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Research Article

Determinants of choice of childbirth place in the health districts of Anié and Kéran, Togo

Amata GNAGNA [1]*, Amadou Ibra DIALLO [1], Essossimna MAGAMANA [2], Afeidou Piyalo AMIZOU [3], Konga PALASSI [3], Mahamondou N'DJAMBARA [3], Atiyihwè AWESSO [3], Ibrahima SECK [1]

[1] Department of Preventive Medicine and Public Health/FMPO; Cheikh Anta Diop University, UCAD III, Claudel city villa N° 87 UCAD, BP 5005. Dakar, Senegal, Tel: +221 33 822 63 60;

[2] Applied Mycology, University of Lomé (Lome - Togo)

[3] Faculty of Human and Social Sciences (FSHS), Department of Anthropology and African Studies

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*For Correspondence:

Amata GNAGNA Doctoral student, Department of Preventive Medicine and Public Health/FMPO; Cheikh Anta Diop University, UCAD III, Claudel city villa N° 87 UCAD, BP 5005. Dakar, Senegal, Tel: +221 33 822 63 60;

Abstract

Introduction: In low-income countries such as Togo, as well as in middle-income countries, a significant number of births still occur at home without the assistance of skilled health personnel. These home deliveries are associated with maternal and neonatal deaths within communities and remain a major concern for development stakeholders across Sub-Saharan Africa.

Objective of the Study: The aim of this study was to identify the factors influencing the choice of childbirth place in the health districts of Anié (Plateaux region) and Kéran (Kara region) in Togo.

Methods: This was a cross-sectional, mixed-methods, and analytically oriented study that employed logistic statistical techniques alongside qualitative methods. Data were collected from 303 women between December 2023 and February 2024.

Results: The mean age of the women surveyed was 26.33 ± 0.50 years. The results showed that the likelihood of a woman delivering in a health facility increased by a factor of 1.086 for each additional year of age (p = 0.000; OR = 1.086; 95% CI [1.042 – 1.131]). Women residing in rural areas were 2.873 times more likely to deliver at home than in a health facility (p = 0.010; OR = 2.873; 95% CI [1.283 – 6.435]). Women who attended antenatal care (ANC) for each pregnancy were 6.790 times more likely to deliver in a health facility compared to at home (p = 0.000; OR = 6.790; 95% CI [2.637 – 17.481]). Women who had knowledge about vaginal delivery assisted with medical instruments in a Basic Emergency Obstetric and Newborn Care (BEmONC) facility were 1.852 times more likely to deliver in a health facility than at home (p = 0.026; OR = 1.852; 95% CI [1.078 – 3.182]).

Conclusion: This study showed that a woman's age and age at marriage, her place of residence, antenatal care (ANC) attendance for each pregnancy, knowledge of danger signs related to childbirth, and awareness of the services provided by Basic Emergency Obstetric and Newborn Care (BEmONC) facilities are key determinants of her choice of delivery location.

Keywords: Home birth, Determinants, EmONC, Kéran, Anié, Togo

INTRODUCTION

Most maternal deaths in Sub-Saharan Africa are attributable to home births [1]. In low- and middle-income countries, a substantial number of deliveries still occur at home without the assistance of skilled health personnel [1]. These unattended home births remain a major concern for development stakeholders in these countries [2]. In industrialized countries, maternal mortality declined significantly over the 20th century as childbirth progressively shifted from homes to health facilities [3]. Home births are also associated with poor neonatal outcomes; approximately 50% of newborns who die during childbirth did not receive skilled medical assistance at birth [4]. A study conducted in the United States reported neonatal mortality rates of 27.98 per 10,000 live births for unplanned home deliveries, 13.66 per 10,000 for all planned home births, and only 3.27 per 10,000 for births attended by certified midwives in hospitals [5].

A systematic review found that knowledge, attitudes, skills, and practices surrounding home births were significant predictors of both the decision to deliver at home and the non-utilization of emergency obstetric and neonatal care (EmONC) services in Africa [6]. The use of health services by women during pregnancy, childbirth, and the postpartum period is critical for the timely management of complications, which contributes to

reducing the burden of maternal and neonatal deaths, preventable stillbirths, and community-level impacts [7]. While statistics are essential, beyond the numbers, it is crucial to examine maternal deaths and complications to better understand and mitigate pregnancy-related risks [8]. In light of the alarming global burden of maternal and neonatal mortality, one of the key strategies to achieve the Sustainable Development Goals (SDGs) by 2030 particularly the targets of reducing the global maternal mortality ratio to fewer than 70 per 100,000 live births and neonatal mortality rate to fewer than 12 per 1,000 live births is to strengthen and increase the utilization of essential, high-quality maternal, neonatal, and child health services [9,10]. Home births without skilled assistance represent missed opportunities to provide emergency obstetric and neonatal care (EmONC) to mothers and newborns in disadvantaged settings [11,12]. In Sub-Saharan Africa, more than 50% of births still occur at home [13]. Even when such births are attended by skilled personnel, challenges such as weak referral systems, geographical inaccessibility, and financial constraints are well-documented barriers that contribute to delays or failure in seeking obstetric care [14].

In Togo, the maternal mortality ratio decreased from 401 to 366 per 100,000 live births between the fourth (2010) and fifth (2022) General Population and Housing Censuses (GPHC-4 and GPHC-5). According to the 2017 Multiple Indicator Cluster Survey (MICS), the neonatal mortality rate was 27 per 1,000 live births. The rate of home deliveries in rural areas was 30%, compared to 1.9% in urban areas. Nationally, 69.4% of deliveries were assisted by qualified health personnel (51.8% in rural areas vs. 96.2% in urban areas). In the Plateaux region, this rate was 57.5%, and in the Kara region, it was 50.1% [15]. In this national context, the present study aims to identify factors associated with the choice of childbirth place in the health districts of Anié (Plateaux region) and Kéran (Kara region) in Togo.

