

Location of Antenatal Care and Delivery among Mothers in Lagelu Local Government Area, Ibadan: A Cross-Sectional Study with Preliminary Exploration of Predictive Factors

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Abstract

Introduction: Skilled antenatal care (ANC) coverage has increased in low-and middle-income countries (LMICs) recently, however, maternal and child mortality rates remain high due to low institutional delivery rates.

Methods: This was a cross-sectional survey conducted in a peri-urban setting using multi-stage sampling technique to select wards, communities and respondents for the study. A total of 617 mothers of under-5 children were interviewed for the study.

Results: The mean age of respondents was 29.5(±6.5) years, about half were Christians (52.9%) and urban residents (51.5%). More than half (56.9%) had secondary education and majority (74.1%) were self-employed. Most respondents (94.6%) attended ANC during their last pregnancy but less than half (47.8%) completed 4 visits or more. Almost half (49%) preferred primary health facilities for ANC but 37.4% delivered in hospitals. The choice of ANC and delivery providers was significantly associated with age, education, employment status and place of residence. There was a significant association between gestational age at commencement of ANC and switching to a higher level facility for delivery (positive shift) while maternal age showed non statistically significant association with negative shift.

Conclusion: Due to poor retention of ANC attendees for delivery in PHCs, many pregnant women drop out of the care continuum by delivering without the assistance of skilled birth attendants, constituting a missed opportunity to reduce maternal/newborn mortality through institutional delivery. We recommend interventions such as sensitization of

pregnant women on the benefits of delivery in health facilities, subsidizing maternal care services at PHCs, and the provision of maternal care services that will improve pregnancy and birth outcomes to improve institutional delivery rates.

Keywords: antenatal care, institutional delivery, maternal health

Abstrait

Introduction: La couverture des soins prénatals qualifiés (ANC) a récemment augmenté dans les pays à revenu faible et intermédiaire (PRFI), cependant, les taux de mortalité maternelle et infantile restent élevés en raison des faibles taux d'accouchement en institution.

Méthodes: Il s'agissait d'une enquête transversale menée dans un contexte périurbain en utilisant une technique d'échantillonnage à plusieurs degrés pour sélectionner les quartiers, les communautés et les répondants pour l'étude. Au total, 617 mères d'enfants de moins de 5 ans ont été interrogées dans le cadre de l'étude.

Résultats: L'âge moyen des répondants était de 29.5 (±6.5) ans, environ la moitié étaient chrétiens (52.9%) et résidents urbains (51.5%). Plus de la moitié (56.9%) avaient fait des études secondaires et la majorité (74.1%) étaient des travailleurs indépendants. La plupart des répondantes (94.6%) ont eu recours à des soins prénatals lors de leur dernière grossesse, mais moins de la moitié (47.8%) ont effectué 4 visites ou plus. Près de la moitié (49%) préféraient les établissements de soins de santé primaires pour les soins prénatals, mais 37.4% les dispensaient dans les hôpitaux. Le choix des prestataires de soins prénatals et d'accouchement était significativement associé à

l'âge, à l'éducation, à la situation professionnelle et au lieu de résidence. Il y avait une association significative entre l'âge gestationnel au début des soins prénatals et le passage à un niveau d'établissement de niveau supérieur pour l'accouchement (décalage positif), tandis que l'âge maternel montrait une association non statistiquement significative avec un changement négatif.

Conclusion: En raison de la faible rétention des participantes aux soins prénatals pour l'accouchement dans les SSP, de nombreuses femmes enceintes abandonnent le continuum de soins en accouchant sans l'assistance d'accoucheuses qualifiées, ce qui constitue une occasion manquée de réduire la mortalité maternelle/infantile grâce à l'accouchement en institution. Nous recommandons des interventions telles que la sensibilisation des femmes enceintes sur les avantages de l'accouchement dans les établissements de santé, le subventionnement des services de soins maternels dans les SSP et la fourniture de services de soins maternels qui amélioreront les résultats de la grossesse et de l'accouchement afin d'améliorer les taux d'accouchement en institution.

Mots-clés: soins prénatals, accouchement en institution, santé maternelle

Introduction

Antenatal care (ANC) is one of the key pillars of the safe motherhood initiative designed to prevent maternal death and improve maternal health in low- and middle-income countries (LMIC) like Nigeria [1,2]. Despite this and other concerted efforts globally, maternal and child mortality and morbidity remain global health challenges of importance [3] because every pregnancy carries risks that may result in avoidable deaths.[4] or disability. [2] Most of these deaths occur in LMICs [5] and resource-poor settings such as sub-Saharan Africa, reflecting inequality in access to quality health care services in these regions. Despite considerable progress in reducing maternal mortality rates (MMR) in sub-Saharan Africa in the last two decades, [6] two-thirds of all maternal deaths recorded by the World Health Organisation (WHO) in 2017 were in the region. Nigeria has one of the highest MMR (512 in 100,000 live births [7]) of any country in the world despite recently recording some progress in reducing MMR (about 11% reduction [7,8]) and following failure to reduce MMR to 75 per 100,000 live births in 2015 [9] as planned, the country may not achieve SDG 3.1 target by 2030.

