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Factors associated with the utilization of postnatal care services among adolescent mothers in Nigeria

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Abstract

This study aims to determine the utilisation of postnatal care (PNC) services among adolescent mothers in Nigeria and their associated factors. The study analysed data from the 2013 Nigeria Demographic and Health Survey. Adolescent mothers who gave birth in the last five years preceding the survey were interviewed using a questionnaire regarding their use of PNC services. The variables included sociodemographic information, attendance at antenatal care (ANC) visits, and delivery and utilisation of any PNC services. There were 1,533 babies born to 1,268 adolescent mothers. A total of 30.5% of the women attended one PNC visit up to six weeks after birth, while more than 56.3% of them had an immediate PNC visit, which is within 24 hours. Significant positive predictors of attendance at an immediate PNC visit include adolescent mothers aged 16 years (aOR 3.67; 95% CI (1.59, 8.48)), high wealth index (aOR 4.30; 95% CI (1.82, 10.17)), Islamic religion (aOR 4.22; 95% CI (2.01, 8.84)), ≥ 4 ANC visits (aOR 1.60; 95% CI (1.04, 2.55)) and delivered at a health facility (aOR 21.01; 95% CI (8.80, 50.14)). The utilisation of PNC services among adolescent mothers in Nigeria is still inadequate. Increasing awareness of and access to PNC facilities may increase postnatal care attendance.

Keywords: Postnatal care service, utilisation, adolescent mother, antenatal care, Nigeria.

INTRODUCTION

Maternal mortality remains a public health challenge that constantly threatens vulnerable groups, such as adolescents. Adolescent mothers are women between the ages of 11 and 19 who become pregnant and raise their children (Cosden,

2011). This population has been found to have several times higher maternal mortality than older women because of their biological immaturity (Cosden, 2011). An analysis of maternal deaths from 144 countries and territories showed a slightly increased risk of mortality in adolescents compared with women aged 20–24 years (Nove et al., 2014). Adolescent mothers' susceptibility to maternal deaths includes haemorrhage and sepsis, which can occur during the postnatal

period (Neal et al., 2016). Therefore, there is a need for adolescents to have sufficient postnatal care, particularly during the immediate postnatal period. The postnatal period, which is defined as the time immediately after the birth of the baby and up to six weeks (42 days) after birth, is critical for new-born and maternal survival. Access to effective, practical and supportive postnatal care is essential for the well-being of the mother and child (World Health Organisation, 2015).

In sub-Saharan Africa, most postpartum care services are offered in the immediate postpartum period, with additional visits, if necessary, during the six-month postpartum period as a strategy to reduce neonatal and maternal deaths (Tripathi et al., 2019; Charurat & Nash-Mercado, 2008). Nevertheless, postnatal care is inadequate in Nigeria as a result of a dearth of qualified personnel and ignorance on the part of the populace. Despite the high maternal mortality level, less than half of Nigerian women (32%) received postnatal care within 42 days postpartum (Rai et al., 2012). Another study reported that only 29% of adolescent females in Ethiopia used postnatal care services at least once (Mekonnen et al., 2019). This ignorance is attributed to the lack of awareness regarding the importance of postnatal care because of the women's young age. Here, the practice of child marriage is prevalent in Nigeria. According to a 2022 statistical overview of child marriage in West and Central Africa, 37% of Nigerian female adolescents between the ages of 20 and 24 years were first married before the age of 18, while 12% were first married before they turned 15 years old (UNICEF, 2022). In terms of childbearing, 19% of female adolescents in the age group 15–19 years have begun childbearing, and of these, 14% of them have given birth and 4% are currently pregnant with their first child. Also, 27% of female adolescents in rural areas have begun childbearing, as opposed to 8% in urban areas of Nigeria (National Population Commission [Nigeria] and ICF, 2019). Young adolescent mothers are expected to have less awareness of the importance of postnatal care compared with mature adult mothers.

In addition, for many adolescent mothers in Nigeria, accessing postnatal care services remains an issue. Despite the availability of health facilities, the utilisation of maternal care services is still low. The lack of maternity programmes, specifically on postnatal care and tailored to the socioeconomic needs of adolescent women to reach the most underserved adolescent women (particularly those who are uneducated, poor and from marginalised social groups and residing in rural areas) are some of the factors that contribute to this problem (Kenneth et al., 2019; Idris et al., 2013; Obasi, 2013). However, how these factors influence the utilisation of postnatal care services in Nigeria remains poorly understood. Therefore, the present study attempts to fill this gap by examining the utilisation of postnatal care services among adolescent mothers in Nigeria and exploring its associated factors.