METHODS AND MATERIALS

This was a cross-sectional, mixed-methods study, combining both quantitative and qualitative approaches, conducted among 303 women of reproductive age in the health districts of Anié and Kéran.

Conceptual framework and study Period

According to the results of the 5th General Population and Housing Census (GPHC-5) of 2022, the total population of Togo is estimated at 8,095,498 peoples. The Plateaux region has a population of 1,635,946, with 180,158 inhabitants in the Anié health district, including an estimated 43,238 women of reproductive age. The Kara region has a population of 985,512, with 128,687 inhabitants in the Kéran district and 30,885 women of reproductive age [16].

Target Population

The target population consisted of women of reproductive age who had delivered either at home or in health facilities within the Basic Emergency Obstetric and Newborn Care (BEmONC) areas of the Kéran and Anié health districts, along with their peripheral healthcare units (PHU) and Social and Medical Centers (SMC), during the five years preceding the survey.

Sample Size Determination

The sample size was calculated using Cochran's formula [18]. In 2020, the two health districts reported a total of 718 and 639 home births, respectively, resulting in 1,357 home deliveries. Based on this data, a sample size of 303 women was determined.

Sampling Method

A three-stage systematic sampling method was employed to select participants. First, clusters were formed based on geographical areas. Localities with a high rate of home births from 2018 to 2022 were selected within these clusters. In each specific health area, neighborhoods were chosen in proportion to the percentage of home births. Then, within these neighborhoods, households were identified and women who had given birth at home at least once in the last five years were targeted for the survey.

Data Collection

Tools, Method, and Data Collection Procedure

The questionnaire was designed based on the implementation experiences of maternal, neonatal, and adolescent health programs and strategies, particularly the provision of quality Basic Emergency Obstetric and Newborn Care (BEmONC) services. It also addressed the analysis of gaps in creating demand for obstetric and neonatal care and regional disparities across different regions and health districts of Togo, as well as residence settings.

Individual interviews for both quantitative and qualitative data collection were conducted in person. Direct interviews with women in the sample were carried out using a digitalized data collection tool, which allowed for real-time submission of collected data to a server (Google Forms). The data collection tool was designed to simultaneously capture quantitative data for statistical analysis and qualitative data for thematic analysis.

Training of Data Collectors

In total, a dozen data collectors with diverse backgrounds and experience in maternal and child health, community health, and the health districts under study were trained. The team also included an anthropologist, all of whom were fluent in and familiar with the local languages and dialects. The training took place over one day and included practical field sessions.

The data collection tool was pre-tested in the field, and adjustments were made based on the feedback before the main survey was conducted.

Selection of Women

The selection was based on the prior identification of households and homes, carried out by healthcare personnel from the relevant maternity wards, health workers, community relays, traditional birth attendants, and community leaders, including village and

neighborhood chiefs from the various localities involved. Within these households, the inclusion criteria for the primary target group were women who had given birth at home at least once in the past five years, women who had delivered both at home and in a healthcare facility, and women who had or had not attended antenatal care (ANC) visits. The selected women were aged between 15 and 49 years and were capable of answering the questionnaire independently. Exclusion criteria included women who had given birth en route while on their way to a healthcare facility.

Data Collected

Quantitative Data

The dependent variable in this study was "place of delivery". The independent variables were related to socio-professional factors, obstetrical characteristics, women's knowledge of EmONC and the attitudes of women and their families towards referral.

Qualitative Data

The interview guide was completed by the data collectors based on the responses provided by the women. To facilitate this, the data collectors identified and synthesized the reactions of the women on the data collection forms (with multiple-choice options). There was a category of questions where the data collectors directly entered the responses given by the women. The women themselves did not fill out the survey forms.

Based on these responses, verbatim transcripts were created. These verbatim transcripts were selected based on their relevance to the argumentation and the correlations defined in the results following the quantitative analysis. Thus, for all 303 women surveyed, each woman answered the same set of qualitative and quantitative questions.

Statistical Analysis

The data collected from Google Forms via Google Sheets were cleaned and processed in Excel 2016. The variables of interest were then imported into IBM SPSS 20 Statistics for correlation and logistic regression analyses.

To conduct the Multiple Correspondence Analysis (MCA), another data matrix was submitted to the R software version 4.4.3.

RESULTS

Descriptive analyses

Characteristics of the dependent variable

Characteristics of the surveyed women (n = 303)

Age of the woman

The results showed that the mean age of the surveyed women was 26.33 ± 0.50 years for those who had delivered exclusively at home, and 29.55 ± 0.60 years for those who had given birth at least once in a health facility. The mean age at marriage was 18.49 ± 0.16 years and 19.33 ± 0.19 years, respectively. Student's t-test revealed a significant association between place of delivery and both the woman's age ($t = -4.106$; $p < 0.001$) and age at marriage ($t = -3.323$; $p = 0.001$) (Table 1).

Table 1: Descriptive statistics of the ages of the surveyed women

Variables	Minimum		Mean ± SD		Maximum		Student's t-test	
	Home	Health facility	Home	Health facility	Home	Health facility	t	P value
Woman's age	18	17	26.33 ± 0.50	29.55 ± 0.60	49	49	-4.106	0.000
Woman's age at marriage	14	14	18.49 ± 0.16	19.33 ± 0.19	30	26	-3.323	0.001

Socio-professional characteristics of women

According to the place of residence, the results showed that women from rural areas were the most likely to deliver at home (53.46%). Regarding the level of education, women with no formal education had the highest percentage of home deliveries (32.01%). Considering the religion of the women, animists were the most likely to deliver at home (37.29%). In terms of marital status, married women had the highest home delivery rate (52.14%), and among the type of marriage, those who had a customary marriage had the highest rate (54.12%). Finally, in terms of occupation, farmers/housewives were the most numerous in the sample, with 45.21% of them delivering at home, while 28.38% had at least one delivery in a health facility. Bivariate analysis using the Chi-square test revealed a correlation between place of residence and place of delivery (Chi-square = 6.18; $p = 0.013$), with a relatively weak correlation strength (Cramér's V = 0.143) (Table 2).