Multiple factors may have contributed to the reduction of MMR to the barest minimum in developed countries (16 and 23.8 per 100,000 live births in the European Union and the United States respectively [10]). Of these, access to quality ANC services is critical, enabling providers to identify and manage pregnancy-related illnesses or complications better [11,12] and ensuring the detection of women with elevated risks of delivery complications and encouraging them to deliver in a suitably equipped facility.[12] Pandit reported that India reduced MMR from 1,920 to 82 per 100,000 live births by improving access to quality ANC services. [13] In addition to access to quality ANC services, institutional deliveries (delivery in health facilities with the help of skilled birth attendants) [7] and the presence/assistance of skilled birth attendants (SBA) at deliveries are crucial to reducing MMR. [14-17] Institutional deliveries have the potential to avert almost one-third of all maternal deaths [18] resulting from the major, largely preventable, complications (hemorrhage, infections, high blood pressure during pregnancy, complications from delivery and unsafe abortion) of pregnancy and labour. [6,18]

Despite considerably high skilled ANC services coverage (67% [7]) in Nigeria, uptake of institutional delivery remains poor, especially in rural areas. [4] Another common and culturally preferred place of delivery is home without SBA, [4,7] a practice reported to contribute up to 800 daily maternal deaths in the world. [1,19] Available evidence shows that associations between ANC utilization and institutional delivery in Nigeria vary along regional and ethnic lines. Studies in northeastern and northwestern Nigeria found that 73% [20] and 74.1% [11] respectively, of pregnant women who received skilled ANC delivered outside of the health facility. On the other hand, in southeast Nigeria, 75% of women who registered for ANC delivered in a health facility. [4] Nationally however, just over a third of the number of women who received skilled ANC (39%) deliver in a health facility [8] representing missed opportunities to reduce maternal deaths. Reasons for non-facility delivery are contextual and studies have identified cultural, religious, economic, and health system factors to influence non-facility delivery despite ANC. [1,2,4,7,11,20]

While various studies, including the National Demographic and Health Survey (NDHS), have investigated the disparities between skilled ANC coverage and institutional delivery rates, correlations between ANC provider types (primary and secondary care level facilities and unskilled/traditional providers)

and the choice of place of delivery have not been fully investigated in Nigeria. Also, how pregnant women interact with these ANC provider types during the same pregnancy for delivery purposes and the rates of institutional delivery among women who do not receive skilled ANC services are yet to be documented. This study therefore describes the characteristics of women accessing antenatal and delivery services and determines the associations between the type of ANC service provider and place of delivery in a peri-urban Local Government Area in southwest Nigeria. The study will contribute to the existing body of knowledge by identifying drivers of non-facility delivery among women who receive ANC from skilled providers and rates of institutional delivery among women who do not receive skilled ANC services.

Materials and methods

This cross-sectional observational study was part of a larger study comparing vaccination card retention among caregivers of under-five children in urban and rural settings of Ibadan, Oyo State. Data were collected between October and December 2019.

Study area

The study was conducted in Lagelu Local Government Area (LGA), Ibadan, Oyo State. Ibadan is the second most populous city in southwest Nigeria with an estimated population of over 3.5 million people [21] and it comprises of 11 LGAs (5 urban and 6 peri-urban). The city is about 120km east of the Nigerian border with the Republic of Benin. The main economic activities of the people in Ibadan include agriculture, trade and public service. Lagelu LGA is one of the six peri urban LGAs in Ibadan, with a population of 148,133 according to the 2006 population census by the National Population Commission census. [22] This is however estimated to be 211,700 in 2022 based on a growth rate of 2.26. [23] It has 14 political wards, 22 primary health facilities, and 3 public secondary-level facilities. [24]

Study population

Mothers of children under the age of 5 years residing in Lagelu LGA.

Sample size determination

The target minimum sample of 422 was based on the primary study question to compare vaccine card retention between urban and rural settings, and we did not conduct a post-hoc power calculation for this pre-planned secondary analysis. We used the formula

for calculating sample size to compare two proportions, where $p_1=0.43$ (urban) and $p_2=0.23$ (rural), with 80% power and at 95% confidence intervals. [25]

Sampling strategy

Multi-stage sampling technique was used to select respondents for this study. Stage 1 involved the selection of one out of six peri urban LGAs in Ibadan using random sampling. In stage 2, we selected two rural and two urban wards using stratified random sampling. In stage 3, two communities were randomly selected from each ward and we subsequently included the contiguous communities when the sample size was not attained. In total, 19 communities were included in the study. The list of communities in Lagelu LGA was obtained from the state government secretariat. All compounds in selected communities were approached for participation. The unit of enquiry was mothers of children under-five residing in the selected communities. In each eligible household, one mother was selected. If the household had more than one eligible woman, the one with the youngest child was then selected.

Data collection

Data were collected through an interviewer-administered questionnaire, which was piloted in Ibadan North LGA in Ibadan. Three data collectors, with at least secondary level education, were recruited locally and trained for 3 days, followed by a 2-week pilot study. We obtained information on the woman's family and socio-demographic profile, ante-natal and perinatal history. Information on feeding patterns, anthropometric data [mid-upper arm circumference (MUAC), length/height, weight, occipito-frontal circumference], vaccine records and retention of the index child's vaccine card were also obtained as part of the larger study. Anthropometric data were measured by the data collector. Data were collected on android tablets using Open Data Kit (ODK) software and underwent regular checks for accuracy.

Study variables

The primary outcome variable for this study was a shift in the level of service provision. "Positive shift" was defined as when a woman delivered at a higher level of care when compared to her place of antenatal care; "negative shift" referred to when a woman delivered at a lower level of care when compared to her place of antenatal care and "no shift" was defined

as when a woman delivered at the same level of care when compared to her place of antenatal care.