MATERIALS AND METHODS

Ethical considerations

Ethical clearance to conduct the 2013 Nigeria Demographic

and Health Survey (2013 NDHS) was obtained from the National Health Research Ethics Committee of Nigeria, Federal Ministry of Health, Abuja, Nigeria. NDHS data are public access data and were made available to us upon request by Measure DHS. All participants were informed about the study protocol, and written informed consent was obtained.

Study design and participants

The data were based on the most recent national survey in Nigeria, the 2013 NDHS, implemented by the National Population Commission (NPC), which included the 36 states and the Federal Capital Territory. The respondents for the 2013 NDHS were nationally representative and covered the entire population residing in noninstitutional dwelling units in the country.

Data collection was conducted from February 2013 to the end of May 2013. However, the present study only included 1,268 adolescent mothers aged 15–19 who gave birth in the last five years. Information on sampling frame, selection of participants, stratification and training provided to enumerators has been explained in previous articles (Dahlui et al., 2015; Dahlui et al., 2016).

Eligibility criteria

Adolescent mothers who gave birth in the past five years before the survey, either permanent residents or visitors present in the household on the night before the survey, were eligible to be interviewed for their utilisation of postnatal care services.

Study instrument

A set of structured interviewer-administered questionnaires was used for interviewing the adolescent mothers. The questionnaire consisted of a series of questions related to population and health issues. The content of the questionnaire was based on model questionnaires developed by the MEASURE DHS programme. The questionnaires were modified according to the country's requirements with advice from health experts. To facilitate readability and comprehension among respondents, the questionnaires were translated into three major Nigerian languages: Hausa, Igbo and Yoruba.

Sociodemographic information was recorded, such as age, sex, highest educational attainment, marital status and wealth index. Marital status of the mothers, their occupation and their husbands' background characteristics; attendance at antenatal care (ANC) visits; delivery; and utilisation of any postnatal care services were recorded. All aspects pertaining to data collection procedures were pretested in November 2012 among 120 households in four locations in Makurdi, where Hausa-, Yoruba-, English- and Igbo-speaking residents were found.

Factors for the utilisation of postnatal care

The 2013 NDHS covered births in the five years preceding the survey. For the present study, the outcomes were attendance at any postnatal care service up to six weeks (42 days) after the birth of the baby and attendance at a minimum of one postnatal care visit within the first 24 hours of delivery. The respondents were asked questions about any postnatal care that they had received related to their last birth. The timing of the first postnatal check-up was recorded. The factors studied were based on previous literature reviews (Ameyaw & Dickson, 2020; Ayele et al., 2019; Adewemimo et al., 2014; Khanal et al., 2014; Phiri et al., 2015; Mosiur Rahman et al., 2011). The factors include maternal and paternal age, education, occupation, wealth index, marital status, place of delivery, birth order, birth attendance, mode of delivery, index pregnancy, frequency and timing of ANC visit.

Place of delivery was dichotomised as delivery at (i) home and (ii) health facilities. Delivery at health facilities can either be public (government hospital, health centre, health post and other public sector) or private sector facility (private hospital, clinic and other private medical sector). Birth order was expressed as (i) first or (ii) second or more. The frequency of ANC visits was categorised as (i) less than 4 visits or (ii) ≥ 4 visits. The World Health Organisation (WHO) has established that pregnant mothers should have at least four ANC visits to have adequate care during pregnancy (WHO, 2011). The timing of an ANC visit was classified as (i) early ANC registration (within the first trimester) or (ii) late ANC registration (after the first trimester). The mode of delivery was reported as either vaginal or caesarean birth. Birth attendance was reported as having (i) skilled or (ii) unskilled birth attendants present. The index pregnancy was grouped as (i) wanted then, (ii) not wanted or (iii) wanted later (Kayode et al., 2014). Wealth index as recorded in the 2013 NDHS was used as the indicator of the household economic status. The index was constructed using household asset data via principal components analysis. Households were then divided into quintiles according to the wealth score: (i) poorest, (ii) poorer, (iii) middle, (iv) rich and (v) richest. Because of similarities between quintiles, the wealth quintiles have been recategorised into three groups: (i) lowest 40% as poor, (ii) middle 40% as middle and (iii) upper 20% as rich (Agho et al., 2011).

