Trends and Determinants of Postnatal Care Utilization in South-West Nigeria Using NDHS Data (2013-2024)

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Abstract

Despite readily available information on national-level analyses of Postnatal care utilization, there is a paucity of studies on subnational evidence on postnatal care uptake. This study addresses this gap by examining trend PNC uptake across the South-West states in Nigeria using pooled NDHS data from 2013 to 2024. A secondary analysis of pooled data from the Nigeria Demographic and Health Surveys (NDHS) conducted in 2013, 2018, and 2024 with a final unweighted sample size of 5,514. The study outcome variable is the postnatal care utilization within seven days of delivery among women of reproductive age. Sampling weight was applied to estimates while multivariable multilevel logistic regression models were fitted to examine determinants of PNC uptake. Majority of the study respondent resided in urban area (72.1%), with secondary education being the highest maternal level of education (51.7%). The proportion of PNC uptake dropped drastically from 48.9% in 2013 to 23.9% in 2018 and 22.7% in 2024. Maternal level of education (Tertiary education: AOR=2.26; 95% CI=1.64-3.13) significantly increased the likelihood of PNC utilization among women of reproductive age. Findings revealed a disturbing downward slope in PNC utilization especially in 2024 which call for urgent response in programme design and implementation. Efforts should be reinforced in ensuring female education as a critical step to reduce neonatal and maternal mortality.

Keywords: *Education, Maternal health, Nigeria, Postnatal care, Utilization, Determinants*

Introduction

Postnatal care (PNC) has been proven to be a cost-effective method for lowering avoidable neonatal and maternal mortality [1, 2]. It is a critical component of the continuum of maternal, newborn, and child health, encompassing care provided to the mother and newborn immediately after birth and during the first six weeks postpartum. This period is associated with the highest risk of maternal and neonatal morbidity and mortality, with a substantial proportion of maternal deaths and nearly half of neonatal deaths occurring within the first week after delivery [3]. One in every 24 newborns dies within the first 28days of life, which indicates that a newborn in Nigeria has 13 times higher risk of dying in the neonatal

period compared with newborns in developing countries [4]. Effective postnatal care provides opportunities for early detection and management of complications, promotion of healthy behaviours such as exclusive breastfeeding, and counselling on family planning, among others.

Despite its recognized importance, postnatal care utilization remains suboptimal in many low- and middle-income countries (LMICs), particularly in sub-Saharan Africa and South Asia [5]. Evidence from Demographic and Health Surveys (DHS) indicates that while antenatal care and skilled birth attendance have improved over time, coverage of timely and adequate postnatal care lags behind, especially for women who deliver at home or in lower-level facilities [6]. Though maternal health indicators have improved during the previous ten years in Nigeria [7, 8], the country still contributes considerably to the worldwide neonatal mortality rate.

In Nigeria, there are significant regional and state-level inequalities. Usually, the South-West geopolitical zone outperforms other areas [9], however, there are state-level differences. Ondo State, for example, has introduced interventions such as free maternity healthcare policies and community-based programs [10-12], which may affect postnatal care use and newborn outcomes.

Although national-level studies of postnatal care utilization and neonatal mortality abound, there is no available data on how postnatal care utilization has changed across South-West Nigeria over time and what explains the differences. Understanding patterns and determinants of postnatal care utilization is essential for improving maternal and neonatal health outcomes.

Methods

Study Design

A cross-sectional study, using pooled data from the Nigeria Demographic and Health Surveys (NDHS) conducted in 2013, 2018, and 2024. The NDHS employs a nationally representative, stratified two-stage cluster sampling design. Of the six geopolitical zones in the country, this present study focused on data from the South-West geopolitical zone consisting of six states states: Ondo, Ekiti, Lagos, Ogun, Osun, and Oyo.

Study Population

The study population comprised recent live births to women of reproductive age who resided in any of the six (6) states in the South-West region of Nigeria. The analysis was based on records from the Children's Recode (KR) file of the 2013, 2018, and 2024 Nigeria Demographic and Health Surveys (NDHS), which contains birth-level information linked to maternal characteristics and postnatal care utilization. Those with missing data on PNC utilization after birth were excluded from the present study.

Data Source and Management

Data from the Children Recode file (KR) of three waves – 2013, 2018, and 2024 – of the Nigeria Demographic and Health Survey were merged and analysed for this study. The KR dataset contains individual records of under-five children across the 36 states of the country. Of the 93,189 records that were obtained in the merged dataset, 5,514 were used for the final analysis after excluding children from states outside the South-West geopolitical zones (n=45, 831), those with missing data on mother's postnatal care utilization (n=37, 435), and those whose postnatal care uptake was after seven (7) days (n=4,408).

