

Inequalities in access to birth by caesarean section in the context of user fee exemption for maternal health services in southwest and north central Nigeria

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Background: User fee exemption for maternal healthcare services was introduced with a focus on providing free maternal health services, including caesarean sections (CS), in Nigeria. This policy has had a positive impact on access to facility-based delivery; however, the extent to which inequality in access to CS exists in the context of user fee exemption is unclear. The objective of this study was to examine inequalities in access to birth by CS 5 y after the implementation of the user fee exemption policy.

Methods: Data were obtained from 1227 women who gave birth between 2011 and 2015 and were selected using cluster random sampling between May and August 2016 from two of the six main regions of the country. Adjusted and unadjusted binary logistic regression models were performed.

Results: An overall CS rate of 6.1% was found, but varied by income, education and place of residence. Women who earned a monthly income of $\leq 20\,000$ naira (US\$150) were 50% less likely to have a birth by CS compared with those who earned more. Compared with women who were educated to the tertiary level, women who had a secondary education or less were 51% less likely to give birth by CS.

Conclusions: This study shows that inequality in access to CS persists despite the implementation of free maternal healthcare services.

Keywords: caesarean section, free maternal healthcare, inequality, Nigeria.

Introduction

Sub-Saharan Africa (SSA) has a heavy burden of maternal deaths. More than 66% of all global maternal deaths occur in SSA, despite accounting for <10% of the world's population.¹ Most maternal deaths are preventable with the use of quality obstetric care, including caesarean section (CS).² However, the cost of maternal healthcare services, distance and sociocultural reasons, among other factors, preclude women from accessing care.^{3–11}

CS is a life-saving intervention that should be available for all women who require it.¹² Healthcare providers are the main decider of CS in situations when it is needed, and this is mostly to save the lives of mothers and babies. While this life-saving intervention is overutilised in many parts of the world, its use is sub-optimal in SSA, especially among women in the lowest wealth quintile.^{13–16} While the rate of utilisation of CS is as high as 44.3%

in Latin America and the Caribbean region, the Africa region has the lowest rate of utilisation, at 4.1%.¹² A study estimated that 3.18 million additional CSs were needed and 6.20 million unnecessary sections were performed in 2008.¹⁷

There is a consensus in the literature that the ideal population-level rate of CSs should be between 10 and 15%.^{17–20} It is well established that when the CS rate is <10%, maternal and perinatal mortality decreases with an increase in CS rates. However, a CS rate that is >10% is not beneficial for women or infants. In other words, limited access to CS is linked with an increase in maternal and perinatal mortality,^{21,22} with a study estimating that a CS rate of <1% among women in the lowest wealth index in SSA contributes about 80 000 maternal deaths per year.¹⁴ A recent study published in *The Lancet* that examined the minimum required level of CS concluded that settings with a CS rate

<9% had an insufficient number of CS procedures to cover all life-threatening causes.¹⁹

Although many factors preclude women from accessing birth by CS,²³ the unaffordability of this life-saving intervention is among the main reasons for its low demand.^{14,24–27} Free maternal healthcare was introduced in many SSA countries^{28,29} to combat the cost barrier to access and to make this intervention universally available. While there is evidence that access to birth by CS slightly increased following the implementation of user fee exemption in Senegal,³⁰ geographic and socio-economic inequalities in access to birth by CS persist in Mali and Benin despite the introduction of a user fee exemption policy.²⁹ Given the mixed results on the state of inequality in access to CS in the context of user fee exemption for maternal health in the literature, further studies are needed to examine this link.