Data analysis

The Statistical Package for the Social Sciences (SPSS) version 20 with complex samples procedure was used for analysis. Frequency and percentages with 95% confidence intervals were used to describe the demographic characteristics of the adolescent mothers. The chi-square analysis procedure in the complex samples add-on module in SPSS was used to test the differences between independent factors with place of delivery and attendance at postnatal care visits. The multivariate logistic regression procedure was used

to test the predictors of attendance at any postnatal care visit and attendance at an immediate postnatal care visit among adolescent mothers in Nigeria. Significant predictors were identified based on a 95% CI. All variables were tested in a simple model using logistic regression to obtain the unadjusted logistic regression. All factors for the attendance of postnatal care visits were included in the model. The variables were entered using the manual stepwise method. All significant variables ($p < 0.05$) were retained in the model.

RESULTS

Results for characteristics of infants born to adolescent mothers in Nigeria by place of delivery are presented in Table 1. Overall, 73.9% of babies were delivered at home with the majority of adolescent mothers aged 17 years. Adolescent mothers in the lower wealth index (85.4%, CI 82.7, 87.6) and those that reside in the rural area (80.5%, CI 78.0, 82.8) were more likely to deliver at home. Adolescent mothers with no formal educational attainment (87.6%, CI 85.1, 89.7) and not working (78.2%, CI 74.9, 81.2) were more likely to deliver at home.

The majority of health facility deliveries were for the first child (26.7%, CI 24.0, 29.6). In terms of parity, 27.3% (CI 24.3, 30.5) of health facility deliveries were by primiparous mothers. Adolescent mothers who attended more than 4 ANC visits (46.1%, CI 41.2, 51.1) were more likely to deliver at a health facility. Almost 90% of adolescent mothers (CI 82.8, 91.2) who delivered at a health facility were assisted by skilled birth attendants.

Less than one-third of the pregnancy by adolescent mothers (30.5%) attended postnatal care visits up to 6 weeks after birth with 56.3% of them having an immediate postnatal care visit. As indicated in Table 2, adolescent mothers with secondary or higher educational level (58.2%, CI 52.3, 63.9), within the rich wealth index (58.7%, CI 51.5, 65.6) and from the South West region (57.6%, CI 45.1, 69.2) had a higher proportion of postnatal care attendance. Approximately half of the urbanite adolescent mothers (47.4%, CI 40.3, 54.7) and adolescent mothers who had ≥ 4 ANC visits (57.3%, CI 52.3, 62.2) attended at least one postnatal care visit up to 6 weeks after birth. About two-thirds of the adolescent mothers who gave birth at a health facility (70.0%, CI 64.7, 74.9) were more likely to attend postnatal care visits. With regards to an immediate postnatal care visit, only 19.3% (CI 16.8, 22.2) of primiparous and only 7.1% (CI 5.6, 8.9) of adolescent mothers who delivered at home attended a postnatal care visit within 24 hours of delivery. One-third of the adolescent mothers who had ≥ 4 ANC visits (30.0%, CI 25.6, 34.8), early ANC registration (34.6%, CI 26.9, 43.1) and received health education on pregnancy complications (34.5%, CI 29.5, 39.8) attended the immediate postnatal care visit.

Results from multivariate analysis on factors associated with attendance at any postnatal care visit and immediate postnatal care visit among adolescent mothers in Nigeria are presented

Table 1: Sociodemographic and clinical characteristics of infants by place of delivery.

