

DETERMINANTS OF SKILLED BIRTH ATTENDANCE SERVICES UTILISATION AMONG CHILDBEARING WOMEN IN NORTHERN NIGERIA: ANALYSIS OF THE 2018 NIGERIA DEMOGRAPHIC AND HEALTH SURVEY

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Abstract

Proper care during pregnancy and delivery which is a major indicator in measuring the level of healthcare is important for the health outcome of both the mother and child. Despite the progress made by governments in expanding the range of healthcare services, the utilisation of skilled birth attendance (SBA) services has remained low in Nigeria, especially in the northern regions. This study examined the determinants of SBA services utilisation among childbearing women in northern Nigeria. The analyses for this study covered a weighted sample of 14,635 childbearing women who reported a live birth using the 2018 Nigeria Demographic and Health Survey. Descriptive and analytical analyses were carried out, including frequency tables, bivariate and multivariate using the binary logistic regression model. The study showed a low prevalence of SBA services utilisation (29.2%) during delivery among childbearing women. Also, women found in the areas of high neighbourhood poverty (*aOR*: 0.50; *CI*: 0.42-0.59); households with large family size (*aOR*: 0.85; *CI*: 0.73-1.00); and residing in rural areas (*aOR*: 0.48; *CI*: 0.42-0.57) were negatively associated with SBA services utilisation, while women who reported that distance to health facility was not a big problem had higher odds of being assisted by a skilled birth attendant during delivery (*aOR*: 1.30; *CI*: 1.10-1.54) than those in the reference category. In addition, the protective factors of educational attainment, adequate number of ANC visits and delivery in a health facility for utilising SBA services were documented. There is the need for intensified programmes and policies on universal access to maternal healthcare services geared towards reducing the poverty levels, especially among the disadvantaged women, as well as reducing maternal and child mortality.

Keywords: Skilled birth attendance; childbearing women, social disorganisation, Northern Nigeria

Introduction

Pregnancy and childbirth are significant events in a woman's life and their families even though they represent a period of heightened vulnerability (WHO, 2018). Proper care during pregnancy and delivery, apart from being a major indicator in measuring the level of healthcare performance, delivery system and developmental indices, is important for the well-being of both mother and child health. Globally, every day in 2017, preventable causes related to pregnancy and childbirth lead to the deaths of about 295,000 women, with the vast majority of these deaths (94%) occurred in low-resource settings, and most could have been prevented (WHO, 2019). Between 2000 and 2017, the maternal mortality ratio, that is the number of maternal deaths per 100,000 live births dropped by about 38% worldwide, but maternal

mortality levels have continued to remain unacceptably high in Africa (WHO, 2019; UNICEF, 2017). Despite the global tremendous decline in child mortality, there is an average under-five mortality rate of 68 deaths per 1,000 live births in 2019 as against 69 deaths per 1,000 live births in 2017 reported in low-income countries (UN IGME, 2020) and 132 deaths per 1,000 live births in Nigeria (NPC & ICF International, 2019). Going by the current trends, it is predicted that close to 48 million children under-five years of age would die between 2020 and 2030, with almost half of these deaths to be newborns whose deaths could be prevented by reaching high coverage of quality antenatal care (ANC) and institutional delivery necessitating skilled care at birth (UN IGME, 2020). Inadequate access to quality maternal healthcare utilization during pregnancy contributes importantly to these preventable maternal deaths (Lawn, 2009).

Adequate care during antenatal visits promotes the health of pregnant women towards reducing the risk of adverse pregnancy outcomes (Afulani, 2016; Kuhnt and Vollmer, 2017; Nimi et al., 2016), and encourages skilled birth attendance (SBA) for delivery and postnatal care as women who attend ANC are more likely to use these services than the non-attendees (Adjiwanou and Legrand, 2013; Dahiru and Oche, 2015; Tekelab, Yadecha and Melka, 2015). As a result, appropriate delivery care is crucial for both maternal and prenatal health, and increasing skilled attendants at birth are the central goals of the safe motherhood and child survival movements. Skilled birth attendants are not only to assist during deliveries and manage complications when they occur, but are also to ensure prompt referral of the mother to the next level of care when the need to do so arises (Kaoje, 2018). Assistance from a skilled birth attendant during delivery is considered a key factor in reducing maternal and neonatal mortality. According to the 2018 Nigeria Demographic and Health Survey (NDHS), less than half (43%) of deliveries are assisted by a skilled provider (NPC & ICF International, 2019). With the women from the three geo-political zones in the north recording lower percentages of assistance from a skilled birth attendant during delivery in relation than their southern counterparts. For instance, SBA during delivery ranges from 18.2% in the North-east to 51% in the North-central (NPC & ICF International, 2019). The proportion of births assisted by skilled birth attendants could be attributed to the potential impact of insecurity and terrorist attacks in the North, especially on population health which goes beyond direct consequences where people are killed, injured, displaced or traumatised. Consequently, high-intensity insecurity and terrorist attacks could damage public health infrastructure and services; increase poverty; transportation among others (Dureab et al., 2019; Levy and Sidel, 2016) and reduce availability, as well as accessibility to maternal healthcare services leading to increased maternal and child mortality (Kotsadam and Ostby, 2019; Ostby et al., 2018).