Nigeria has a heavy burden of maternal deaths. Nigeria alone accounts for 19% of global maternal deaths, thus making the country one of the most dangerous places on earth for a woman to deliver a baby.¹ User fee exemption for maternal and child health was introduced in the country under a subsidy reinvestment programme of the federal government to address the poor maternal outcomes. Also, each state provided additional funds to support free maternal healthcare intervention by the federal government. However, there is a paucity of data on the prevalence of birth by CS in the context of free maternal healthcare. Also, inequality in access to birth by CS in the context of free maternal healthcare policy implementation in Nigeria has not been previously explained. What is more, we do not know how free maternal healthcare has impacted inequality in access to CS. This study's main objective was to examine access to birth by CS in the context of free maternal healthcare. Specifically, the study examines sociodemographic and geographic inequalities in access to birth by CS among women who gave birth between 2011 and 2015 under the free maternal healthcare policy using population-based survey data obtained from two of the six main regions of the country.

Methods

Study area and study design

The data analysed in this study were part of a more extensive study that evaluated the free maternal health programme in Nigeria. This was a cross-sectional study in which data were obtained through a household survey conducted in two of the six main regions of Nigeria. The full details of the methodology are published elsewhere.²⁸ The two regions and states were purposively selected because of the uniqueness of their free maternal healthcare policy. In the southwest region, two states (Ondo and Ekiti) were selected, while in the north central region, Nasarawa was selected.

The Ondo, Ekiti and Nasarawa state governments all implemented the free maternal and child health programme to complement the effort of the federal government. In response to the 2008 Nigeria Demographic and Health Survey, which revealed that Ondo had the worst maternal outcomes of all the southwest Nigerian states,³¹ universal free maternal and child healthcare was introduced in Ondo by the state government in 2010. The programme is known as the 'Abiye initiative'. *Abiye* means safe

motherhood in the local language. The policy covers free CSs in all government hospitals. The programme complemented the effort of the federal government to combat maternal mortality and receives much support from several international donors. However, the free maternal healthcare in Ekiti was not universal. The policy deliberately targeted poor people, who were most likely to seek care in primary health centres. Given this context, only the users of primary healthcare were covered in Ekiti.²⁸ Women with delivery complications or those who require an emergency CS are referred to government-owned tertiary facilities for free care. The free healthcare in Nasarawa is accessible in all government hospitals. Even though universal free maternal and child healthcare was introduced in Nasarawa, the skewed distribution of health facilities in the state means the poor are the least likely to benefit.²⁸ Maternal healthcare utilisation is low in Nasarawa and access to healthcare is disproportionately skewed to urban areas.

Study population and sampling strategy

The study population was women of reproductive age (15–49 y) who gave birth within the 5 y preceding the survey (2011–2015), the period when free maternal healthcare was available. The data were obtained from May to August 2016. A total of 1227 women were recruited from Ekiti and Ondo in the southwest region and Nasarawa in the north central region. The sample size was determined using the sample size calculator at a confidence level of 95%, with a precision level of $\pm 5\%$, a maximum variation of 50%, an infinite population and 10% adjustment for possible non-response. A sample of 409 participants is required to achieve representativeness and to be able to draw a valid conclusion in each state.

Participants were selected using a three-stage cluster random sampling method. The states were clustered into enumeration areas (EAs) and stratified into rural and urban areas. Simple random sampling was used to select EAs from the list of EAs in the 2006 census. A total of 25 EAs are needed per state to reach the sample size. In each EA, at least 15–30 women were interviewed, with probability proportional to the size of the state. Given that new houses have emerged since the 2016 census, participants were recruited from every 10th household in each EA until the total sample of 1227 was reached. Households in which there were no women who met the inclusion criteria were skipped and only one woman was selected in each household.

Data collection

The research assistants, who were graduate students and understood the local languages, were explicitly trained for the purpose of this study. The training involved ethical issues in research, especially the rights of the participants to privacy, respect, anonymity and confidentiality. Also, they were trained on the objectives of the study and how to administer the instrument. These trained research assistants administered the instrument to women who gave birth in the 5 y preceding the survey. The questionnaire was piloted among 20 women in another state not included in the study. The feedback from the pilot study helped us rephrase ambiguous questions.