Study Variables

Outcome Variable

The outcome variable is postnatal care (PNC) utilization by mothers of the under-five children after birth, defined as receipt of a postnatal check for the mother and/or newborn

within the recommended postnatal period (7 days).

Explanatory Variables

The main explanatory variable for this study is the geographical location (rural/urban). Other covariates that were considered in this study include socio-demographic characteristics of the child such as sex, multiple birth (i.e singleton/multiple), ever/currently breastfeeding etc. In addition, maternal health factors, including maternal education, household wealth index, among other factors, were considered as covariates in the analysis.

Data Analysis

Sampling weights and survey design effects were applied to ensure representativeness of the participants. Descriptive statistics using mean, standard deviation, frequency and percentages were used to estimate postnatal care utilization for each state and survey year. Trends in postnatal care utilisation from 2013 to 2024 were examined and assessed graphically using a multiple bar chart. Postnatal care utilisation was originally dichotomised in the dataset as 1 – "Baby had postnatal check within 7 days" and 0 otherwise, and was used to fit the regression models. Multivariable multilevel logistic regression models were used to examine predictors of postnatal care utilization, considering the hierarchical/complex nature of the Demographic and Health Survey data. First, univariable multilevel logistic models were fitted to identify factors that independently predict the outcome. Consequently, factors from the univariable models that were statistically significant ($p\text{-value} < 0.05$) were included in the multivariable (adjusted) model. Data cleaning and analysis were conducted using Stata v.16.

Results

Socio-demographic Characteristics of the Study Population (DHS 2013-2024)

Table 1. Weighted and Unweighted Distribution of Socio-demographic Characteristics (DHS 2013-2024)

	Unweighted count (%)	Weighted count (%)
State	N=5,514	N=6,574
Oyo	1168(21.2)	1711(26.0)
Osun	829(15.0)	772(11.7)
Ekiti	667(12.1)	328(5.0)
Ondo	737(13.4)	618(9.4)
Lagos	1228(22.3)	2029(30.9)
Ogun	885(16.0)	1116(17.0)
Year		
2013	2178(39.5)	2485(37.8)
2018	2038(37.0)	2656(40.4)
2024	1298(23.5)	1433(21.8)
Sex of child		
Male	2866(52.0)	3422(52.1)
Female	2648(48.0)	3152(47.9)
Multiple birth		
Singleton	5356(97.2)	6399(97.4)
2nd of multiple	155(2.7)	169(2.6)
3rd of multiple	3(0.1)	6(0.1)
Ever breastfed		
Never	178(3.2)	208(3.2)

Ever/currently breastfeeding	5336(96.8)	6366(96.8)
Place of residence		
Urban	3975(72.1)	5075(77.2)
Rural	1539(27.9)	1499(22.8)
Wealth index		
Poor	622(11.3)	641(9.7)
Middle	837(15.2)	839(12.8)
Rich	4055(73.5)	5094(77.5)
Maternal Highest educational level		
None	585(10.6)	664(10.1)
Primary	1029(18.7)	1214(18.5)
Secondary	2849(51.7)	3429(52.2)
Higher	1051(19.1)	1268(19.3)

As shown in Table 1 above, a total weighted sample of 6,574 under-five children from the different South-West states were recruited into the study. Specifically, majority of them were from Lagos 2029(30.9%) and Oyo state 1711(26.0%), with the least 328(5.0%) from Ekiti state. Also, there was a higher proportion of males (52.1%) compared to females (47.9%) in the study. A vast majority of the children were of single birth 6399(97.4%), leaving only 2.6% as multiple births (i.e., second or third of multiple births). In addition, most of the children had ever or were currently breastfeeding (96.8%) and resided in an urban area (77.2%). Regarding the maternal highest level of education, the majority of the mothers had a secondary level of education (52.2%), relatively higher than those with higher (19.3%) and primary (18.5%) education.