Although, researches in some low and middle-income countries have shown key predictors of SBA services utilisation among women to include educational status, age multiparity, higher wealth quintiles, attending four or more ANC visits among others (Edward et al., 2020; Dickson and Amu, 2017; Mengesha, Biks, Ayele, Tessema and Koye, 2013; Nyongesa et al., 2018). Women's attainment of higher education has been noted as a strong predictor of maternal healthcare utilization (Adu, Tenkorang, Banchani, Allison and Mulay, 2018; Nyongesa et al., 2018), as higher education makes women more confident and gives them the ability to make appropriate health decisions (Ayele, Melku and Belda, 2019). Also, women from the areas of high neighbourhood poverty (poorest wealth quintile) specifically had a lower propensity of utilizing maternal healthcare services, especially ANC, delivery at the healthcare facility and SBA services, compared to their counterparts from the richest wealth quintile as revealed in previous studies (Adu et al., 2018; Ahinkorah et al., 2021; Yaya, Bishwajit and Gunawardena, 2019). As a result, poverty becomes a strong barrier to maternal healthcare services utilisation and its

impact is even more pronounced in the case of maternal and child health outcomes (Prakash and Kumar, 2013). A study established that women residing in urban areas were more likely to use health facility and SBA services during delivery than their counterparts in rural areas (Tanou and Kamiya, 2019). Also, distance to health facility including limited availability of transport and travelling long distances to access health care facilities might serve as barriers to maternal healthcare services utilisation, as well as SBA, especially for rural disadvantaged women (Larsen, Lupiwa, Kave, Gillieatt and Alpers, 2004; Prusty, Buoy, Kumar and Pradhan, 2015). However, studies focusing on the determinants of SBA services utilisation among childbearing women have been limited in Nigeria, especially in the northern region with various cases of insurgency activities.

Irrespective of the progress made by present and previous Nigerian governments in expanding the range of healthcare services, especially in the Northern regions, the utilisation of SBA services has remained low compared to Southern regions with skilled attendance services during delivery ranging from 18.2% in the North-west, 24.8% in the North-east to 51% in the North-central (NPC & ICF International, 2019). This is particularly troubling, in consideration of the consequences and negative effects of the activities of insurgents which have created some degrees of social disorganisation with respect to maternal healthcare services utilisation in the region. Despite previous studies on maternal healthcare services utilisation in Northern Nigeria (Idris, Sambo and Ibrahim, 2013; Kaoje et al., 2018; Shamaki, Yew and Dahiru, 2017; Solanke, 2018; Yar'zever and Said, 2013), there is the paucity of data from studies showing determinants of SBA services utilisation among childbearing women in the region. This study, therefore, examined the determinants of SBA services utilisation among childbearing women in northern Nigeria by looking beyond women's socio-economic statuses.

Methods

Data source and design

The data for this study were obtained from the individual recode data file of the 2018 Nigeria Demographic and Health Survey (NDHS). The survey is a cross-sectional study and the sixth survey of its kind to be implemented by the National Population Commission (NPC). Although the 2006 National Population and Housing Census of the Federal Republic of Nigeria conducted by NPC did not provide the number of households and population for each Enumeration Area (EA), population estimates were published for 774 Local Government Areas (LGAs). A combination of information from cartographic material demarcating each EA and the LGA population estimates from the census was used to identify the list of EAs, estimate the number of households, and distinguish EAs as urban or rural for the survey sample frame. The survey provides up-to-date information on demographic and health indicators, including ANC utilisation in Nigeria. The sample was selected using a stratified, two-stage cluster design, with EAs as the sampling units for the first stage. The second stage was a complete listing of households carried out in each of the 1,400 selected EAs. A representative sample of 41,668 households was selected for the survey. Data were generated from 41,821 women aged 15-49 and 13,311 men aged 15-59. A detailed report of the data collection methods and procedures for 2018 NDHS has been published elsewhere (NPC and ICF International, 2019). The analyses for this study covered a weighted sample of 14,635 childbearing women (15-49 years) who reported a live birth in the five years that preceded the survey. This is to improve the representativeness of the data from the group of women interviewed in the survey (i.e. 2013-2018).