Measures

Dependent variable

The main outcome variable of this study was birth by CS. Women who met the inclusion criteria and consented to participate in the study were asked whether their most recent childbirth was delivered by CS or by vaginal birth.

Independent variable

The main independent variables of this study were education, income and place of residence. These variables are proxy measures of inequality and have been used to measure inequality in access to health services by previous studies.^{32,33} Participants were asked to state their highest level of education and their monthly income. Place of residence was categorised as urban or rural based on the population of the community and infrastructure located in the community. Income was measured as a continuous variable but later categorised as $\leq 20\,000$ naira (US\$150) and $> 20\,000$ naira. The rationale for the classification is because the minimum wage in the country at the time of the study was around 20 000 naira.

Control variables

Age, antenatal care (ANC) attendance, ethnicity and study locations were control variables included in the analysis. Age was measured as a continuous variable and later categorised into 15–35 y and 36–49 y. The age categorisation is based on the fact that older age is associated with birth complications, including CS.³³ Women were asked if they sought care from skilled providers during their index pregnancy. Those who sought care were categorised as 1 and those who did not were coded as 0. Women were asked which ethnic group they belonged to and their responses were recorded.

Data analysis

The data obtained were captured in the Statistical Package for the Social Sciences version 24 (IBM, Armonk, NY, USA). Descriptive statistics were used to summarise the data. Mean and SD were calculated for continuous variables, while simple frequency counts and percentages were estimated for categorical variables. Bivariate and multivariable logistic regression models were used to examine the socio-economic and geographical inequality in access to birth by CS. The bivariate model was estimated in order to examine the net effect of each independent variable on the outcome variable, while the multivariable logistic regression was used to examine the effect of socio-economic and geographical factors on births by CS while controlling for other covariates. The analyses were performed at a 95% CI and p-values < 0.05 were considered to be statistically significant. Sampling weight was assigned at various levels of analysis to account for over- and undersampling of some areas within the study settings.

Results

The analysis included 1212 women with a complete response on the mode of child delivery. The mean age of study participants

Table 1. Sociodemographic characteristics of study participants

Variable	n	%
State		
Ekiti	400	33.0
Ondo	401	33.1
Nasarawa	411	33.9
Place of residence		
Urban	384	31.7
Peri-urban	331	27.3
Rural	497	41.0
Level of education		
No schooling	93	7.7
Primary	209	17.2
Secondary	571	47.1
Higher education	339	28.0
Religion		
Christian	933	77.0
Islam	275	22.7
Traditional religion	4	0.3
Marital status		
Currently married	1162	95.9
Formerly married	12	1.0
Never married	38	3.1
Own a mobile phone		
Yes	1080	89.1
No	132	10.9
Own a television		
Yes	1110	91.6
No	102	8.4
Own a bank account		
Yes	602	49.7
No	610	50.3
Access to the internet		
Yes	338	27.9
No	874	72.1
Parity		
1	289	23.8
2	293	24.2
3	292	24.1
4	203	16.7
5–13	150	11.2

was 30.4 y (SD 6.3). Most participants were Christians (76.9%), married (95.9%), owned a mobile phone (89.1%) and watched television (91.6%) (Table 1).

Prevalence and correlates of birth by CS among childbearing women

The prevalence of CS births was 6.1%. The prevalence of CSs was highest among older women (age ≥ 36 y) (8.1%), women residing in Nasarawa (7.5%), urban residents (7.8%), women who earned $> 20\,000$ naira (10.7%) and women who had higher education (11.8%) (Table 2).