The explanatory variables explored in this study included respondents' age, educational attainment, employment status, religion, place of residence, household wealth index, gestational age at registration for antenatal care and adverse birth outcome (i.e., preterm birth).

Data Analysis

We performed all analyses using Stata 16.0. We described respondents' characteristics including their utilization of antenatal and delivery services and summarized data using frequencies and percentages for categorical variables and mean and standard deviation for continuous variables. The shift from an ANC provider to another level of healthcare facility for delivery among respondents was presented using bar charts. The relationship between respondents' characteristics and ANC providers as well as place of delivery were reported using Chi-square test and Fisher's exact test analyses. Multinomial logistic regression model was used to predict and quantify the influence of the explanatory variables on the categorical outcome variable of interest (shift in the level of service provision). The relationship between place of delivery and neonatal illness was measured using binary logistic regression analysis. The level of statistical significance was set at 5 percent. Descriptive and inferential statistics were used to summarize and compare the study participants.

Ethics statement

Prior to the commencement of the study, we sought ethical approval from Department of Planning, Research and Statistics, Ministry of Health, Oyo state. The application was granted with approval number AD 13/479/1433A. We also obtained verbal informed consent from all study participants.

Results

Socio-demographic characteristics of respondents

There were 617 female caregivers, mean age (\pm SD) was 29.5 (\pm 6.5) years. Majority of the respondents (95.9%) were married or living together with a spouse. More than half of the respondents (52.9%) practised Christianity, while 51.5% resided in urban communities. More than three-quarters of the respondents (86.3%) belonged to wealthy households. Nearly three-quarters of the respondents (74.1%) were self-employed; those with secondary education represented 56.9% of the participants. A few

respondents (6.5%) had below secondary school education (**Table 1**).

Utilization of ante-natal care and delivery services

About 94.6% of the respondents had ANC visitation during their last pregnancy. Among respondents that had ANC visitation, 47.8% had at least 4 visits, while 49.3% visited during the second trimester. PHCs were the most common antenatal facility attended (49.0%), while the most popular facility of delivery among respondents was the hospital (37.4%). More than three quarters of the respondents (78.0%) had no shift between facilities of ANC and delivery. In terms of maternal outcome, 10.5% of the respondents had preterm birth, while neonatal sickness (7.9%) was also reported by respondents. (**Table 1**).

Figure 1 illustrates retention rates at all facility types for delivery services. Both hospitals and TBAs/Faith clinics had high retention rates with 89.9% and 86.7% respectively. In contrast, 33.4% of respondents who received ANC in PHC failed to deliver in a PHC. Most of these respondents delivered in a TBA/Faith clinic or Home/In transit.

Characteristics of participants by ANC facility and place of delivery

The findings regarding the association between caregivers' characteristics and their choice of ANC facility are presented in Table 2. The choice of ANC provider and place of delivery was significantly associated with participants' age, educational attainment, employment status and place of residence. Religion and gestational age at first ANC contact were associated with the place of delivery, but such was not found for the choice of ANC provider (Table 2). Women attending ANC at the hospital were generally older (mean age 31 years) than those attending PHCs (29 years) or TBAs/faith clinics (28 years) – with similar findings regarding the place of birth. Women with tertiary education were more likely to have their ANC and delivery in hospitals; in contrast, PHCs and TBAs were more common as both ANC facility and places of delivery among women with below tertiary level of education ($p < 0.001$). In terms of employment status, ANC (59.2%) and delivery (60.0%) in hospitals were more prevalent among participants with Private/public employment. ANC and delivery in PHCs were higher among participants that were self-employed or unemployed ($p < 0.001$).

ANC (43.5%, $p < 0.001$) and delivery (43.4%, $p = 0.006$) in hospitals were the most common among

Table 1: Respondents' socio-demographic characteristics, obstetric history and their utilization of ante-natal care and delivery services (N=617)

Characteristics	Frequency (%)	Characteristics	Frequency (%)
Number of siblings		Gestational age at initial ANC visit	
1	336 (54.5)	First trimester	211 (38.6)
2	208 (33.7)	Second trimester	270 (49.3)
3	73 (11.8)	Third trimester	66 (12.1)
Age group of mothers (years)^a		Antenatal visit during last pregnancy	
Less than 35 years	451 (76.2)	Yes	584 (94.6)
35 years and above	141 (23.8)	No	33 (5.4)
Age group of fathers (years)		Preterm birth	
Less than 35 years	239 (44.3)	Yes	65 (10.5)
35 years above	300 (55.7)	No	552 (89.5)
Household wealth index^a		ANC facility attended^a	
Poor	7 (1.2)	Hospitals	207 (35.6)
Middle	72 (12.5)	PHCs	285 (49.0)
Wealthy	498 (86.3)	TBAs/Faith Clinics	90 (15.4)
Employment status		Number of ANC visits^a	
Private/public employees	105 (17.0)	At least 4 visits	278 (47.8)
Self employed	457 (74.1)	Can't remember	263 (45.3)
Unemployed	55 (8.9)	Less than 4 visits	40 (6.9)
Marital status^a		Place of delivery	
Married/Living together	397 (95.9)	Home/In-transit/Market	57 (9.2)
Divorced	3 (0.7)	Hospitals	231 (37.4)
Separated	11 (2.7)	PHCs	203 (32.9)
Single	11 (2.7)	TBAs/Faith Clinics	126 (20.4)
Religion^a		Neonatal sickness	
Christianity	325 (52.9)	Yes	49 (7.9)
Islam	289 (47.1)	No	568 (92.1)
Education^a		Shift from ANC facility to Delivery facility	
No formal education	19 (3.1)	Positive shift	44 (7.6)
Primary	56 (9.1)	No shift	454 (78.0)
Secondary	350 (56.9)	Negative shift	84 (14.4)
Tertiary	190 (30.9)		
Place of residence			
Rural	299 (48.5)		
Urban	318 (51.5)		
Husband's education^a			
No formal education	10 (1.7)		
Primary	28 (4.8)		
Secondary	310 (52.7)		
Tertiary	240 (40.8)		