Table 2: Descriptive statistics of the socio-professional characteristics of the surveyed women

	Variables	Number of women (Place of delivery)		Frequency (%)		Chi-2		Cramer's V test
		Home	Health facility	Home	Health facility	Value	P value	
Place of residence	Rural	162	105	53.46	34.65	6.18	0.013	0.143
	Urban	14	22	4.62	7.26			
Level of education	None	97	61	32.01	20.13	2.09	0.553	-
	Primary	66	55	21.78	18.15			
	Secondary first level school	12	9	3.96	2.97			
	Secondary second level school	1	2	0.33	0.66			
Religion	Animism	113	75	37.29	24.75	2.55	0.465	-
	Christianity	56	43	18.48	14.19			
	Muslim	5	8	1.65	2.64			
	No religion	2	1	0.66	0.33			
Current marital status	Single	7	2	2.31	0.66	4.94	0.293	-
	Divorced	5	1	1.65	0.33			
	Married	158	118	52.14	38.94			
	Separated	3	1	0.99	0.33			
	Widowed	3	5	0.99	1.65			
Type of marriage	Other	7	2	2.31	0.66	2.76	0.240	-
	Customary	164	118	54.12	38.94			
	Religious	5	7	1.65	2.31			
Profession	Farmer/housewife	137	86	45.21	28.38	6.23	0.183	-
	Craftsmanship	21	21	6.93	6.93			
	Shopkeeper	9	13	2.97	4.29			
	Housewife	9	6	2.97	1.98			
	Factory worker	0	1	0.00	0.33			

Multiple Correspondence Analysis (MCA)

Correlation between the variables and the place of delivery

Figure 1 illustrates the relationship between the various variables of interest. The analysis of this figure reveals two distinct groups. Group 1 (G1) is characterized by variables that are more or less correlated with the place of delivery, namely, the woman's age at first pregnancy, her religion, occupation, and level of education. Group 2 (G2), on the other hand, is defined by the relationship between the woman's marital status and type of marriage.

Association between the categories and the place of delivery

Figures 2 and 3 below illustrate two distinct groups of categories (G1 and G2), differentiated based on the place of delivery (home and health facility). Group 1 is characterized by categories associated with home delivery. This group includes women with no formal education, animist religion, customary marriages, aged 19 years or younger, and residing in rural areas. In contrast, Group 2 (G2) is defined by categories more strongly associated with delivery in a health facility. This group includes women over 19 years old, living in urban areas, employed as civil servants, married religiously, Christian, and with a higher level of education.

