Western	2.00 (1.53-2.62)	0.000	2.00 (1.38-2.89)	0.000



Household sex				
Male	Ref		Ref	
Female	1.05(0.922-1.20)	0.4500	1.07(0.90-1.18)	0.427
Household size				
Less than 7	Ref		Ref	
7 and above	1.06 (0.94-1.18)	0.353	0.90 (0.88-1.14)	0.261
Educational level				
No education	Ref		Ref	
Primary	0.93 (0.79-1.11)	0.452	0.88 (0.73-1.06)	0.714
Secondary	1.06 (0.94-1.21)	0.341	0.97 (0.81-1.15)	0.725
Tertiary	0.86 (0.60-1.22)	0.396	0.85 (0.54-1.33)	0.469
Exposure to newspaper/magazine				
No	Ref		Ref	
Yes	1.24(0.73-1.21)	0.612	0.89 (0.63-1.25)	0.496
Exposure to radio				
No	Ref		Ref	
Yes	0.95 (0.84-1.07)	0.360	0.91 (0.78-1.06)	0.245
Exposure to television				
No	Ref		Ref	
Yes	1.15 (0.99-1.33)	0.072	1.10 (0.90-1.35)	0.351
Exposure to Internet				
No	Ref		Ref	
Yes	0.98(0.77-1.25)	0.892	1.00 (0.73-1.37)	0.990
Wealth index				
Poorest	Ref		Ref	
Poorer	0.88 (0.74-1.05)	0.159	0.90 (0.75-1.08)	0.261
Middle class	0.93 (0.76-1.12)	0.407	0.89 (0.74-1.07)	0.221
Richer	0.93 (0.76-1.13)	0.472	0.85 (0.64-1.12)	0.242
Richest	1.14 (0.89-1.46)	0.294	0.92 (0.63-1.35)	0.683
Religion				
Christian and others	Ref		Ref	
Islam	1.10 (0.96-1.27)	0.183	1.05 (0.89-1.24)	0.526
Ethnicity				
Creole	Ref		Ref	
Fullah	1.08 (0.52-2.25)	0.834	1.15 (0.44-3.02)	0.775
Kono	1.52 (0.70-3.33)	0.290	2.70 (0.95-7.66)	0.061
Limba	2.54 (1.28-5.07)	0.008	3.10 (1.25-7.69)	0.015
Loko	1.78 (0.85-3.72)	0.124	1.88 (0.68-5.17)	0.222
Mandingo	1.52 (0.68-3.41)	0.303	1.79 (0.66-4.85)	0.249
Mende	1.54 (0.79-3.01)	0.203	2.18 (0.87-5.47)	0.096
Sherbro	2.44 (1.15-5.18)	0.020	2.80 (1.02-7.69)	0.046
Temne	2.47 (1.28-4.77)	0.007	2.79 (1.13-6.85)	0.026
Korankoh	0.96 (0.45-2.03)	0.910	1.20 (0.45-3.20)	0.714
Other	1.65 (0.79-3.46)	0.180	2.13 (0.82-5.50)	0.119
Foreign	0.78 (0.22-2.75)	0.704	1.21 (0.27-5.51)	0.802

**Decision maker on healthcare**

Respondent alone	Ref		Ref	
Respondent and husband/partner	0.68 (0.53-0.86)	0.001	0.70 (0.55-0.89)	0.004
Husband/partner alone	0.81 (0.63-1.03)	0.084	0.85 (0.66-1.08)	0.177
Someone else	1.00 (0.32-3.16)	0.998	1.09 (0.36-3.27)	0.879
Other	0.15 (0.03-0.86)	0.033	0.14 (0.24-0.84)	0.031

Permission to go get medical help

Big problem	Ref		Ref	
Not a big problem	1.00 (0.85-1.17)	0.964	0.83 (0.70-1.00)	0.046

Parity

1	Ref		Ref	
2-3	1.02 (0.87-1.19)	0.845	1.17 (0.95-1.46)	0.135
4+	0.95 (0.83-1.10)	0.499	1.05 (0.82-1.36)	0.686

Distance to the health facility

Big problem	Ref		Ref	
Not a big problem	1.08 (0.93-1.26)	0.287	1.06 (0.91-1.24)	0.458