Mean age of respondents = 29.5 (SD = 6.5)

^a = missing variable

urban residents. In contrast, ANC (58.7%) and delivery in PHCs (36.5%) were most common in rural settings ($p < 0.001$). A higher proportion of women in urban settings (16.6% urban; 14.2% rural) utilized TBAs/faith clinics but proportion of women who delivered outside hospitals and PHCs was higher in rural settings (27.0% urban; 32.4% rural).

Deliveries in hospitals and TBAs/faith clinics were more common among Christian women,

whereas deliveries in PHCs, at home/in transit were more among Muslim women ($p < 0.001$)

Determinants of shifts in facilities of ANC and delivery among participants

Table 3 indicates a significant association between participants' gestational age at initial ANC visit and positive shift (i.e., movement from a lower-level facility of ANC to a higher-level facility of delivery).

Table 2: Characteristics of participants by ANC facility and place of delivery

Characteristics	Choice of ANC Facilities			P value	Total	Place of delivery			P value	
	Total	Hospitals	PHCs			TBAs/ Faith Clinics	Hospitals	PHCs		TBAs/ Faith Clinics
Predisposing characteristics	N (%)				N (%)					
Age Mean (SD)	29.6(6.5)	30.5(6.2)	29.4(6.6)	0.013	29.5(6.6)	30.3(6.0)	29.1(7.0)	28.2(6.6)	30.0(6.0)	0.029
Education										
Secondary and below	392	110(28.1)	208(53.1)	74(18.8)	425	134(31.5)	146(34.3)	98(23.1)	47(11.1)	
Tertiary	188	96(51.1)	76(40.4)	16(8.5)	190	97(51.0)	56(29.5)	27(14.2)	10(5.3)	<0.001
Employment										
Private/Public	103	61(59.2)	36(35.0)	6(5.8)	105	63(60.0)	26(24.7)	13(12.4)	3(2.9)	
Self-employed	440	134(30.4)	234(53.2)	72(16.4)	457	157(34.4)	159(34.8)	96(21.0)	45(9.8)	
Unemployed	39	12(30.8)	15(38.4)	12(30.8)	55	11(20.0)	18(32.7)	17(30.9)	9(16.4)	<0.001
Religion										
Christianity	307	113(36.8)	139(45.3)	55(17.9)	325	126(38.7)	97(29.9)	84(25.9)	18(5.5)	
Islam	272	94(34.6)	146(53.7)	32(11.7)	289	105(36.3)	106(36.7)	39(13.5)	39(13.5)	<0.001
External environment	N (%)				N (%)					
Place of residence										
Rural	281	76(27.1)	165(58.7)	40(14.2)	299	93(31.1)	109(36.5)	62(20.7)	35(11.7)	
Urban	301	131(43.5)	120(39.9)	50(16.6)	318	138(43.4)	94(29.6)	64(20.1)	22(6.9)	0.006
Enabling characteristics										
Household wealth index										
Poor	5	2(40.0)	2(40.0)	1(20.0)	7	1(14.2)	2(28.6)	2(28.6)	2(28.6)	
Middle	61	16(26.2)	33(54.1)	12(19.7)	72	20(27.8)	24(33.3)	19(26.4)	9(12.5)	
Wealthy	476	176(37.0)	227(47.7)	73(15.3)	498	193(38.8)	163(32.7)	100(20.1)	42(8.4)	0.148
Need factors	N (%)				N (%)					
Gestational age at initial ANC visit										
First trimester	211	73(34.6)	102(48.3)	36(17.1)	211	84(39.8)	68(32.2)	44(20.9)	15(7.1)	
Second trimester	270	102(37.8)	133(49.3)	35(12.9)	270	111(41.1)	97(35.9)	50(18.5)	12(4.4)	
Third trimester	66	18(27.3)	36(54.5)	12(18.2)	66	19(28.8)	23(34.8)	13(19.7)	11(16.7)	0.026
Preterm birth										
Yes	63	19(30.2)	37(58.7)	7(11.1)	65	5(7.7)	20(30.8)	26(40.0)	14(21.5)	
No	519	188(36.2)	248(47.8)	83(16.0)	552	52(9.4)	211(38.2)	177(32.1)	112(20.3)	0.530

Table 3. Determinants of shifts in facilities of ANC and delivery among participants