Factor	Place of delivery		χ^2 (p-value)
	Home delivery (n=1133) n, % (95% CI)	Health facility delivery (n=400) n, % (95% CI)	
Maternal age (years)			9.105 (0.120)
15	37, 76.0 (59.8, 87.1)	14, 24.0(12.9, 40.2)	
16	82, 73.2 (63.2, 81.3)	31, 26.8(18.7, 36.8)	
17	184, 81.3 (75.6, 85.9)	53, 18.7(14.1, 24.4)	
18	452, 76.4 (72.4, 80.1)	139, 23.6(19.9, 27.6)	
19	378, 71.6 (67.1, 75.7)	163, 28.4(24.3, 32.9)	
Paternal age (years)^a			1.331 (0.576)
16-25	398, 76.6 (72.4,80.3)	139, 23.4(19.7,27.6)	
26-35	454, 79.4 (75.6,82.2)	130, 20.6(17.2,24.4)	
≥ 36	145, 77.7 (70.5,83.5)	44, 22.3(16.5,29.5)	
Maternal education			238.118 (<0.001)
No education	748, 87.6 (85.1, 89.7)	118, 12.4 (10.3, 14.9)	
Primary	191, 67.2 (60.6, 73.2)	87, 32.8 (26.8, 39.4)	
Secondary or higher	194, 46.1 (40.2, 52.0)	195, 53.9 (48.0, 59.8)	
Paternal education			162.377 (<0.001)
No education	633, 87.4 (84.6, 89.7)	99, 12.6 (10.3, 15.4)	
Primary	154, 76.0 (68.9, 81.9)	53, 24.0 (18.1, 31.1)	
Secondary or higher	346, 56.4 (51.7, 61.0)	248, 43.6 (39.0, 48.3)	
Maternal occupation			8.097 (0.011)
Unemployed	629, 78.2 (74.9, 81.2)	191, 21.8 (18.8, 25.1)	
Employed	504, 71.9 (68.1, 75.5)	209, 28.1 (24.5, 31.9)	
Paternal occupation^a			40.565 (<0.001)
Others ^b	86, 61.8 (52.4, 70.4)	55, 38.2 (29.6, 47.6)	
Manual	221, 72.0 (66.3, 77.1)	97, 28.0 (22.9, 33.7)	
Agricultural	469, 84.6 (81.1, 87.6)	100, 15.4 (12.4, 18.9)	
Sales	249, 76.6 (71.0, 81.4)	73, 23.4 (18.6, 29.0)	
Wealth index			190.883 (<0.001)
Poor	791, 85.4 (82.7, 87.6)	148, 14.6 (12.4, 17.3)	
Middle	217, 66.9 (60.7, 72.6)	114, 33.1 (27.4, 39.3)	
Rich	125, 44.4 (37.4, 51.6)	138, 55.6 (48.4, 62.6)	
Residence type			102.972 (<0.001)
Urban	123, 51.2 (43.9, 58.3)	130, 48.8 (41.7, 56.1)	
Rural	1010, 80.5 (78.0, 82.8)	270, 19.5 (17.2, 22.0)	
Geographical zone			240.729 (<0.001)
North Central	83, 52.6 (43.9, 61.1)	82, 47.4 (38.9, 56.1)	
North East	313, 81.3 (77.0, 84.9)	93, 18.7 (15.1, 23.0)	
North West	553, 86.9 (83.8, 89.5)	84, 13.1 (10.5, 16.2)	
South East	17, 27.3 (16.7, 41.2)	42, 72.7 (58.8, 83.3)	
South South	137, 66.1 (56.6, 74.5)	49, 33.9 (25.5, 43.4)	
South West	30, 40.4 (28.9, 53.1)	50, 59.6 (46.9, 71.1)	

in Table 3. Adolescent mothers aged 15 years (aOR 4.14; 95% CI (1.36, 12.65)), within the rich wealth index (aOR 5.09; 95% CI (2.24, 11.61)), from the North East region (aOR 10.29; 95% CI (2.39, 44.22)), who had ≥4 ANC visits (aOR 2.35; 95% CI (1.52, 3.62)), who delivered at a health facility (aOR 13.46; 95% CI (6.79, 26.69)) and with skilled birth attendants present (aOR 2.50; 95% CI (1.27, 4.92)) were more likely to use any

postnatal care visits up to 6 weeks after birth. Significant positive predictors of attending immediate postnatal care visits include adolescent mothers aged 16 years (aOR 3.67; 95% CI (1.59, 8.48)), with high wealth index (aOR 4.30; 95% CI (1.82, 10.17)), professing Islamic religion (aOR 4.22; 95% CI (2.01, 8.84)), who had ≥4 ANC visits (aOR 1.60; 95% CI (1.04, 2.55)) and who delivered at a health facility (aOR 21.01; 95% CI (8.80, 50.14)).

Table 1. Cont.