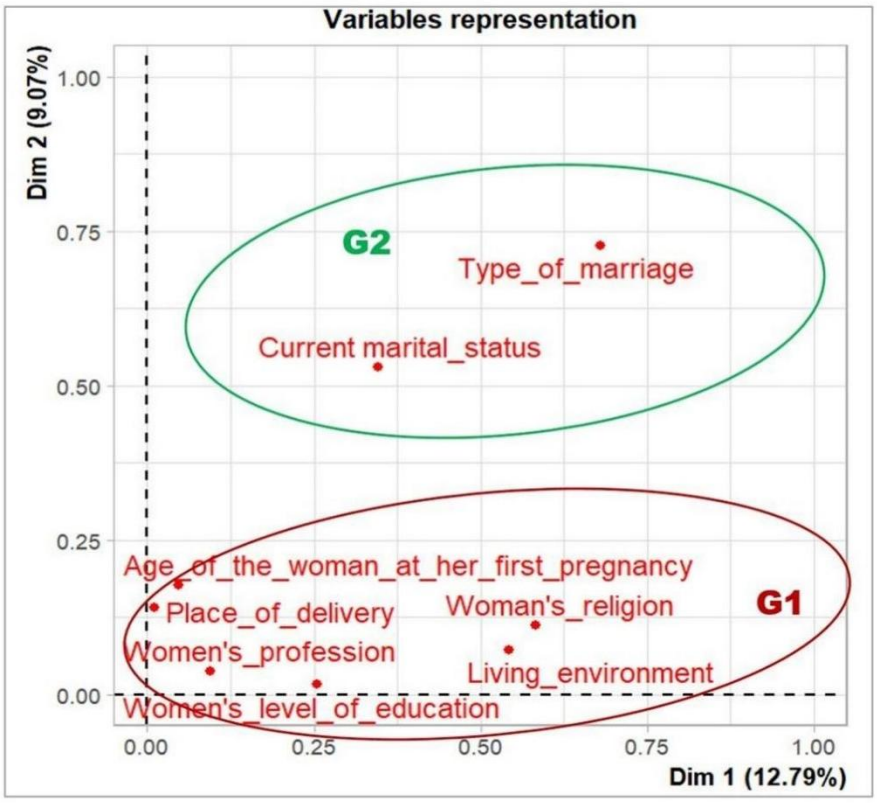

Figure 1 : Correlation between the variables and the place of delivery

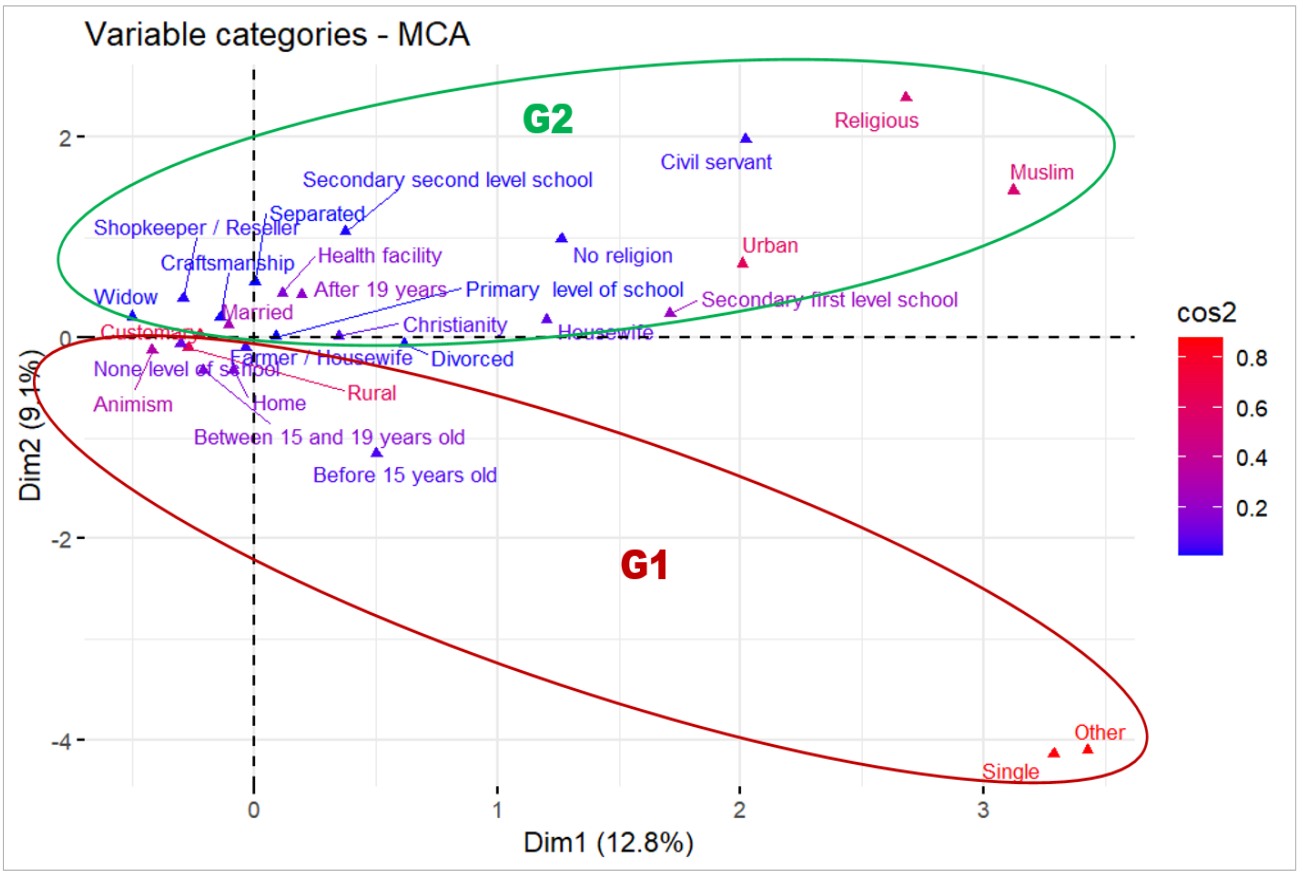

Figure 2 : Association between the categories of the different variables studied

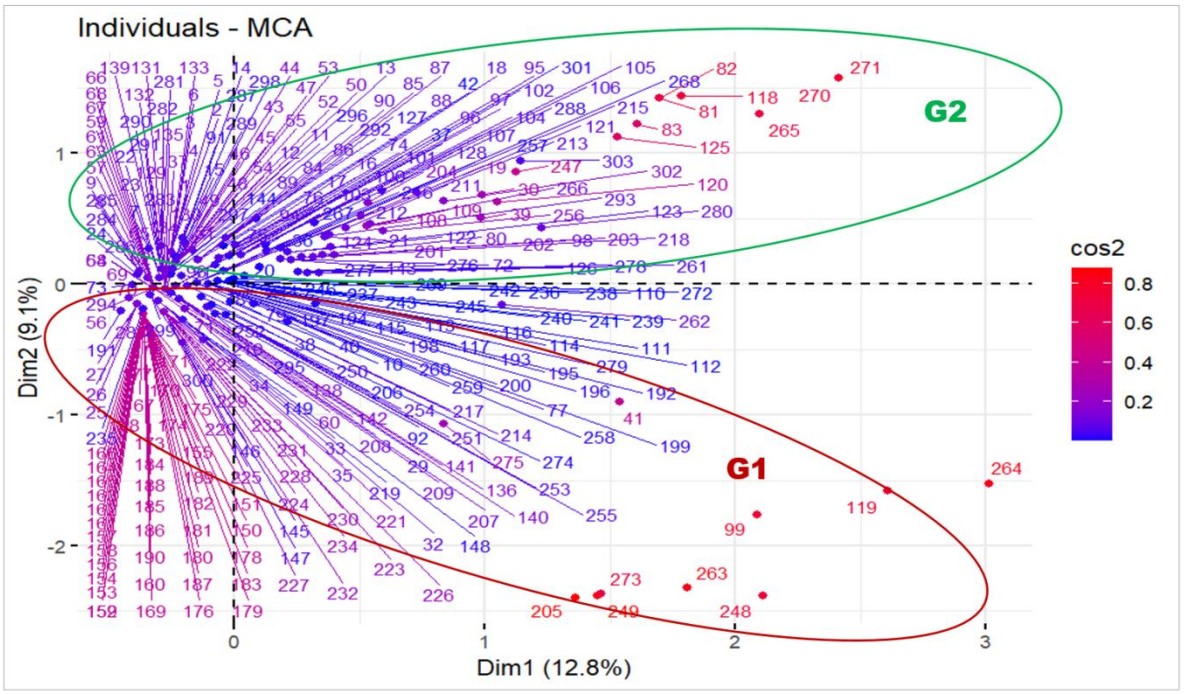

Figure 3 : Association between individuals corresponding to the different categories