Characteristics	Negative Shift			Positive Shift		
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)
Place of residence						
Rural	1.00		1.00	1.00		1.00
Urban	0.68 (0.43–1.09)	0.112	0.86 (0.52–1.43)	0.79 (0.43–1.47)	0.112	0.71 (0.37–1.38)
Age						
Less than 25 years	1.00		1.00	1.00		1.00
25–35 years	1.06 (0.59–1.91)	0.844	1.10 (0.60–2.04)	1.80 (0.77–4.21)	0.176	2.18 (0.89–5.33)
More than 35 years	1.23 (0.60–2.53)	0.579	1.36 (0.64–2.90)	0.93 (0.28–3.03)	0.902	1.15 (0.33–3.93)
Education						
Less than secondary	1.00		1.00	1.00		1.00
Secondary and higher	0.56 (0.29–1.10)	0.095	0.66 (0.32–1.39)	1.05 (0.36–3.07)	0.931	0.90 (0.29–2.79)
Employment						
Private/Public formal	1.00		1.00	1.00		1.00
Self employed	2.08 (0.999–4.32)	0.050	1.71 (0.79–3.69)	1.54 (0.63–3.77)	0.348	2.06 (0.76–5.60)
Unemployed	1.22 (0.35–4.25)	0.752	1.33 (0.31–5.62)	1.38 (0.32–5.83)	0.666	2.21 (0.72–17.01)
Religion						
Christianity	1.00		1.00	1.00		1.00
Islam	1.14 (0.71–1.81)	0.588	1.18 (0.72–1.93)	0.86 (0.46–1.61)	0.648	0.95 (0.49–1.81)
Gestational age at initial ANC visit						
First trimester	1.00		1.00	1.00		1.00
Second trimester	0.76 (0.46–1.28)	0.302	0.71 (0.41–1.21)	0.85 (0.45–1.61)	0.619	0.86 (0.45–1.65)
Third trimester	1.15 (0.57–2.35)	0.693	0.89 (0.43–1.87)	0.15 (0.07–1.15)	0.068	0.13 (0.02–0.98)

***0.048**

Compared to participants that had initial ANC visit in their 1st trimester, there was 87% lower odds of having positive shift among those that had their initial ANC visit in their 3rd trimester [AOR = 0.13; 95% CI: (0.02 – 0.98)] while there was no statistical significance for participants that had their initial ANC visit during their 2nd trimester.

Although not statistically significant, increasing maternal age was associated with negative shift. Compared to respondents who were less than 25 years, the odds of negative shift were 1.10 (95%

CI: 0.60 – 2.90) and 1.36 (0.64 – 2.90) among respondents aged 25-35 years and greater than 35 years respectively. (Table 3)

Association between place of delivery and neonatal illness

Place of delivery was not significantly associated with neonatal illness. However, neonatal illness was more prevalent among infants of respondents that had their deliveries at TBAs/Faith clinics (8.7%) and Home/In-transit (10.5%). (Table 4)

Table 4: Association between place of delivery and neonatal illness

Place of delivery	Neonatal illness			RR (95% CI)	P-value
	Total	No	Yes		
Hospitals	231	211 (91.3)	20 (8.7)	1.00	
PHCs	203	191 (94.1)	12 (5.9)	0.66 (0.32–1.39)	0.277
TBAs/Faith clinics	126	115 (91.3)	11 (8.7)	1.01 (0.47–2.18)	0.982
Home/In-transit	57	51 (89.5)	6 (10.5)	1.24 (0.47–3.25)	0.660

Discussion

We investigated the choice of ANC providers and place of delivery among mothers of under-5 children in a peri-urban setting with a view to documenting utilization of maternal care services and the determinants of positive and negative shifts between skilled and unskilled ANC exposure and delivery. Most of the participants attended ANC during their most recent pregnancy. PHCs are the most preferred choice for ANC and hospitals are the most preferred choice for delivery among the respondents. Also, more than three-quarters of the respondents exhibited no shift in facilities for ANC and that of delivery. We also found that maternal age, education, employment status and place of residence (rural/urban) were significantly associated with the choice of ANC and delivery facilities among the respondents while only religion and gestational age at first ANC were significantly associated with the choice of delivery facility type. Our study showed that both skilled and unskilled ANC were more common among urban dwellers, but non-facility delivery is more common among rural dwellers. In addition, we found retention rates (delivery at the facility of ANC) to be highest in hospitals (89.9%) and TBAs/Faith Clinics (86.7%) and lowest in PHCs (66.6%). We discovered a statistically significant relationship between respondents' gestational age at first ANC visit and the likelihood of a positive shift at delivery and there

was a dose-response relationship between maternal age and the likelihood of a negative shift.

Our study revealed that skilled ANC coverage in the study LGA (84.6%) is higher than the national average of 67% but similar to the state average for Oyo state (85.4%) [7] reported in the most recent national demographic and health survey (NDHS). This likely reflects the relatively higher socio-economic and maternal education characteristics of southwest Nigeria compared to other parts of Nigeria, [11,16] and reinforces the need for local data for policy development and decision making at sub-national level. Despite high ANC coverage, the proportion of respondents who had minimum of 4 ANC contacts (47.8%) as recommended by the WHO [19] prior to 2016 when it was reviewed to a minimum of 8 visits [26] was found to be lower than the national average of 57% [7] regardless of the high literacy rates and urban population. This contrasts with available evidence as higher level of education has been reported to be positively correlated with completion of minimum of 4 ANC visits. [1,7,27-30] This may be related to the fact that majority of the respondents (74.1%) are self-employed, possibly petty traders and small – and medium – scaled entrepreneurs (SME) who do not enjoy the benefits of paid leave and insurance cover available in most formal/corporate employment. While work – related factors may be responsible for

the low number of ANC visits completed by women in the study area, we were unable to explore this, and we recommend further research in this area.