Religion^a			140.436 (<0.001)
Catholic and other Christian	246, 51.2 (45.5, 56.8) 869, 82.5 (79.9, 84.7)	183, 48.8 (43.2, 54.5) 212, 17.5 (15.3, 20.1)	
Islam			
Marital status			39.801 (<0.001)
Married	963, 78.1 (75.5, 80.4)	305, 21.9 (19.6, 24.5)	
Non-married	170, 57.8 (50.4, 64.9)	95, 42.2 (35.1, 49.6)	
Birth order			13.896 (0.001)
First child	885, 73.3 (70.4, 76.0)	343, 26.7 (24.0, 29.6)	
Second or more	248, 83.6 (78.6, 87.6)	57, 16.4 (12.4, 21.4)	
Parity			10.362 (0.004)
Primiparous	718, 72.7 (69.5, 75.7)	288, 27.3 (24.3, 30.5)	
Multiparous	415, 80.2 (76.2, 83.7)	112, 19.8 (16.3, 23.8)	
Birth interval (months)^a			1.804 (0.451)
<18	31, 69.4 (52.7, 82.2)	14, 30.6 (17.8, 47.3)	
18-36	154, 79.2 (72.2, 84.8)	43, 20.8 (15.2, 27.8)	
>36	27, 79.9 (61.2, 90.9)	8, 20.1 (9.1, 38.8)	
Frequency of ANC visit^a			184.040 (<0.001)
Less than 4 visits	673, 87.9 (85.1, 90.2)	100, 12.1 (9.8, 14.9)	
≥4 visits	260, 53.9 (48.9, 58.8)	235, 46.1 (41.2, 51.1)	
Timing of ANC visit^a			8.646 (0.008)
Early ANC registration	77, 47.5 (39.0, 56.2)	84, 52.5 (43.8, 61.0)	
Late ANC registration	327, 60.9 (56.1, 65.5)	210, 39.1 (34.5, 43.9)	
Birth attendants^a			877.661 (<0.001)
Skilled attendants	38, 12.4 (8.8, 17.2)	306, 87.6 (82.8, 91.2)	
Unskilled attendants	852, 96.2 (94.5, 97.3)	37, 3.8 (2.7, 5.5)	
Number of pregnancy			3.277 (0.109)
Single	1117, 75.6 (73.1, 77.9)	390, 24.4 (22.1, 26.9)	
Twin	16, 60.3 (38.7, 78.5)	10, 39.7 (21.5, 61.3)	
Index pregnancy^a			55.611 (<0.001)
Wanted then	794, 78.8 (75.9, 81.5)	232, 21.2 (18.5, 24.1)	
Wanted later	129, 53.2 (45.4, 60.9)	98, 46.8 (39.1, 54.6)	
Not wanted	4, 71.4 (21.6, 95.8)	1, 28.6 (4.2, 78.4)	
Received health education on pregnancy complications^a			12.818 (0.002)
Yes	219, 52.2 (46.8, 57.5)	205, 47.8 (42.5, 53.2)	
No	181, 65.9 (59.2, 72.0)	91, 34.1 (28.0, 40.8)	
Experience any type of violence during pregnancy			17.308 (0.001)
No	665, 76.9 (73.8, 79.8)	226, 23.1 (20.2, 26.2)	
Yes	36, 52.8 (37.0, 68.0)	21, 47.2 (32.0, 63.0)	

^a Percentages are calculated based on less than 1,533 birth due to missing data.

^b Others include unemployed, professional/technical/managerial, clerical, household/domestic and services. Manual includes skilled and unskilled manual.

DISCUSSION

The current study has aimed to investigate the factors influencing the utilisation of postnatal care (PNC) at 24 hours and six weeks among adolescent mothers in Nigeria.

Specifically, the present study has investigated factors that promote or hinder adolescent mothers from attending PNC services. More than 30% of the adolescent mothers were in their late adolescence stages. Most were unemployed, had no formal education, resided in rural areas and were from the

Table 2: Percentage of attending any postnatal care and immediate postnatal care visits by sociodemographic and community factors.