Binary logistic regression

Characteristics of the women

Ages

The results of the binary logistic regression using the woman's age and age at marriage as independent variables, and the choice of place of delivery as the dependent variable, showed that the model was globally significant according to the Chi-square test (Chi^2 = 21.82; p = 0.000), with 64.70% of the data accounted for by the model. The Cox & Snell R Square and Nagelkerke R Square indices indicated that between 6.9% and 9.3% of the variance in the dependent variable was explained by the model. The results further revealed that for each additional year of a woman's age, the probability of delivering in a health facility increased by a factor of 1.061 (p = 0.001; OR = 1.061; CI [1.024 – 1.100]), while each additional year in age at marriage increased this probability by a factor of 1.144 (p = 0.020; OR = 1.144; CI [1.021 – 1.281]).

The response of one of the surveyed women to the question below supports these findings :

Question : *Knowing the benefits of delivering in a health facility, why did you choose to deliver at home ?*

"I am afraid of being repudiated by my husband; moreover, my mother-in-law will not be happy because she is a traditional birth attendant, and she will force me to deliver at home. If I don't, I will be treated as weak by my family and the community." (Response from a woman living in a rural area of the health district of a maternity facility within the peripheral network of BEmONC in Kantè, who had her first pregnancy before the age of 15 and was assisted during her home deliveries by a traditional birth attendant, line N°3 in the Google Sheets data collected from the Google Forms server).

Indeed, faced with her mother-in-law, this woman, who had her first pregnancy before the age of 15, submitted to the family authority of her husband with the threat of being repudiated if she did not deliver at home. She may have resigned herself because, according to her, her mother-in-law had proven expertise based on her history of assisting with home deliveries within her family and community. Therefore, why seek other skills elsewhere and spend money?

Socio-professional characteristics

For the socio-professional characteristics of the women, logistic regression showed, through the Chi-square test, that the chosen model was significant (Chi^2 = 26.38; p = 0.049), with 62.70% of the information accounted for by the model. The Cox & Snell R Square and Nagelkerke R Square indices indicated that the model explained 8.30% to 11.20% of the variance in the dependent variable. This analysis revealed that women living in rural areas were 3.575 times more likely to deliver at home compared to those living in urban areas (p = 0.016; OR = 3.575; CI [1.265 – 10.099]). Qualitatively, the response provided by one of the surveyed women to the following question provides justification for the above result.

Question : What do you think about referring pregnant women or women in labor to the hospital in Anié/Kantè ?

« *It is important to save the life of the mother and the fetus or newborn, but it is too expensive, there is no appropriate means of transportation, and the referral facility is too far away. We do not have the financial means* ». (Response from a woman living in a rural area of the health district of a maternity facility within the peripheral network of BEmONC in Anié, aged 44, sixth pregnancy, who had her first pregnancy after 19 years, attended antenatal care for all her pregnancies, and had delivered at home three

times and in a health facility three times, assisted during her home deliveries by a traditional birth attendant, line N°255 in the Google Sheets data collected from the Google Forms server).

This response highlights that for women living in rural areas, access to obstetric care faces various barriers that hinder the referral of women in obstetric emergencies and newborns in respiratory distress to higher levels of care. The Kantè and Anié hospitals are BEmONC health facilities.

Obstetric characteristics

The binary logistic analysis between the obstetric characteristics of the women and the place of delivery showed, through the Chi-square test, that the chosen model was globally significant (Chi^2 = 31.12; p = 0.001), with 58.40% of the information accounted for by the model. The Cox & Snell R Square and Nagelkerke R Square indices indicated that the model explained 9.80% to 13.10% of the variance in the dependent variable. These results showed that women who attended antenatal care (ANC) for every pregnancy in their life were 7.72 times more likely to deliver in a health facility compared to those who did not attend ANC for every pregnancy (p = 0.008; OR = 7.72; CI [1.70 – 35.04]). The responses from two women to the following question further support the findings in this section.

Question : What were the reasons you attended antenatal care (ANC) ?

« I attended antenatal care to have an ultrasound, receive HIV/AIDS treatment, because I was ill, and to benefit from free medications and tests ». (Response from a woman living in the urban area of the BEmONC health district of Anié, who benefited from a delivery assisted by a midwife, line N°239 in the Google Sheets data from the Google Forms server).

By attending antenatal care (ANC), this woman likely understood that delivery assisted by qualified healthcare personnel was beneficial for both her and her baby. The ultrasound and the care provided by the midwife reassured her and encouraged her to seek delivery in a healthcare facility. Her place of residence was likely advantageous, as the maternity ward had an acceptable level of equipment and the presence of midwives.

One woman responded: "*I attended antenatal care to know the position of the fetus and to be able to deliver easily at home*." (Response from a woman living in a rural area of the health district of a maternity facility within the peripheral network of BEmONC in Anié, who had her first pregnancy before the age of 15, surveyed at approximately 22 years old with four living children, all born at home with assistance from a relative or a friend, line N°284 in the Google Sheets data collected from the Google Forms server).

This woman's response implies an understanding of the limitations of traditional birth attendants' skills. The traditional birth attendant may not want to take the risk of assisting a woman delivering at home if the fetus is in a breech position. This could be seen as a covert collaboration, unilaterally perceived by the women and traditional birth attendants, without the healthcare staff realizing the opportunity for collaboration. If traditional birth attendants are educated and involved in the implementation of the EmONC strategy, they could become invaluable allies in referring pregnant women to health facilities for deliveries and other care. They could also play an important role in the continuum of maternal and neonatal healthcare.