Table 2. Association between demographic factors and CS among childbearing women

Variables	CS birth	Vaginal birth	p-Value
All	74 (6.1)	1138 (93.9)	
Age (y)			0.257
15–25	15 (4.9)	292 (95.1)	
26–35	38 (5.9)	609 (94.1)	
36–49	21 (8.1)	237 (91.9)	
State			0.136
Ekiti	17 (4.3)	383 (95.8)	
Ondo	26 (6.5)	375 (93.5)	
Nasarawa	31 (7.5)	380 (92.5)	
Place of residence			0.002
Urban	56 (7.8)	659 (92.2)	
Rural	18 (3.6)	479 (96.4)	
Level of education			<0.001
No schooling	0 (0.0)	93 (100.0)	
Primary	10 (4.8)	199 (95.2)	
Secondary	24 (4.2)	547 (95.8)	
Higher education	40 (11.8)	299 (88.2)	
Religion			0.128
Christian	64 (6.9)	869 (93.1)	
Islam	10 (3.6)	265 (96.4)	
Traditional	0 (0.0)	4 (100.0)	
Marital status			0.440
Currently married	73 (6.3)	1089 (93.7)	
Formerly married	0 (0.0)	12 (100.0)	
Never married	1 (2.6)	37 (97.4)	
Monthly income (naira)			0.001
0–20 000	48 (5.0)	920 (95.0)	
>20 000	26 (10.7)	218 (89.3)	
Parity			0.002
1	24 (8.3)	265 (91.7)	
2	26 (8.9)	267 (91.1)	
3–13	24 (3.8)	606 (96.2)	
Ethnic groups			0.115
Yoruba	42 (5.9)	673 (94.1)	
Hausa/Fulani	2 (3.1)	63 (96.9)	
Igbo	10 (11.8)	75 (88.2)	
Others	20 (5.8)	327 (94.2)	
ANC attendance			0.140
Did not receive ANC	0 (0.0)	55 (100.0)	
Attended ANC up three times	5 (5.4)	88 (94.6)	
Attended ANC four or more times	69 (6.5)	995 (93.5)	

Multivariable analysis

The results of the unadjusted and adjusted regression, are presented in [Table 3](#). Rural residence, secondary education level and below and monthly income <20 000 naira were independently associated with a lower likelihood of having a CS birth. Parities of one and two children were associated with a higher likelihood of having a CS birth. The direction and magnitude of the effect persisted even after controlling for ethnicity, age, study location and ANC attendance. Women who had one or two children were more

than twice as likely to have a CS birth compared with women who had three or more children.

Rural places of residences were significantly associated with lower odds of birth by CS in the unadjusted model. While the relationship was no longer significant in the adjusted model, the direction of the effect remains.

Secondary education and below was significantly associated with lower odds of having a CS birth, and the magnitude and direction of the effect persisted even in the adjusted model.

Table 3. Binary logistic regression showing determinants of CS among childbearing women in the context of free maternal healthcare

Variables	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Age (y)		
15–35	0.66 (0.39–1.12)	0.39 (0.22–0.74)*
36–49 (ref)	1	1
Place of residence		
Rural (ref)	0.44 (0.26–0.76)*	0.79 (0.43–1.44)
Urban	1	1
Education level		
Secondary education and below	0.30 (0.19–0.49)***	0.49 (0.28–0.85)*
Higher education (ref)	1	1
Income level (naira)		
≤20 000	0.32 (0.19–0.54)***	0.50 (0.27–0.91)*
>20 000	1	1
Parity		
1	2.29 (1.28–4.10)*	2.84 (1.45–5.56)*
2	2.46 (1.39–4.36)*	2.84 (1.52–5.35)*
3–13	1	1
Ethnic group		
Yoruba	1.02 (0.59–1.77)	2.30 (0.83–6.36)
Hausa/Fulani	0.52 (0.12–2.28)	0.73 (0.16–3.33)
Igbo	2.18 (0.98–4.85)	2.50 (1.02–6.12)
Others	1	1
ANC attendance		
Did not attend ANC	–	–
Attended ANC one to three times	0.82 (0.32–2.08)	0.93 (0.36–2.42)
Attended ANC four or more times	1	1

ref, reference; UOR, Unadjusted odds ratio; AOR, Adjusted odds ratio; confidence interval (CI).