Factors	Attended any postnatal care visit (up to 6 weeks after birth) n=467 n, % (95% CI)	χ^2 (p-value)	Attended immediate postnatal care visit (within 24 hours of delivery) n=263 n, % (95% CI)	χ^2 (p-value)
Maternal age (years)		15.716 (0.015)		14.534 (0.016)
15	21, 46.0 (30.7, 62.2)		7, 9.8 (3.7, 23.7)	
16	38, 34.6 (25.6, 44.9)		27, 25.9 (17.9, 35.9)	
17	64, 22.9 (17.6, 29.3)		33, 10.9 (7.5, 15.6)	
18	166, 26.6 (22.8, 30.8)		95, 15.8 (12.7, 19.4)	
19	178, 31.0 (26.8, 35.6)		101, 16.0 (12.9, 19.6)	
Paternal age (years)^a		0.262 (0.898)		0.138 (0.943)
16-25	146, 25.9 (21.9, 30.3)		86, 13.9 (11.1, 17.4)	
26-35	153, 24.6 (20.9, 28.7)		91, 14.4 (11.5, 17.8)	
≥ 36	50, 25.6 (19.5, 32.9)		30, 15.0 (10.3, 21.4)	
Maternal education		216.256 (<0.001)		71.062 (<0.001)
No education	153, 16.5 (14.0, 19.4)		97, 9.9 (8.0, 12.2)	
Primary	98, 36.3 (30.1, 42.9)		55, 20.1 (15.2, 26.1)	
Secondary or higher	216, 58.2 (52.3, 63.9)		111, 28.8 (23.7, 34.5)	
Paternal education		140.044 (<0.001)		57.732 (<0.001)
No education	140, 17.8 (15.0, 20.9)		78, 9.6 (7.6, 12.1)	
Primary	53, 24.0 (18.2, 31.0)		35, 15.4 (10.8, 21.5)	
Secondary or higher	274, 47.6 (43.0, 52.4)		150, 25.2 (21.3, 29.5)	
Maternal occupation		1.184 (0.334)		1.787 (0.225)
Unemployed	244, 27.6 (24.3, 31.2)		135, 14.5 (12.1, 17.3)	
Employed	223, 30.1 (26.4, 34.0)		128, 17.0 (14.1, 20.3)	
Paternal occupation^a		26.464 (<0.001)		8.744 (0.056)
Others ^b	60, 39.9 (31.3, 49.1)		33, 21.6 (15.1, 29.8)	
Manual	101, 30.0 (24.7, 35.9)		55, 15.6 (11.8, 20.3)	
Agricultural	123, 20.0 (16.6, 23.9)		77, 11.9 (9.3, 15.1)	
Sales	83, 27.1 (21.9, 33.0)		50, 15.4 (11.4, 20.4)	
Wealth index		183.273 (<0.001)		75.221 (<0.001)
Poor	182, 18.0 (15.5, 20.8)		105, 10.0 (8.2, 12.2)	
Middle	133, 40.4 (34.3, 46.8)		77, 22.6 (17.7, 28.4)	
Rich	152, 58.7 (51.5, 65.6)		81, 30.4 (24.3, 37.3)	
Residence type		56.029 (<0.001)		19.403 (<0.001)
Urban	119, 47.4 (40.3, 54.7)		66, 24.5 (19.0, 31.0)	
Rural	348, 24.7 (22.2, 27.4)		197, 13.8 (11.8, 16.0)	

northwest region. This finding is in line with results from a previous study that evaluated the risk factors associated with teenage pregnancy among Nigerians between the ages of 14 and 19 years; the study found that teenage pregnancy in the

Niger Delta is concentrated among older adolescents with less formal education and who are unemployed (Ayuba & Gani, 2012). This is because adolescent mothers are less likely to complete their education once they are pregnant. In contrast

Table 2. Cont.

Geographical zone		137.761		57.526
	71, 42.3 (34.0, 51.1)	(<0.001)	55, 31.4 (24.0, 40.0)	(<0.001)
North Central	107, 23.3 (19.1, 28.1)		75, 15.8 (12.5, 19.9)	
North East	121, 19.2 (16.0, 22.7)		63, 9.9 (7.7, 12.7)	
North West	28, 51.6 (37.7, 65.2)		11, 18.6 (9.8, 32.5)	
South East	93, 53.4 (44.3, 62.2)		41, 23.3 (16.5, 31.8)	
South South	47, 57.6 (45.1, 69.2)		18, 20.2 (12.3, 31.3)	
South West				
Religion^a		105.705		15.260
Catholic and other Christian	204, 51.1 (45.4, 56.7)	(<0.001)	97, 22.6 (18.2, 27.7)	(<0.001)
Islam	261, 22.5 (19.9, 25.3)		165, 13.9 (11.8, 16.2)	
Marital status		94.994		17.447
Married	323, 24.3 (21.8, 27.0)	(<0.001)	193, 14.1 (12.2, 16.3)	(<0.001)
Non-married	144, 57.1 (49.9, 64.0)		70, 25.4 (19.7, 32.1)	
Frequency of ANC visit		174.362		62.154
		(<0.001)		(<0.001)
Less than 4 visits	181, 20.9 (17.9, 24.2)		105, 12.1 (9.9, 14.8)	
≥4 visits	286, 57.3 (52.3, 62.2)		158, 30.0 (25.6, 34.8)	
Timing of ANC visit^a		6.624		3.219
	99, 61.7 (53.1, 69.6)	(0.018)	58, 34.6 (26.9, 43.1)	(0.099)
Early ANC registration	268, 49.8 (45.0, 54.6)		151, 27.0 (23.0, 31.5)	
Late ANC registration				
Place of delivery		418.666		259.774
	188, 15.2 (13.0, 17.7)	(<0.001)	93, 7.1 (5.6, 8.9)	(<0.001)
Home delivery	279, 70.0 (64.7, 74.9)		170, 41.8 (36.4, 47.4)	
Health facility delivery				
Birth attendance^a		386.526		186.354
	272, 78.5 (73.2, 83.0)	(<0.001)	161, 43.9 (38.0, 49.9)	(<0.001)
Skilled attendance	184, 18.6 (15.9, 21.6)		95, 9.7 (7.7, 12.0)	
Unskilled attendance				
Birth order		5.309		0.095
	387, 30.1 (27.2, 33.0)	(0.036)	212, 15.8 (13.7, 18.2)	(0.776)
First child	80, 23.4 (18.6, 29.0)		51, 15.1 (11.2, 20.0)	
Second or more				
Sex of infant		0.053		0.218
		(0.837)		(0.672)
Male	238, 29.0 (25.5, 32.8)		141, 16.1 (13.5, 19.1)	
Female	229, 28.5 (25.0, 32.2)		122, 15.2 (12.6, 18.3)	
Mode of delivery		31.745		10.133
	445, 28.2 (25.7, 30.8)	(<0.001)	252, 15.4 (13.5, 17.6)	(0.002)
Vaginal birth	22, 82.8 (59.9, 93.9)		11, 40.2 (22.2, 61.4)	
Caesarean birth				