Although, most of the respondents preferred ANC with skilled healthcare providers in Hospitals or PHCs, our study found differences in the choice of facility type between urban and rural dwellers in the LGA. While hospitals (secondary level facilities or higher) were the most preferred choice among urban dwellers, more than half (58.7%) of rural dwellers utilized PHCs. This difference may be due to economic and proximity factors. Most hospitals (public and private) are sited in urban settings thereby giving urban dwellers the luxury of choices. But the choice of PHCs among rural dwellers may be due to proximity and accessibility considerations as walking is the third most common means of transportation to health facility for delivery in the state. [7] Choosing a proximal facility is crucial to avoid delay in reaching health facilities which have been reported to be experienced in 59.6% of all maternal fatalities in health facilities. [31] Also, for most rural dwellers, who may not be as wealthy as their urban counterparts, PHCs are the cheaper alternatives especially in terms of direct and indirect cost of care. Surprisingly, more urban dwellers (16.6%) prefer unskilled ANC (TBAs and Faith clinics) compared to rural dwellers (14.2%). Although both values bear similarities to the official state average (14.6%), being more common in the urban cohort is however striking and may be worth further exploration.

With 70% of the respondents having their most recent delivery in a health facility (hospital/PHC), there is high preference for institutional delivery among mothers of under-5 in the study area. This is comparatively higher than in most settings in Nigeria given the national average of 39% [7] and other settings in sub-Saharan Africa. Ahinkorah (2020) reported that almost half (47.6%) of women of child-bearing age in Guinea deliver at home [32] and Ghana has a non-facility delivery rate of 68%. [16] Similar to the national average however, Abubakar *et al* found that home delivery is preferred by most pregnant women (74%) in Northern Nigeria despite attending skilled ANC during pregnancy. [11] This has been corroborated by Atinge *et al* in Taraba state, [20] but our finding is in consonance with Egharevba *et al* who reported 75% facility delivery rate in southeastern Nigeria. [4] Higher educational attainment, urban residence, skilled ANC attendance and higher socio-economic status have been reported to be positively correlated with facility delivery. [4,7,16,18,20,33] However, it falls short of the target

for institutional delivery set by many countries (100%)[34] to reduce maternal mortality.

Almost a third of the respondents in our study delivered their most recent pregnancy out of the health facility despite attending ANC with skilled healthcare provider. Our study found that PHCs were unable to retain one-third of their ANC attendees for delivery, most of whom delivered in TBAs/Faith Clinics or in transit (negative shift). Thus, PHCs account for most shifts and are responsible for the highest proportion of negative shifts. Atinge *et al* reported that women who received ANC in PHCs are two times more likely to deliver out of the health facility than those who received ANC in hospitals [20] thereby corroborating our finding. Women who received skilled ANC in hospitals and unskilled ANC (TBAs/Faith Clinics) also exhibited some degree of shift, but this was minimal and mostly positive. Positive shift significantly correlated with early ANC initiation emphasizing the importance of initiating skilled ANC in the first trimester to allow for proactive management and referral to a higher-level facility if necessary. Our finding on the proportion of out of facility deliveries is identical to the official figure (30.0%) [7] and bear some similarities to other findings in southern Nigeria. [4,35,36] These findings corroborate Amoro *et al* (2021) submission that there is a growing trend of bypassing PHCs for maternal care services (antenatal, delivery and post-natal care). The reasons for this may be connected to cost, perceived quality of care, availability of ultrasound services and income levels of pregnant women. [36-40] In a study in Delta state of Nigeria, perceived poor quality of care is the most common reason why pregnant women refrain from PHCs [36] but in Anambra state where most women were reported to be satisfied with maternal health services, utilization of health facilities for ANC and delivery services have been reported to be 97% and 92.7% respectively. [37] In other studies, conditional cash transfer [38] and availability of ultrasound services have been found to increase ANC and delivery attendance in PHCs, [40] an indication that availability of needed diagnostic services may improve retention of ANC attendees for delivery at PHCs.

Multiple contextual factors may be associated with negative shift especially in rural setting. Economic incapability and labour-related factors (such as labour occurring at night and suddenly, lack of means of transportation during labour and access to skilled healthcare worker at home) negatively affect facility delivery and encourages delivery at home or with TBAs. [4,20] Also, lack of

formal education by both spouses [7,32] and health system factors such as staff attitude [11] have also been reported as reasons women opt for out – of – facility delivery. These may disproportionately affect rural dwellers more because urban dwellers have access to more private facilities with better service delivery.

Limitations

We interviewed caregivers of under-5 children in the study to assess their choice of ANC and delivery facilities for their most recent pregnancy. Therefore, our findings may be prone to caregivers' recall bias. Also, because this was a cross-sectional study, we were unable to establish a causal relationship between facility types and negative or positive shifts. We did not conduct qualitative interviews with caregivers or healthcare workers, health facility assessments, and a review of patients' medical charts to ascertain the appropriateness or reasons for the shifts. Nevertheless, our findings identified areas of further research and interventions to improve maternal health outcomes in Nigeria.

Conclusion

Our study found that due to poor retention of ANC attendees in PHCs, many pregnant women dropped out of the care continuum constituting a missed opportunity to reduce maternal mortality through institutional delivery. The study also highlights key opportunities to improve patronage of PHCs for maternal healthcare services which may require a multi-pronged approach. We recommend that government should ensure PHCs have the capability to run simple diagnostic and imaging tests required during ANC. The ongoing initiative of the Oyo state government to upgrade a PHC per ward is commendable and should be ramped up. In addition, we recommend community- and worship centers directed sensitization campaigns to discourage unskilled ANC and delivery services.

Finally, we recommend further research to explore factors responsible for PHC bypass for maternal and child health services.