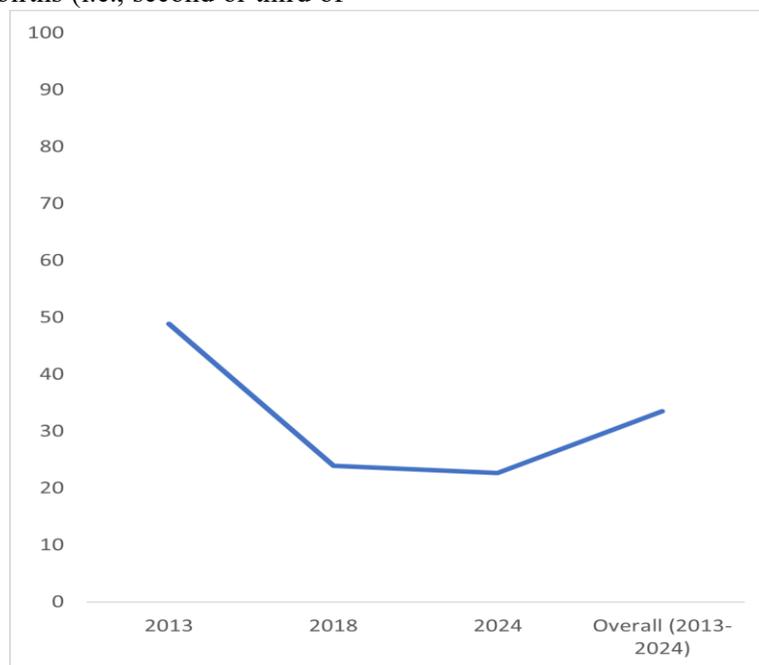**Trend of Postnatal Care Utilization in South-West, Nigeria**

Figure 1. Trend of Postnatal Care Utilization in South-West, Nigeria (2013-2024)

Findings from this study, as depicted in figure 1 reveals a consistent decline in postnatal care utilization among recent live births of women of reproductive age in Nigeria over the

study period (2013-2024). As displayed in figure1, the proportion of children who received postnatal care after birth was highest in 2013 (48.9%) followed by significant decline to 23.9% in 2018 and further reduction to 22.7% in 2024, indicating a sustained downward trend over time.

Postnatal Care Utilization Predictors

Table 2. Predictors of Postnatal Care Utilization in South-West Nigeria (DHS 2013-2024)

	South-West Nigeria			
	OR (95% CI)	p-value	AOR (95% CI)	p-value
Gender				
Male	Ref			
Female	0.99(0.87-1.13)	0.940		
Birth type				
Singleton	Ref			
2nd of multiple	1.02(0.69-1.49)	0.907		
3rd of multiple	2.55(0.18-35.71)	0.486		
Breastfeed				
Ever	Ref		Ref	
Never	0.24(0.14-0.38)	**<0.001**	0.23(0.14-0.38)	**<0.001**
Residence				
Urban	Ref		Ref	
Rural	0.58(0.47-0.72)	**<0.001**	0.81(0.63-1.05)	0.123
Wealth index				
Poor	Ref		Ref	
Middle	1.85(1.36-2.53)	**<0.001**	1.44(1.04-1.99)	**0.025**
Rich	2.75(2.06-3.68)	**<0.001**	1.70(1.23-2.37)	**0.001**
Maternal education				
No formal	Ref		Ref	
Primary	2.25(1.68-3.01)	**<0.001**	1.87(1.38-2.53)	**<0.001**
Secondary	2.05(1.56-2.69)	**<0.001**	1.83(1.37-2.45)	**<0.001**
Higher	2.62(1.94-3.54)	**<0.001**	2.26(1.64-3.13)	**<0.001**
Year				
2013	Ref		Ref	
2018	0.24(0.19-0.30)	**<0.001**	0.24(0.19-0.31)	**<0.001**
2024	0.21(0.17-0.26)	**<0.001**	0.22(0.18-0.27)	**<0.001**
State				
Oyo	Ref		Ref	
Osun	1.62(1.20-2.19)	**0.002**	1.19(0.88-1.62)	0.240
Ekiti	1.13(0.81-1.56)	0.454	1.12(0.81-1.55)	0.473
Ondo	0.94(0.69-1.26)	0.694	1.06(0.77-1.44)	0.712
Lagos	2.83(2.15-3.72)	**<0.001**	1.31(0.99-1.74)	0.054
Ogun	0.93(0.70-1.24)	0.654	0.61(0.45-0.83)	**0.002**

The major determinants of postnatal care utilization in South-West Nigeria identified include Child breastfeeding status, household wealth index, maternal education attainment, as well as child's state of residence.