Women's knowledge of the EmONC

The binary logistic analysis on women's knowledge of EmONC showed, through the Chi-square test, that the chosen model was significant (Chi^2 = 29.14; p = 0.015), with 63.40% of the information accounted for by the model. The Cox & Snell R Square and Nagelkerke R Square indices indicated that the model explained 9.20% to 12.30% of the variance in the dependent variable. This analysis revealed that home delivery was 2.449 times more likely among women who had no knowledge of assisted vaginal delivery with medical instruments in a health facility (p = 0.000; OR = 2.449; CI [1.487 – 4.032]). Considering the qualitative aspect of the results, the response from a woman who delivered at home and did not go to a health facility immediately after delivery supports the finding.

Question : Why didn't you go to a health facility after giving birth ?

"I did't go to the health facility after my delivery because both my condition and the newborn's were fine after the birth, due to the lack of equipment at the health facility, financial constraints, and poor reception at the health facility." (Response from a woman living in the rural area of the health district of a maternity facility within the peripheral network of BEmONC in Kantè, who delivered at home with the assistance of a traditional birth attendant, line N°67 in the Google Sheets data collected from the Google Forms server).

This response shows that this woman does not expect any benefits from the local health facility for her deliveries.

Women's knowledge of danger signs related to pregnancy, childbirth, and prematurity

The binary logistic analysis between women's knowledge of danger signs related to pregnancy, childbirth, and prematurity, and the dependent variable, showed through the Chi-square test that the chosen model was not globally significant (Chi^2 = 21.45; p = 0.123), with 62.00% of the information accounted for by the model. However, the variable "Women's knowledge of the possibility of death due to bleeding within two hours after delivery if not quickly and properly managed" was found to be correlated with the dependent variable (p = 0.030). The Cox & Snell R Square and Nagelkerke R Square indices showed that the model explained 6.80% to 9.20% of the dependent variable. The results also showed that women with knowledge of the danger signs related to pregnancy, childbirth, and prematurity were 4.320 times more likely to deliver in a health facility than those who had less knowledge on this subject (p = 0.030;

OR = 4.320; CI [1.156 – 16.152]). The following question assesses women's knowledge of premature births.

Question : Do you know that delivering a preterm baby at home poses a danger to the baby ?

If YES, what are these dangers ?

« Yes. Delivering a preterm baby at home poses dangers to the baby, such as the risk of death from hypothermia, the risk of infection, the inability to defend against diseases if appropriate care is not provided, and the lack of essential care for the premature infant ». Response from a woman from the rural area of the health district of a maternity facility within the peripheral network of BEmONC in Kantè, who had her first pregnancy between the ages of 15 and 19 and had delivered all six of her children at home with the assistance of a traditional birth attendant, line N°31 in the Google Sheets data collected from the Google Forms server.

Following this response, it is clear that women who are at risk of premature delivery at home or who are uncertain about the management of their pregnancy will not take the risk of delivering at home.

Global Risk Factors for Home Births

The binary logistic regression analysis between the statistically significant risk factors described above and the dependent variable showed, through the Chi-square test, that the chosen model was globally significant (Chi-square = 61.73; P value = 0.000), with 70.30% of the information accounted for by the model. The Cox & Snell R Square and Nagelkerke R Square indices showed that the model explains 18.40% to 24.80% of the dependent variable.

The results indicated that the woman's age, place of residence, attendance at antenatal care (ANC) for each pregnancy in her life, and knowledge of the possibility of death due to hemorrhage within two hours after delivery if not quickly and properly managed were the main risk factors determining whether a woman delivers at home or in a healthcare facility.

- A woman's likelihood of giving birth in a healthcare facility increases by 1.086 for every additional year of her age (p = 0.000; OR = 1.086; 95% CI [1.042 - 1.131]).
- A woman living in a rural area is 2.873 times more likely to give birth at home than in a healthcare facility (p = 0.010; OR = 2.873; 95% CI [1.283 – 6.435]).
- A woman who attended prenatal care for every pregnancy in her life is 6.790 times more likely to deliver in a healthcare facility than at home (p = 0.000; OR = 6.790; 95% CI [2.637 – 17.481]).
- A woman with knowledge about childbirth assisted with medical instruments in a EmONC maternity is 1.852 times more likely to give birth in a healthcare facility than at home (p = 0.026; OR = 1.852; 95% CI [1.078 – 3.182]) (Table 3).

The points and error bars in Figure 4 represent the odds ratios and confidence intervals of the significant variables.