References

1. Fagbamigbe, A. F., & Idemudia, E. S. (2017). Wealth and antenatal care utilization in Nigeria: Policy implications. *Health Care for Women International*, 38(1), 17–37. <https://doi.org/10.1080/07399332.2016.1225743>
2. Dickson, K. S., Darteh, E. K. M., Kumi-Kyereme, A., & Ahinkorah, B. O. (2018). Determinants of choice of skilled antenatal care service providers in Ghana: analysis of demographic and health survey. *Maternal Health, Neonatology and Perinatology*, 4(1). <https://doi.org/10.1186/s40748-018-0082-4>
3. Fagbamigbe, A. F., Mashabe, B., Lepetu, L., & Abel, C. (2017). Are the timings and risk factors changing? Survival analysis of timing of first antenatal care visit among pregnant women in Nigeria (2003-2013). *International Journal of Women's Health*, 9. <https://doi.org/10.2147/IJWH.S138329>
4. Egharevba, J., Pharr, J. R., Van Wyk, B., & Ezeanolue, E. E. (2017). Factors Influencing the Choice of Child Delivery Location among Women Attending Antenatal Care Services and Immunization Clinic in Southeastern Nigeria. *International Journal of Maternal and Child Health and AIDS (IJMA)*, 6(1), 82–92. <https://doi.org/10.21106/ijma.213>
5. World Health Organisation. (2022). *Maternal mortality*. <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>
6. World Health Organisation. (2022). *Maternal mortality*. <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>
7. National Population Commission (NPC) Nigeria. (2019). *The Federal Republic of Nigeria Nigeria Demographic and Health Survey 2018 National Population Commission Abuja, Nigeria*. www.DHSprogram.com.
8. National Population Commission (NPC) Nigeria. (2014). *NIGERIA DEMOGRAPHIC AND HEALTH SURVEY 2013 National Population Commission Federal Republic of Nigeria Abuja*. www.population.gov.ng
9. National Population Commission (NPC) Nigeria. (2004). *Nigeria Demographic and Health Survey 2003 National Population Commission Federal Republic of Nigeria*. www.measuredhs.com.
10. World Health Organisation. (2022). *WHO/Europe Maternal and newborn health - Data and statistics*. <https://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/data-and-statistics>
11. Abubakar, S., Adamu, D., Hamza, R., & Galadima, J. B. (2017). Determinants of home delivery among women attending antenatal care in Bagwai Town, Kano Nigeria. *African Journal of Reproductive Health*, 21(4). <https://doi.org/10.29063/ajrh2017/v21i4.8>
12. Carroli, G., Rooney, C., & Villar, J. Â. (2001). How effective is antenatal care in preventing maternal mortality and serious morbidity? An

- overview of the evidence. *Paediatric and Perinatal Epidemiology*, 15(s1), 1–42. <https://doi.org/10.1046/J.1365-3016.2001.0150S1001.X>
13. Pandit, R. D. (1992). Role of Antenatal Care in Reducing Maternal Mortality. *Asia-Oceania Journal of Obstetrics and Gynaecology*, 18(1), 1–6. <https://doi.org/10.1111/J.1447-0756.1992.TB00291.X>
 14. Fagbamigbe, A. F., Hurricane-Ike, E. O., Yusuf, O. B., & Idemudia, E. S. (2017). Trends and drivers of skilled birth attendant use in Nigeria (1990–2013): policy implications for child and maternal health. *International Journal of Women's Health*, 9, 843. <https://doi.org/10.2147/IJWH.S137848>
 15. World Health Organisation. (2019). *Maternal mortality Evidence brief Progress towards achieving the Sustainable Development Goals*. <https://www.who.int/publications/m/item/maternal-mortality-evidence-brief-progress-towards-achieving-the-sustainable-development-goals>
 16. Manyeh, A. K., Akpakli, D. E., Kukula, V., Ekey, R. A., Narh-Bana, S., Adjei, A., & Gyapong, M. (2017). Socio-demographic determinants of skilled birth attendant at delivery in rural southern Ghana. *BMC Research Notes*, 10(1), 1–7. <https://doi.org/10.1186/S13104-017-2591-Z/TABLES/2>
 17. Jacobs, C., Moshabela, M., Maswenyeho, S., Lambo, N., & Michelo, C. (2017). Predictors of antenatal care, skilled birth attendance, and postnatal care utilization among the remote and poorest rural communities of Zambia: A multilevel analysis. *Frontiers in Public Health*, 5(FEB), 11. <https://doi.org/10.3389/FPUBH.2017.00011/BIBTEX>
 18. Nyongesa, C., Xu, X., Hall, J. J., Macharia, W. M., Yego, F., & Hall, B. (2018). Factors influencing choice of skilled birth attendance at ANC: Evidence from the Kenya demographic health survey. *BMC Pregnancy and Childbirth*, 18(1), 1–6. <https://doi.org/10.1186/S12884-018-1727-Z/TABLES/2>
 19. Lincetto, O., Mothebesoane-Anoh, S., Gomez, P., & Munjanja, S. (2020). *Opportunities for Africa's Newborn*.
 20. Atinge, S., Ogunnowo, B. E., & Balogun, M. (2020). Factors associated with choice of non-facility delivery among women attending antenatal care in bali local government area of taraba state, north-eastern Nigeria. *African Journal of Reproductive Health*, 24(1), 143–151. <https://doi.org/10.29063/ajrh2020/v24i1.15>
 21. *Statistics – National Population Commission*. (n.d.). Retrieved October 11, 2022, from <http://nationalpopulation.gov.ng/statistics/>
 22. *PRIORITY TABLE*. (2010).
 23. Citypopulation. (2022). *Nigeria: Administrative Division (States and Local Government Areas) - Population Statistics, Charts and Map*. <https://www.citypopulation.de/en/nigeria/admin/>
 24. Federal Ministry of Health. (2019). *Nigeria Health Facility Registry*. Health Facility Registry. <https://hfr.health.gov.ng/>
 25. National Bureau of Statistics. (2017). National Bureau of Statistics. *Multiple Indicator Cluster Survey 2016-17, Survey Findings Report*.
 26. Alkema, L., Chou, D., Hogan, D., Zhang, S., Moller, A. B., Gemmill, A., Fat, D. M., Boerma, T., Temmerman, M., Mathers, C., & Say, L. (2016). Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: A systematic analysis by the Maternal Mortality Estimation Inter-Agency Group. *The Lancet*, 387(10017), 462–474. [https://doi.org/10.1016/S0140-6736\(15\)00838-7](https://doi.org/10.1016/S0140-6736(15)00838-7)
 27. Nghargbu, R., & Olaniyan, O. (2019). Determinants of Antenatal Care Utilization in Nigeria. *Central Ethiopia Ethiop J Health Dev*.
 28. Muchie, K. F. (2017). Quality of antenatal care services and completion of four or more antenatal care visits in Ethiopia: A finding based on a demographic and health survey. *BMC Pregnancy and Childbirth*, 17(1). <https://doi.org/10.1186/s12884-017-1488-0>
 29. Basha, G. W. (2019). Factors Affecting the Utilization of a Minimum of Four Antenatal Care Services in Ethiopia. *Obstetrics and Gynecology International*, 2019. <https://doi.org/10.1155/2019/5036783>
 30. Nwankwo, C. U., & Ezenwaka, C. E. (2020). The barriers preventing pregnant women from accessing midwife-led antenatal care in Nigeria. *Journal of Nursing Education and Practice*, 10(5). <https://doi.org/10.5430/jnep.v10n5p36>
 31. Mgawadere, F., Unkels, R., Kazembe, A., & van den Broek, N. (2017). Factors associated with maternal mortality in Malawi: Application of the three delays model. *BMC Pregnancy and Childbirth*, 17(1), 1–9. <https://doi.org/10.1186/S12884-017-1406-5/TABLES/4>
 32. Ahinkorah, B. O. (2020). Non-utilization of health facility delivery and its correlates among childbearing women: a cross-sectional analysis of the 2018 Guinea demographic and health survey data. *BMC Health Services Research*, 20(1). <https://doi.org/10.1186/s12913-020-05893-0>