Variables measurements

Outcome/dependent variables

The outcome/dependent variable for this study was 'skilled birth attendance services utilization', measured by respondent's assistance by a skilled birth attendant during delivery. The composite index of skilled birth attendance services utilization was derived from the respondents' responses on whether they were assisted by a doctor, nurse/midwife, auxiliary nurse/midwife, community health extension worker, traditional birth attendant, relative/friend or no assistance for their most recent birth in the five years before the survey. The respondents whose responses were in affirmative 'yes' for a doctor, nurse/midwife and auxiliary nurse/midwife were classified as having 'skilled birth attendance during delivery – coded as 1, otherwise classified as having 'unskilled birth attendance – coded as 0. Also, the respondents whose responses were in affirmative 'yes' for a community health extension worker, traditional birth attendant, relative/friend and no assistance were classified as having 'unskilled birth attendants' during delivery – coded as 0, otherwise classified as having 'skilled birth attendants' – coded as 1.

Explanatory/independent variables

The explanatory/independent variables for the study were the respondents' socio-economic/demographic factors which include marital status, age, educational attainment, employment status and place of residence. Also, variables included were selected social disorganisation factors like neighbourhood poverty, sex of household head, number of household members and distance to the health facility, as well as other factors like the number of ANC visits and place of delivery. To make interpretation simpler and more meaningful, some variables were regrouped from their original categories in the datasets. For instance, marital status: never in union/married or living with partner/widowed, divorced or separated; age: 15–24/25–34/35+ years; educational attainment: no education/ primary/secondary or tertiary; number of ANC visits: <4/4 or more visits based on World Health Organisation's recommendation that pregnant women should have at least four ANC visits is to maximize the benefits of ANC services especially if she is found not have any associated ill-health or condition that could affect her health outcome and that of her foetus or newborn (WHO, 2016). In addition, neighbourhood poverty which was derived from the poorest quintile of the wealth index was categorised as no/yes (Rustein, 2004). The number of household members which was based on the average household size of 4.7 persons in Nigeria was grouped as 1-5 persons/6 persons and above (NPC & ICF International, 2019). The place of delivery variable was dichotomized as home or health facility. The women who delivered in a health facility (delivery in public or private hospitals or health centres) were grouped as 'health facility', while those who delivered at home or any other place outside the health facility were grouped as 'home'. All the explanatory/independent variables were selected based on how they influence maternal healthcare services utilization including skilled birth attendant during delivery.

Statistical analysis

Three levels of analyses (univariate, bivariate and multivariate) were carried out in this study. At the univariate level, descriptive analysis using summarised percentages was employed to describe the study population by selected variables. Pearson chi-square test was used at the bivariate level to investigate the relationship between the outcome variable (skilled birth attendance services utilization) and each of the explanatory variables. At the multivariate level, binary logistic regression analysis was adopted to measure the odds ratio (OR) of women using

contraceptive methods or not. Two logistic regression models were fitted to examine the unadjusted and adjusted odds ratio (aOR) of SBA services utilization or not. Measures of association between the outcome and explanatory variables were expressed as OR with 95% confidence intervals (CIs). A variable with OR greater than 1.00 implied that the variable increases the likelihood of the outcome, while it is the opposite when the OR is less than 1.00. All the analyses were conducted using Stata software (version 14). Svy command in Stata was used to adjust for the complex survey design of the Demographic and Health Survey (DHS) data. Besides, the dataset was carefully checked for missing values and weighted with the appropriate sampling weights as per the DHS sampling scheme before the analyses.