to the present study, which showed that the majority of the adolescent mothers (n = 963, 78.1%) were married, the study from Niger Delta found that most of the pregnant adolescents were unmarried (Ayuba & Gani, 2012). This is because, in Nigeria, many girls are married off before their eighteenth birthday. Poverty, poor educational attainment and strong social and religious traditions determine child marriage in

Nigeria (Salami, 2015).

The postnatal period is a critical phase in the lives of mothers, mainly among growing adolescents and their new-born babies. Immaturity makes adolescents prone to poor judgment when making decisions to utilise postnatal care services. In the present study, about 30.0% of the adolescent mothers

Table 2. Cont.

Index		68.134		10.558
pregnancy^a	329, 30.3 (27.2, 33.5)	(<0.001)	198, 17.6 (15.2, 20.3)	(0.008)
Wanted then	134, 61.3 (53.4, 68.6)		64, 27.2 (20.9, 34.6)	
Wanted later	1, 17.8 (2.3, 66.5)		-	
Not wanted				
Received health education on pregnancy complications^a		19.809		16.892
		(<0.001)		(<0.001)
Yes	247, 59.2 (53.9, 64.3)		147, 34.5 (29.5, 39.8)	
No	119, 41.9 (35.4, 48.8)		62, 20.0 (15.3, 25.8)	
Parity		91.921		29.750
Primiparous	387, 36.7 (33.4, 40.2)	(<0.001)	212, 19.3 (16.8, 22.2)	(<0.001)
Multiparous	80, 13.4 (10.5, 16.9)		51, 8.7 (6.4, 11.6)	
Experienced any type of violence during pregnancy^a		16.769		4.900
		(0.001)		(0.067)
Yes	293, 30.9 (27.6, 34.4)		165, 16.8 (14.3, 19.7)	
No	29, 56.8 (40.9, 71.4)		17, 28.2 (16.4, 44.0)	
Yes				

^a Percentages are calculated based on less than 1,533 birth due to missing data.

^bOthers include unemployed, professional/technical/managerial, clerical, household/domestic and services. Manual includes skilled and unskilled manual.

attended postnatal care six weeks after childbirth, with more than half having had an immediate postnatal care visit. This finding shows that most adolescent mothers may lack awareness of the importance of attending postnatal care, especially during the immediate postnatal period, when it is critical for the survival of both the mother and her new-born (Tripathi et al., 2019; Charurat & Nash-Mercado, 2008), which is inline with the results published in a previous study. The study reported that only 32% of Nigerian women received postnatal care within 42 days postpartum (Rai et al., 2012). However, another report revealed that only 29% of adolescent females used postnatal care services at least once in Ethiopia (Mekonnen et al., 2019). Another possibility that may lead to this is because of the lack of access to postnatal care, which then causes adolescent mothers not to attend postnatal care immediately after their childbirth (Tripathi et al., 2019; Charurat & Nash-Mercado, 2008).