33. Muhammed, G., Kibria, A., Ghosh, S., Hossen, S., Ara, R., Barsha, A., Sharmeen, A., & Uddin, S. M. I. (2017). Factors affecting deliveries attended by skilled birth attendants in Bangladesh. *Maternal Health, Neonatology and Perinatology 2017 3:1*, 3(1), 1–9. <https://doi.org/10.1186/S40748-017-0046-0>
34. World Health Organisation. (2022). *Institutional births (%)*. Institutional Births. <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/institutional-birth>
35. Johnson, O. E., Obidike, P. C., Eroh, M. U., Okpon, A. A., Basse, E. I., Patrick, P. C., Ebong, P. E., & Ojumah, E. (2020). Choices and determinants of delivery location among mothers attending a primary health facility in Southern Nigeria. *Nigerian Postgraduate Medical Journal*, 27(1), 42. https://doi.org/10.4103/NPMJ.NPMJ_150_19
36. Ahuru, R. R. (2020). Maternal Care Utilization in Primary Healthcare Centers in Nigerian Communities. *International Quarterly of Community Health Education*, 272684X20983956. <https://doi.org/10.1177/0272684X20983956>
37. Emelumadu, O. F., Onyeonoro, U. U., Ukegbu, A. U., Ezeama, N. N., Ifeadike, C. O., & Okezie, O. K. (2014). Perception of quality of maternal healthcare services among women utilising antenatal services in selected primary health facilities in Anambra State, Southeast Nigeria. *Nigerian Medical Journal/ : Journal of the Nigeria Medical Association*, 55(2), 148. <https://doi.org/10.4103/0300-1652.129653>
38. Okoli, U., Morris, L., Oshin, A., Pate, M. A., Aigbe, C., & Muhammad, A. (2014). Conditional cash transfer schemes in Nigeria: Potential gains for maternal and child health service uptake in a national pilot programme. *BMC Pregnancy and Childbirth*, 14(1), 1–13. <https://doi.org/10.1186/S12884-014-0408-9/TABLES/4>
39. Amoro, V. A., Abihiro, G. A., & Alatinga, K. A. (2021). Bypassing primary healthcare facilities for maternal healthcare in North West Ghana: socio-economic correlates and financial implications. *BMC Health Services Research*, 21(1), 1–14. <https://doi.org/10.1186/S12913-021-06573-3/TABLES/5>
40. Luntsi, G., Ugwu, A. C., Ohagwu, C. C., Kalu, O., Sidi, M., & Akpan, E. (2022). Impact of ultrasound scanning on pregnant Women's compliance with attendance at antenatal care visits and supervised delivery at primary healthcare centres in northern Nigeria: Initial experiences. *Radiography*, 28(2), 480–486. <https://doi.org/10.1016/J.RADI.2022.01.003>

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