Results

Distribution of the study population sample

The percentage distributions of the study population sample as presented in Table 1 showed that an overwhelming majority of the women were married and living with partners (95.7%). The largest proportion of the women (45.5%) belonged to the age groups of 25-34. Over one-half reported having no formal education (61.8%). Considering the employment status, about 61% of the women were employed. The majority of the women (68.0%) were not found in areas of high neighbourhood poverty. Also, an overwhelming majority of the women (94.0%) were found in male-headed households and households with members larger than the average size of 4.7 persons (62.9%). A larger proportion of the women (68.1%) reported that distance to health facility was not a big problem. Concerning number of ANC visits, a little above one-half of the women (53.5%) had less than four ANC visits, while 71.5% of the women delivered at home during their last pregnancies. The majority of the women (75.3%) resided in rural areas, while the largest proportion of the women (43.1%) was found in the North-west geopolitical region. Over two-thirds of the women (70.8%) were assisted by unskilled birth attendants during deliveries.

Table 1: Percentage distribution of the sample characteristics, NDHS 2018

Variables	Number(%) N = 14,635
Marital status	
Never in union	185(1.3)
Married/living with partner	14,000(95.7)
Widowed/divorced/separated	450(3.1)
Age	
15 – 24	4,119(28.1)
25 – 34	6,653(45.5)
35 +	3,863(26.4)
Educational attainment	
No education	9,050(61.8)
Primary	2,078(14.2)
Secondary or higher	3,507(24.0)
Employment status	
Not working	5,765(39.4)
currently working	8,870(60.6)
Neighbourhood poverty	
No	9,951(68.0)
Yes	4,684(32.0)
Sex of household head	
Male	13,756(94.0)
Female	879(6.0)
Number of household members	
1-5 persons	5,425(37.1)
6 persons and above	9,210(62.9)
Distance to health facility	
Big problem	4,669(31.9)
Not a big problem	9,966(68.1)
Number of ANC visits	
<4 visits	7,822(53.5)
4 or more visits	6,813(46.5)
Place of delivery	
Home	10,465(71.5)
Health facility	4,170(28.5)
Place of residence	
Urban	3,618(24.7)
Rural	11,017(75.3)
Region	
North-central	3,834(26.2)
North-east	4,498(30.7)
North-west	6,303(43.1)
Birth attendance during delivery	
Unskilled	10,366(70.8)
Skilled	4,269(29.2)

Distribution of SBA services utilisation during delivery by women's characteristics

Table 2 presented the percentage distribution of women who received assistance from skilled birth attendants during their recent deliveries by socio-demographic and other selected factors. The results revealed that all the characteristics were significantly associated with SBA services utilisation. The relationship between marital status and SBA during delivery showed that the lowest percentage of SBA during delivery was found among women who reported to be married or living with partners (28.6%) and highest among women who were never in union (49.2%; $p < 0.001$). The results further showed that the highest percentage of SBA during delivery was reported among women aged 25-34; women's increase in their educational attainment increased linearly with receiving assistance from a skilled birth attendant during delivery, as well as women who were employed (32.9%; $p < 0.001$). Also, a high proportion of SBA during delivery was found among women in the areas of low neighbourhood poverty (38.4%; $p < 0.001$); women from female-headed households (46.3%; $p < 0.001$); women in households with members within the average size (36.2%; $p < 0.001$); women who reported that distance to health facility was not a big problem (34.4%; $p < 0.001$); women who had at least 4 ANC visits (47.3%; $p < 0.001$) and women who delivered in a health facility (90.1%; $p < 0.001$).

Table 2: Selected variables of the sample associated with SBA services utilisation during delivery, NDHS 2018

Variables	Birth attendance during delivery			Chi-square
	Total number n = 14,635	Unskilled n = 10,366	Skilled n = 4,269	
Marital status				58.7***
Never in union	185	50.8	49.2	
Married/living with partner	14,000	71.4	28.6	
Widowed/divorced/separated	450	61.1	38.9	
Age				15.3***
15 – 24	4,119	72.7	27.3	
25 – 34	6,653	69.3	30.7	
35 +	3,863	71.5	28.6	
Educational attainment				320.0***
No education	9,050	86.4	13.7	
Primary	2,078	62.2	37.8	
Secondary or higher	3,507	35.9	64.1	
Employment status				148.7***
Not working	5,765	76.5	23.5	
currently working	8,870	67.1	32.9	
Neighbourhood poverty				130.0***
No	9,951	61.6	38.4	
Yes	4,684	90.4	9.6	
Sex of household head				130.7***
Male	13804	71.8	28.2	
Female	884	53.7	46.3	
				204.2***