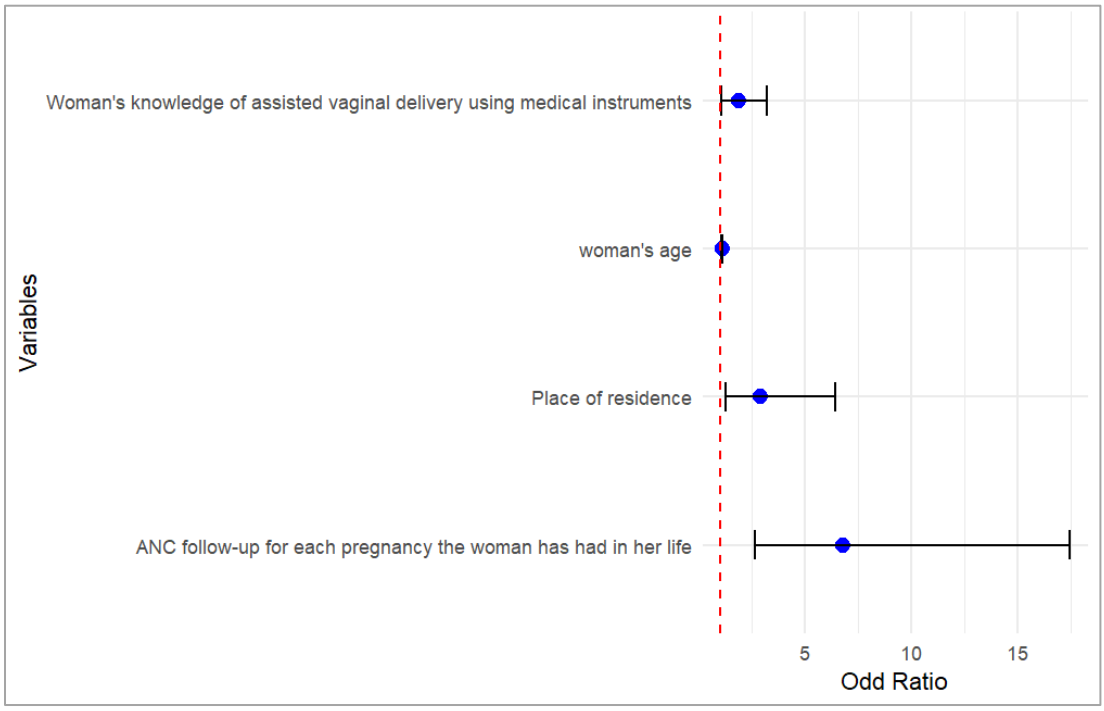

Figure 4 : Odds Ratio with Confidence Interval of the variables

Table 3: Global logistic regression parameters on risk factors (independent variables) and place of delivery (dependent variable)

Variables	B	S.E.	Wald	P value	Odd ratio	95% odd ratio confidence interval	
						Minimum	Minimum
Woman's age	0.082	0.021	15.609	0.000	1.086	1.042	1.131
Woman's age at the mariage	0.107	0.065	2.705	0.100	1.113	0.980	1.265
Place of residence (Rural/Urban)	1.055	0.411	6.583	0.010	2.873	1.283	6.435
Antenatal Care Follow-up for each pregnancy in a woman's life (Yes/No)	1.915	0.483	15.756	0.000	6.790	2.637	17.481
A woman's knowledge of assisted vaginal delivery with medical instruments (No/Yes)	0.616	0.276	4.982	0.026	1.852	1.078	3.182
A woman's knowledge of the possibility of death due to hemorrhage within two hours after delivery if not promptly and properly managed (No/Yes)	0.683	0.492	1.928	0.165	1.981	0.755	5.197
Constant	-7.330	1.395	27.591	0.000	0.001		

DISCUSSION

The results of this study showed that the information considered by the globally significant analysis models exceeded 58%.

When age is considered, the results of this study are similar to those of the cross-sectional study conducted by Teferi HM *and al*. in Ethiopia on the factors associated with pregnant women's preference for home births. Indeed, pregnant women aged 15 to 19 years (PR = 2.3; 95% CI : 1.43-4.00) had a preference for home births compared to those over 34 years old [18]. However, a study conducted in Margibi, Liberia by Leroy S *and al*. on the prevalence and determinants of home births among women of reproductive age showed that women aged ≥ 31 years were 6.7 times more likely to give birth at home than women aged < 31 years (aOR = 6.74, 95% CI = 2.86-15.90) [19]. Similarly, the study by Enyew EB *and al*. on factors associated with home birth among women of reproductive age in Ethiopia showed that, compared to women aged 15 to 24 years, women aged 35 to 49 years had a 2.29 times higher probability [AOR = 2.29, 95% CI: 1.80, 2.92] of giving birth at home [20]. Another study conducted by Nkurunziza M on home births despite free healthcare in rural Burundi showed that among the factors significantly affecting home births in rural areas, age was found to be more common in all age groups compared to women aged 20-24 years at the time of childbirth (OR > 1) [21]. Additionally, in the presence of other variables, home birth was reduced by 67% among primiparous women compared to multiparous women [21]. Thus, age and parity constitute a barrier to giving birth in healthcare facilities, as some older multiparous women are reluctant to be attended by young healthcare providers who are almost the same age as their older children. The qualitative survey showed that since the daily functioning of the household depends on the woman, some older multiparous women take the risk of waiting to avoid spending too much time in a healthcare facility [21]. Other women refrain from going because they cannot leave their household, as they are unable to find someone to take care of their children during hospitalization [21].

A qualitative survey on adolescent mothers' experiences with maternal healthcare in Nigeria, conducted by Alex-Ojei CA *and al*. showed that their experiences with healthcare providers were marked by mistreatment, including extortion, verbal violence, and the death of their newborns [22]. Some of them also complained about verbal abuse from the nurses at their prenatal clinic [22]. Regarding the use of maternal healthcare services by adolescent mothers, these young mothers mentioned several factors that influenced their decision to seek or not seek maternal health services for prenatal care and delivery [22].

Regarding the correlation between rural residence and home deliveries, the analysis of the 2017 Philippine National Demographic and Health Survey data on the prevalence and determinants of home births in urban and rural areas, conducted by Amit AML *and al*. revealed that women residing in rural areas were more likely to deliver at home (23.53%; 95% CI: 20.38–26.99) compared to their urban counterparts (10.72%; 95% CI: 8.23–13.85), indicating a statistically significant difference in the prevalence of home births by place of residence [23]. Similar findings were reported by Chernet AG *and al*. in a study on home delivery practices and associated factors in Ethiopia, where living in rural areas was identified as a significant predictor of home delivery at the 5% significance level [24].

A qualitative study conducted by Adatara P *and al*. on the reasons why women in rural northern Ghana prefer home births highlighted several contributing factors. These included poor quality of care and negative attitudes of skilled birth attendants, the perception that traditional birth attendants provided better care,

financial constraints, and limited access to healthcare facilities in rural settings all of which contributed to the continued preference for home deliveries among women in rural northern Ghana [25].