*** $p < 0.001$, * $p < 0.05$.

Compared with women who were educated to a tertiary level, women who had secondary education or less were 51% less likely to have birth by CS.

Monthly income of ≤20 000 naira was associated with a lower likelihood of having a CS birth. The magnitude and direction of the effect remain in the adjusted model. Women who earn a monthly income of ≤20 000 naira were 50% less likely to have a birth by CS compared with those who make more.

Discussion

Free maternal healthcare was introduced in Ekiti and Ondo in southwest Nigeria and Nasarawa in north central Nigeria to provide universal access to life-saving intervention for pregnant women. This study examined the prevalence of CS and inequality in access to birth by CS in the context of free maternal healthcare in these states. The study found a CS prevalence rate of 6.1% (4.3% in Ekiti, 6.5% in Ondo and 7.5% in Nasarawa). Despite the implementation of the user fee exemption policy, the prevalence of CS found in the study settings is well below the WHO 10–15% acceptable rate of CS.³⁴ However, the rate of CS among women with higher education and those whose monthly

income is >20 000 naira is within the CS rate recommended by the WHO.³⁴ A CS rate of >15% is said to have no health benefit, while a CS rate of <10% could be detrimental to the health of women.³⁵

Despite exemption of the user fee for maternal health in the study setting, women in the poorest stratum still had unequal access to life-saving intervention such as CS. This is evidenced by the finding that shows women whose monthly income is <20 000 naira were less likely to give birth through CS compared with those who earn more. This finding is consistent with a study conducted in Mali and Benin that revealed income inequality in access to birth by CS despite the introduction of free maternal healthcare.²⁹ Also, a study conducted in Morocco showed that women who gave birth by CS paid more than women who did not, despite the free maternal healthcare policy.³⁶ It is possible that the rate of CS may have slightly increased as a result of the free maternal healthcare policy, although not a finding of this study but based on findings of a previous study.³⁰ Nonetheless, these findings unequivocally show that inequality in access to CS persists despite the free maternal healthcare policy.

Besides income, education level is an important measure of inequality in this study. The analysis reveals significantly lower access to CS among women with lower levels of education.

Another study showed that less-educated women are more likely to refuse CS even when medically indicated. According to the study, this is as a result of concerns about the cost and perceived threat to life during the surgery.²³ The fear of danger to life during CS is real, given the high number of deaths and complications recorded during CSs in SSA.³⁷ Maternal deaths following CS in low- and middle-income countries are 100 times higher than in high-income countries.³⁷ However, it is vital to educate women about the safety of CS to improve uptake of the service when indicated. While free maternal healthcare addresses the financial barrier hindering access to maternal healthcare services, it does not address the geographic and knowledge barriers. Also, free maternal healthcare does not address the skill gap that may exist among providers. It is therefore imperative to train providers in order to reduce mortality arising from CS.

We observed lower access to CS among women who resided in rural areas, with a prevalence rate of <4%, which is well below the 10% considered to be the threshold for the population-level rate of CS. Even though the result of the multivariable analysis did not reach a significant level, the direction of effect suggests that geographic inequality in access to birth by CS persists. A previous study conducted in a southeastern Nigerian state revealed geographic inequality in access to birth by CS.³⁸ Residing in rural areas presents a serious challenge to accessing birth by CS, given the capacity of the available facilities and their staff. In many rural areas, pregnant women may have to be referred to an urban centre due to the lack of capacity in local clinics. This problem is further exacerbated by the lack of ambulances in rural clinics.³⁹ The lack of ability to perform CS in most rural areas and the unavailability of ambulances means that women residing in rural areas experience a delay in accessing CS, a life-saving intervention they urgently need. Such delays lead to maternal morbidity and mortality and probably explain why maternal deaths are far too common in the country.