Number of household members			
1-5 persons	5,425	63.8	36.2
6 persons and above	9,210	75.0	25.0
Distance to health facility			405.2***
Big problem	4,669	81.9	18.1
Not a big problem	9,966	65.7	34.4
Number of ANC visits			200.3***
< 4 visits	7,822	86.6	13.4
4 or more visits	6,813	52.7	47.3
Place of delivery			110.0***
Home	10,465	95.1	4.9
Health facility	4,170	9.9	90.1
Place of residence			110.3***
Urban	3,618	49.1	50.9
Rural	11,017	78.0	22.0

Note: ***p < 0.001

Unadjusted and adjusted association of SBA services utilisation during delivery with selected variables of the study population

The results of unadjusted and adjusted logistic regression analyses of the association between receiving assistance from a skilled birth attendant during delivery and selected variables of the study population are presented in Table 3. In Model 1, the unadjusted results showed that the odds of receiving assistance from a skilled birth attendant during delivery significantly reduced among those who were married or living with their partners (OR: 0.41; CI: 0.31-0.55) and widowed, divorced or separated (OR: 0.66; CI: 0.47-0.93). Age-wise, women aged 25-34 were significantly more likely to be assisted by skilled birth attendants during delivery (OR: 1.18; CI: 1.08-1.29) compared with those in the reference category. The increasing level of women's education increased linearly with receiving assistance from a skilled birth attendant during delivery. For instance, women with primary and secondary/tertiary education were significantly 7.47 times more likely to receive assistance from a skilled birth attendant during delivery than their counterparts with primary education. Also, women with primary education were significantly more likely to be assisted by a skilled birth attendant during delivery (OR: 3.84; CI: 3.45-4.28) than those with no education. Being employed increased the likelihood of women receiving assistance from a skilled birth attendant during delivery (OR: 1.59; CI: 1.48-1.72). The likelihood of being assisted by a skilled birth attendant during delivery significantly reduced among women found in the areas of high neighbourhood poverty (OR: 0.17; CI: 0.15-0.19), but increased among women found in female-headed households (OR: 2.18; CI: 1.89-2.50). In addition, the odds of receiving assistance from a skilled birth attendant during delivery significantly reduced among women found in households with members above the average size (OR: 0.59; CI: 0.55-0.63). Women who reported that distance to health facility was not a big problem were significantly more likely to be assisted by a skilled birth attendant during delivery (OR: 2.36; CI: 2.17-2.57), compared to those who affirmed that distance to health facility was a big problem. Also, women who had at least 4 ANC visits were more likely to receive assistance from skilled birth attendants during delivery (OR: 5.79; CI: 5.34-6.27) in relation to those had

less than 4 ANC visits. Interestingly, women who delivered in a health facility were 176 times more likely to receive assistance from a skilled birth attendant during delivery than women who delivered at home. Women residing in the rural areas significantly had lower odds of receiving assistance from a skilled birth attendant during delivery (OR: 0.27; CI: 0.25-0.29).

After adjusting for the effects of selected variables in Model 2, the results of logistic regression analyses indicated that as observed in Model 1, the increasing level of women's education increased linearly with receiving assistance from a skilled birth attendant during delivery. Also, the likelihood of being assisted by a skilled birth attendant during delivery significantly reduced among women found in the areas of high neighbourhood poverty (aOR: 0.50; CI: 0.42-0.59). The likelihood of receiving assistance from a skilled birth attendant during delivery significantly reduced among women found in households with members above the average size (aOR: 0.85; CI: 0.73-1.00). Women who reported that distance to health facility was not a big problem were significantly more likely to be assisted by a skilled birth attendant during delivery (aOR: 1.30; CI: 1.10-1.54), compared to those who affirmed that distance to health facility was a big problem. The results of adjusting logistic regression analyses further showed that a woman having at least 4 ANC visits was associated with receiving assistance from a skilled birth attendant during delivery (aOR: 2.07; CI: 1.79-2.40) in relation to women who had less than 4 ANC visits. Women who delivered in a health facility were 181.4 times more likely to receive assistance from a skilled birth attendant during delivery than women who delivered at home and residing in the rural areas significantly reduced women's odds of receiving assistance from a skilled birth attendant during delivery (aOR: 0.48; CI: 0.42-0.57).