With respect to the association between antenatal care (ANC) follow-up and institutional deliveries, a study conducted by Ilesanmi BB et al. in Nigeria found that women who had received prenatal care in public health facilities were six times more likely to deliver in such facilities than women who did not (adjusted odds ratio [aOR] = 6.82; 95% CI: 5.52–8.42) [26]. Similarly, a multilevel analysis conducted by Yalew M et al. on the spatial distribution and associated factors of institutional delivery abandonment after ANC follow-up in Ethiopia revealed that women who had attended four or more ANC visits were 48% less likely to abandon institutional delivery compared to those with fewer than four visits (AOR = 0.52; 95% CI : 0.38–0.71), which supports the findings of the present study [27].

Furthermore, a qualitative study by Shifraw T *and al*. investigating the factors influencing women's choice of institutional delivery in Addis Ababa, Ethiopia, showed that women's experiences with ANC and other aspects of health facility interactions played a key role in their decision-making regarding the place of delivery [28]. Regarding the correlation between women's knowledge of medically assisted vaginal deliveries in EmONC (Emergency Obstetric and Newborn Care) facilities and their choice of place of delivery, an exploratory qualitative study by Seljeskog L *and al*. in rural Malawi—using in-depth interviews and non-participant observation identified suboptimal quality of care as a major influencing factor [29].

Similarly, a study conducted in Tanzania on decision-making around the place of delivery reported that dissatisfaction with the quality of care particularly due to shortages of health personnel and medical supplies was a key determinant influencing the decision to deliver at home [30].

Strengths and limitations of the study

The ages of the women were difficult to determine, as most respondents did not know their exact date of birth. In some cases, age was estimated based on the timing of the first pregnancy, the age of the first or last child, or by comparing with the age of a family or community member. Although minimal, there were instances of incomplete data entries. These were harmonized by cross-referencing with other collected variables that allowed for reasonable deduction, such as the age of the first child or the total number of children, which helped to confirm the woman's approximate age.

It was also challenging in the field to clearly delineate the boundary between urban and rural settings. The tendency was to classify neighborhoods that were distant from urban Basic Emergency Obstetric and Newborn Care (BEmONC) facilities and lacked urban infrastructure as rural, in contrast to more traditionally defined rural areas.

No recordings were made of specific questions whose results are intended to be presented in the form of verbatim quotes in this document. Nevertheless, the presence of an anthropologist during the data collection process ensured the reliability and quality of the qualitative information gathered.

CONCLUSION

The various levels of analysis conducted in this study revealed that the choice of place of delivery was correlated with a range of factors, including the woman's age and age at marriage, her place of residence, the frequency of antenatal care (ANC) visits during her reproductive life, her knowledge of Emergency Obstetric and Newborn Care (EmONC) services provided in maternity facilities particularly vaginal deliveries assisted with medical instruments, as well as her awareness of danger signs related to childbirth and prematurity. Several reasons were cited by women to support the observed correlations. However, further research is needed to strengthen the conclusions drawn from this study.

DECLARATIONS

Authorization, ethical approval and consent to participate

Based on the authorization of the Togo Bioethics Committee for Health Research (CBRS) of October 2021, the authorization and consent for the collection of the necessary information from the people constituting the sample were requested and verbally obtained. The study did not cover human experimentation. The study was based on a quantitative and qualitative questionnaire to which the respondents replied. This research was inspired by the African Union (AU) Guidelines on Ethical Research in Africa (2008) and the Belmont Report Principles (1979) of the National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research (respect for the individual, consent, confidentiality, non-maleficence and justice). The prefectural directorates concerned by the survey were informed in order to obtain their agreement. Authorizations from community leaders such as traditional chiefs were also sought and obtained. Authorization and consent to collect the necessary information from the individuals making up the sample were sought and verbally obtained.

In fact, the consent form had to be read and approved by signature by the respondents, then countersigned by the interviewer before any interview, as initially planned. Notwithstanding the availability of the consent form at the start of the survey in December 2023, the level of instruction of the respondents, who were women of childbearing age, their spouses, traditional birth attendants and community leaders, mainly from rural areas in the Anié and Kéran health districts, and prejudices about printed documents to be signed, acted as a brake on consent based on physical documents submitted for approval. Verbal consent was therefore opted for by mutual agreement with the respondents at the time of the survey. Verbal consent was more common

than written consent, which required a signature from the respondents.

To this end, the content of the consent form was integrated directly at the beginning of each survey form. At the start of each interview, the interviewers read the content of the consent form to the respondents, explained it to them and obtained their verbal consent before beginning any interview.

Consent to publication: The entire chain of participants in this research gave their agreement in principle to the publication of the research results.

Availability of data and materials: Data and research materials are available and accessible as needed

Competing interests: The authors declare that they have no competing interest.

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Authors' contributions

AG is a doctoral student in public health and the initiator of this scientific manuscript as part of her doctoral research. She developed the research protocol, collected the survey data, carried out the analysis, performed the literature review required for the article, wrote the article and drew the main conclusions.

IAD contributed to the quality assurance of the research methodology, statistical analysis and provided advice on the writing of the article. He proofread and provided inputs to the manuscript.

EM collaborated with Ms **AG** for statistical analysis and processing of the survey data.

APA contributed to the development of the interview guide, field data collection, and the interpretation of qualitative data.

KP and **MN** contributed to the development of the research methodology and ensured the quality of the qualitative section of the article.

AA coordinated the writing of the qualitative section.

IS the thesis director, coordinated the study from start to finish and ensured the quality of the entire research process throughout its duration, culminating in submission. He proofread the manuscript and provided inputs

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