Evidently inequality in access to CS persists despite the introduction of the user fee exemption policy. Plausible reasons for this are perhaps the effect of the health workers' decisions and capacity, prenatal care, distance to health facilities and sociocultural factors. These factors are well-established barriers to the use of maternal health services, including CS.²⁸ Outcomes of CSs are worst in resource-poor settings of SSA, with maternal deaths after CS 50 times higher in Africa compared with high-income countries.³⁷ The poor outcome of CS is in part due to the decision making of providers as well as their capacity. The poor outcomes of CS could possibly erode patients' trust and lead them to fear and reject the CS birth option even when medically indicated.

Distance to health facilities combined with poor means of transportation in resource-poor settings further disadvantage the poor despite the availability of free maternal healthcare services. Women residing far away from health facilities are at a disadvantage in accessing life-saving interventions such as CS.^{40,41} In settings where available health facilities are >20 km away in Nigeria, most women give birth at home without the assistance of skilled providers. The effect of distance means that skilled providers are unavailable to indicate CS when medically necessary. Thus women who experience birth complications requiring CS will continue to attempt a vaginal delivery until it is too late for both the baby and the mother to receive a life-saving intervention,

thus leading to deaths. This is among the reasons why Nigeria accounts for 19% of global maternal deaths, with >50 000 maternal deaths per year.¹ Free maternal healthcare obviously does not mitigate the effect of distance to health facilities on the use of maternal healthcare services.

The user fee exemption policy does not address the effect of sociocultural factors affecting the use of maternal healthcare services. Culturally, the perception of CS is not favourable, with women preferring vaginal delivery and fearing CS births.⁴² Indication of CS is unwelcome news to many women in the study area, and they often attribute it to the work of evil spirits. Also, many women in Nigeria do not attend prenatal care services,^{40,43} which helps to identify danger signs that might require a CS. Focusing on providing a multidimensional intervention that addresses the reasons why women fail to use prenatal care services, distance to facilities, improving providers' capacity and decision making and allaying the fear of CS will significantly help eliminate inequality in the use of CS.

Implications for policy and practice

CS is only of public health importance if medically or obstetrically necessary. Given that previous studies have shown that emergency CSs represent the overwhelming majority of CSs performed in the study setting⁴⁴ and repeat CSs are the main reason for elective CS,⁴⁵ the rate of CS among women in the low-income group, those who had no formal education and those who reside in rural areas indicates an underutilisation of this life-saving intervention. The underutilisation of CS persists despite the user fee exemption policy. Providing universal access to CS is an important policy that will save the lives of many pregnant women. However, this policy alone is not enough to eliminate inequality in access to birth by CS. It is therefore important to improve the capacity of health-care providers in delivering this life-saving intervention, given the robust evidence indicating that many clinicians in the study setting are not adequately trained to provide the service.³⁷ Improving the quality of CS services will inspire confidence in pregnant women who otherwise may attribute death and complications to CS.²³ Educating women on the safety of CSs, when medically indicated, could also help dispel the beliefs and myths of women regarding this life-saving intervention.

Limitations

While this study provides important data on the state of CS in the context of free maternal healthcare policy, it is not without limitations. This study did not establish the reason a woman had a CS or prior use of a CS. It is possible that women with higher education and those with a monthly income of >20 000 naira could have opted for elective CS when not medically indicated. This is speculative, however, given that facility-based studies in the study area show that >93.7% of CSs are emergencies and most elective CSs are a result of repeat CSs.^{44,45} Also, the effect of health insurance was not adjusted for in this study, given that data on health insurance were not collected. However, given that the user fee was exempted for CSs in the study area, the user fee may not be the major reason for use or non-use of CS.

Conclusions

This study shows that inequality in access to CS persists despite the implementation of free maternal healthcare services. Given the poor access to facilities with capabilities to offer CS in most rural areas, free maternal healthcare policy is not enough to make birth by CS universally accessible to all pregnant women in Nigeria.

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