Table 3: Unadjusted and adjusted analyses of determinants of SBA services utilization, NDHS 2018

Variables/categories	Birth attendance during delivery	
	Model 1 OR(95% CI)	Model 2 aOR(95% CI)
Marital status		
Never in union (RC)	1.00	1.00
Married/living with partner	0.41(0.31-0.55)***	0.79(0.45-1.39)
Widowed/divorced/separated	0.66(0.47-0.93)*	0.83(0.43-1.60)
Age		
15 – 24 (RC)	1.00	1.00
25 – 34	1.18(1.08-1.29)**	1.15(0.97-1.37)
35 +	1.06(0.97-1.17)	1.24(1.00-1.53)
Educational attainment		
No education (RC)	1.00	1.00
Primary	3.84(3.45-4.28)***	2.13(1.76-2.57)***
Secondary or higher	11.31(10.32-12.40)***	2.97(2.49-3.56)***
Employment status		
Not working (RC)	1.00	1.00
currently working	1.59(1.48-1.72)***	1.06(0.91-1.23)
Neighbourhood poverty		
No (RC)	1.00	1.00

Yes	0.17(0.15-0.19)***	0.50(0.42-0.59)***
Sex of household head		
Male (RC)	1.00	1.00
Female	2.18(1.89-2.50)***	0.81(0.60-1.10)
Number of household members		
1-5 persons (RC)	1.00	1.00
6 persons and above	0.59(0.55-0.63)***	0.85(0.73-1.00)*
Distance to health facility		
Big problem (RC)	1.00	1.00
Not a big problem	2.36(2.17-2.57)***	1.30(1.10-1.54)**
Number of ANC visits		
< 4 (RC)	1.00	1.00
4 or more visits	5.79(5.34-6.27)***	2.07(1.79-2.40)***
Place of delivery		
Home(RC)	1.00	1.00
Health facility	176.00(153.80-201.40)***	181.37(102.37-136.87)***
Place of residence		
Urban (RC)	1.00	1.00
Rural	0.27(0.25-0.29)***	0.48(0.42-0.57)***

Note: *p < 0.05; **p < 0.01; ***p < 0.001; RC = Reference Category

Discussion

This study examined the determinants of SBA services utilisation among childbearing women in Northern Nigeria. Using a nationally representative population sample of women who reported a live birth in the 5 years that preceded the 2018 NDHS survey with a special focus on SBA services utilisation marks a departure in terms of its national coverage from most of the previous studies on maternal health services utilization in the region.

Overall, the findings revealed that 70.8% of deliveries of the sampled childbearing women were assisted by unskilled birth attendants. This is an indication of the low prevalence of SBA services utilisation during delivery in Northern Nigeria. The plausible explanation for the decline in SBA could be attributed to the destruction of health facilities, as well as qualified health professionals to the activities of the insurgents in the region (Obi and Eboime, 2017) and the influence of women's socio-economic indices (Adu et al., 2018; Ahinkorah et al., 2021; Ayele, Melku and Belda, 2019; Ochako, Fotso, Ikamari, and Khasakhala, 2011; Prakash and Kumar, 2013; Yaya, Bishwajit and Gunawardena, 2019). This has some policy implications considering the country's effort to reduce maternal and child mortality associated with unskilled birth attendance services utilisation through increased training of health professionals who provide maternal and child health services. Hence, the finding implies the importance of more strategic programmes aimed at increasing the number of trained health professionals who provide maternal healthcare services, especially during deliveries.

The bivariate results of this study revealed that all the selected women's characteristics were significantly associated with SBA services utilisation. However, after running the multivariate logistic regression analyses, the results showed significantly lower odds of SBA services utilisation by women who reported to be married/living with partners, as well as those who

were widowed/separated/divorced (Table 3, Model 1). This finding corroborates a previous study that never-married women were more likely to use the services of skilled birth attendants (Tarekegn and Lieberman, 2014). In line with previous observations, the findings of this study revealed established significantly direct relationships between women's educational attainment and SBA services utilisation (Adu et al., 2018; Ayele, Melku and Belda, 2019). Thus, education provides women with the knowledge and helps them to adopt healthcare seeking attitudes and behaviours that positively influence maternal and child health outcomes. For neighbourhood residence, this study further showed the negative influence of areas of high neighbourhood poverty on SBA services utilisation (Adu et al., 2018; Ahinkorah et al., 2021; Koenig et al., 2007; Ochako et al., 2011; Yaya, Bishwajit and Gunawardena, 2019). Programmes should be developed to reduce the poverty levels of childbearing women, especially the disadvantaged ones in the areas of high neighbourhood poverty by providing them with financial supports aimed at increasing access to SBA services utilisation.