As presented in Table 2, children who were never breastfed had an 79% lower likelihood of receiving postnatal care after birth (AOR=0.23; 95% CI=0.14-0.39; p-value<0.001). Similarly, children from the 2018 DHS survey (AOR=0.25; 95% CI=0.19-0.31; p-value<0.001) and those from the most recent 2024 survey (AOR=0.22; 95% CI=0.18-0.27; p-value<0.001) were remarkably less likely to receive postnatal care uptake.

On the contrary, the household wealth index, maternal education, and state of residence were significant predictors for Postnatal care utilization. Specifically, children from the middle wealth quantile were 1.44 more likely to receive postnatal care compared to those in the poor households (95% CI=1.04-1.99; p-value=0.025). While those from the rich households had higher odds (AOR=1.70; 95% CI=1.23-2.37; p-value=0.001). Likewise, maternal education had a positive association with PNC utilization. Mothers with primary education (AOR=1.87; 95% CI=1.38-2.53; p-value<0.001), secondary education (AOR=1.83; 95% CI=1.37-2.45; p-value<0.001), and tertiary education (AOR=2.26; 95% CI=1.64-3.13; p-value<0.001) were more likely to utilize postnatal care for their children compared to those with no formal education.

In term of geographical variation, children residing in Ogun state had significantly lower odds of receiving postnatal care (AOR=0.61; 95% CI=0.45-0.83; p-value<0.001), compared to those in Oyo state.

Discussion

This study investigated the prevalence of postnatal care utilisation in the South-West Geopolitical zone in Nigeria using data from the 2013, 2018, and 2024 waves of the DHS survey.

Regional and Temporal Changes in Uptake of Postnatal Care

The observed strong association between postnatal care uptake across all survey waves and state of residence highlight the need of subnational context in maternal and newborn health service utilization. While Lagos State recorded the highest postnatal careuptake in 2013, subsequent survey waves revealed a shift in peak to Ekiti and Ondo States in 2018, followed by a significant decline across all South-West states by 2024. Given the critical function of postnatal care in early detection and prompt treatment of neonatal complications—which contribute substantially to under-five mortality—the decline noted in most recent survey wave (2024) is very disturbing. The reduction in PNC uptake might represent general institutional related issues, including health system disruptions, competing healthcare priorities, or diminished accessibility to essential health services [13-15]. Comparable changes in maternal and child health service use have been recorded in low- and middle-income nations during times of health system stress [16, 17], highlighting the need for resilient and sustainable postnatal care delivery systems.

Determinants of Postnatal Care Uptake

Additionally, this study identified the major determinants of postnatal care uptake, including maternal education, household wealth index, place of residence, and breastfeeding status. The observed positive wealth index and postnatal care utilization dose-response relationship points to socioeconomic disparities in access to maternal and neonatal health services even within middle and rich wealth index. Similar findings have been documented in previous studies in Nigeria, when women from wealthier households and those with higher education

attainment were more likely to utilize postnatal care services [18].

Another notable determinant of postnatal uptake was maternal education; which is consistent with existing documented evidence that educated women are more likely to notice danger signs, seek prompt treatment, and navigate healthcare systems effectively [19-21]. Conversely, reduced postnatal care utilization among rural people highlights continuing geographical obstacles/barriers including long distance to services and limited availability of skilled health providers [22].

Overall, the results of this study indicate that improving postnatal care uptake in the South-West requires more than just expanding the postnatal care service coverage. Targeted efforts to address socioeconomic inequalities, promote exclusive breastfeeding practices, and ensure the quality, accessibility and continuity of postnatal service are vital for improving the maternal and neonatal health outcomes.

Conclusion

This study provides strong evidence of considerable subnational diversity in postnatal care uptake across the six states in the South-West Geopolitical Zone of Nigeria. Though zonal maternal and child health indicators are relatively good, there is a worrisome decline in the postnatal care in 2024.These findings spotlight the fragility of recent gains in maternal and newborn health and highlight the need for sustained, context-specific interventions to strengthen PNC uptake and provision.

Conflict of Interest

The authors declare there is no conflict of interest.

Ethical Approval

This study is based on secondary analysis of NDHS data. Therefore, it leveraged on the NHREC clearance for conduct of the 3 NDHS in the country.

Data Availability

The data is publicly available on the DHS portal (https://dhsprogram.com/).

Author Contributions

- **Adeyinka Odejimi:** Conceptualization of paper, manuscript drafting, data analysis, and interpretation.
- **Tolulope O. Afolaranmi:** Manuscript review, analysis interpretation, supervision.
- **Samson. O. Bamiwuye:** Data analysis.
- **Gabriel D. Ogunde:** Analysis and interpretation review.

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