Furthermore, the study result showed that SBA services utilisation was significantly associated with women from female headed-households (Table 3, Model 1). This finding explains the importance of women's autonomy and involvement in decision-making relating to their health which has been found to increase the utilisation of maternal health services (Aliyu and Dahiru 2017; Woldemicael, 2010). On the other hand, the findings of this study on the significantly negative influence of large household size on SBA services utilisation validate the observations of previous studies (Regassa, 2011; Saad-Haddad et al., 2016). The plausible explanation for this finding could be attributed to the pressure of households with large family size which relieves some of the resource constraints that might force most pregnant women to patronise unskilled birth attendants to save the cost of maternal health services utilisation. The finding on the negative effect of distance to the health facility on the utilisation of SBA services corroborates the previously documented findings (Dotse-Gborgbortsi et al., 2020; Lohela, Campbell and Gabrysch 2012; Nesbitt et al., 2016), as well as the negative effect of residing in rural areas (Dahiru and Oche, 2015; Haruna-Ogun, 2018; Tanou and Kamiya, 2019). No doubt, distance to the health facility which includes travelling long distances to access quality health care services might serve as barriers to the utilisation of SBA services, especially for rural disadvantaged women. Rural location significantly confers some disadvantages for the women to the utilisation of SBA services, especially for rural disadvantaged women is essential to the design and assessment of interventions aimed at addressing the negative impacts of the COVID-19 pandemic socio-economic lockdown in Nigeria.

The multivariate regression results further revealed that the likelihood of utilising SBA services significantly increased for women who had at least four ANC visits. This supports the observations of earlier studies that adequate ANC promotes and encourages SBA for delivery (Adjiwanou and Legrand, 2013; Dahiru and Oche, 2015; Gitonga and Muiruri, 2016). This is an indication that a pregnant woman's adequate number of ANC visits could affect her utilisation of SBA services. There is a need to encourage regular ANC visits among pregnant women through health insurance coverage. As expected, the results further established that delivery in a health facility overwhelmingly increases the propensity of pregnant women utilising SBA services during deliveries. This plausibly explains that the percentage of births delivered in health facilities is an important factor in reducing deaths arising from the complications of pregnancy since a skilled birth attendant could manage the complication or refer the mother to the next level of care.

Conclusion

This study showed a low prevalence of SBA services utilisation during delivery among childbearing women in Northern Nigeria. The study further demonstrated that being found in the areas of high neighbourhood poverty and households with large family size, distance to health facility and residing in rural areas were negatively associated with SBA services utilisation. Given the protective factors of educational attainment, an adequate number of ANC visits and delivery in a health facility for utilising SBA services, these factors should be strengthened through more pragmatic efforts and strategic campaigns aimed at enlightening childbearing women on the importance of accessing SBA services during delivery. Maternal healthcare services utilization intensified interventions, programmes and policies in the country should be geared towards reducing the poverty levels among childbearing women, especially the disadvantaged ones in the areas of high neighbourhood poverty by providing them with financial supports aimed at increasing access to SBA services. This becomes imperative considering the impact of the COVID-19 pandemic and socio-economic lockdown towards achieving universal access to maternal and child healthcare services. Adopting the implications of these findings is essential for achieving sustainable development goals of universal access to sexual and reproductive healthcare services, empowerment of all women, reducing maternal deaths and ending preventable deaths of newborns and children under-five years of age by 2030.

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Limitations

This study is not without some limitations. The limitation is using DHS data constrained inference of cause-effect relationship given that the data are cross-sectional. Thus, the explanatory variables are only temporal factors associated with SBA services utilisation. Because of the self-reported information from women, there is the likelihood of reporting bias about socio-economic/demographic factors, as well as other selected explanatory variables. Finally, the data used are nearly 2 years old, hence the need for recent qualitative data and new studies to investigate the level of influence of the selected explanatory variables on SBA services utilisation since 2018. Despite these limitations, the findings of this study are important to re-strategise in formulating policies for reducing U5M by encouraging SBA services utilisation through ending poverty in all its forms and empowerment of all women particularly in the region and country at large.

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