Adolescent mothers with higher educational levels had a higher proportion of postnatal care attendance. This finding can be explained by the level of awareness, in which educated mothers are better informed about health risks and demand and access to health services. In the current study, most of the adolescents who attended postnatal care came from a better socioeconomic background, whereby they lived within rich wealth index areas and came from the southwest region of Nigeria. A similar study on the utilisation of maternal healthcare services among adolescents in India found that taking advantage of postnatal care is associated with household wealth and woman's education, full ANC, safe delivery care and region of residence (Singh et al., 2014).

More than 40% of Nigerian adolescents from the city had at least one postnatal care visit up to six weeks after birth. This is because of the wide availability of maternal and child health services in urban areas. In contrast to adolescents living away from local government headquarters, poor road and transportation conditions hinder the social outreach and mobilisation efforts that play a vital role in ensuring access to maternal health services. In addition, mothers who go for follow-up services have often been told to come back some other time because there is no medicine or nurse to attend to them (UNICEF, 2014). The results of the current study indicated that employed adolescents were more likely to access postnatal care. Those who were employed were found to have better financial status and the ability to use postnatal services. In addition, they also had increased awareness of health problems and used this information more effectively to achieve good health.

According to the multivariate analysis, adolescent mothers who gave birth at a health facility were more likely to attend postnatal care visits. This may be because of the reminders or advice given by health care providers prior to discharge from the hospital. The close contact between the health care providers and mothers can make it easier to convince adolescent mothers of the importance of going for postnatal visits. Also, the mothers who developed obstetric complications or had a baby with medical problems that would warrant hospitalisation were more likely to utilise postnatal care services. The findings of the current study coincide with that stated in a survey, which reported that 81% of Nigerian

Table 3: Predictors of attendance at any postnatal care visit and immediate postnatal care visit.

Factor	Adjusted odds ratio (95% CI)	
	Attendance of any postnatal care visit	Attendance of immediate postnatal care visit
Maternal age (years)		
17	1.00	1.00
15	4.14 (1.36, 12.65)	1.58 (0.29, 8.61)
16	1.67 (0.72, 3.87)	3.67 (1.59, 8.48)
18	1.21 (0.64, 2.32)	1.67 (0.86, 3.25)
19	1.30 (0.63, 2.68)	1.45 (0.71, 2.97)
Wealth index		
Poor	1.00	1.00
Middle income	2.39 (1.29, 4.45)	1.88 (1.01, 3.52)
Rich	5.09 (2.24, 11.61)	4.30 (1.82, 10.17)
Geographical zone		
South East	1.00	1.00
North Central	7.34 (1.70, 31.66)	3.46 (0.87, 13.85)
North East	10.29 (2.39, 44.22)	3.12 (0.74, 13.08)
North West	8.42 (1.95, 36.29)	1.77 (0.41, 7.58)
South South	8.03 (2.04, 31.65)	4.12 (0.89, 18.99)
South West	7.49 (1.57, 35.75)	1.09 (0.22, 5.49)
Frequency of ANC visit		
Less than 4 visits	1.00	1.00
≥4 visits	2.35 (1.52, 3.62)	1.60 (1.04, 2.55)
Place of delivery		
Home delivery	1.00	1.00
Health facility delivery	13.46 (6.79, 26.69)	21.01 (8.80, 50.14)
Birth attendance		
Unskilled attendance	1.00	-
Skilled attendance	2.50 (1.27, 4.92)	-
Religion		
Catholic and other Christian	-	1.00
Islam	-	4.22 (2.01, 8.84)

The sample size included in the logistic regression is less than the total sample of 1,533 due to missing data for some variables.

Other variables entered: maternal and paternal education, maternal and paternal occupation, marital status, locality, birth order, mode of delivery, no of pregnancy, index pregnancy and parity.

women who delivered in a health facility were more likely to have a postnatal health check-up within two days of delivery compared with those who delivered elsewhere (15%) (National Population Commission [Nigeria] and ICF, 2019). This indicates that the place of delivery is associated with the likelihood of receiving immediate postnatal care. In 2022, the WHO recommended that a mother and her newborn child should receive postnatal care within 24 hours of the birth. The preventive care practices and assessments have been designed to identify and manage or refer to complications for both the mother and neonate (WHO, 2022). In the present study, less than 20.0% of primiparous and only 7.0% of adolescent mothers who delivered at home attended immediate postnatal care. In Africa, the period ensuing from birth is often affected by cultural practices. One of the practices is isolation, whereby most African communities will

retain both the mother and baby at home for the first month after birth. Families are cautious about visitors coming in close contact with new-borns. Young first-time mothers are often most likely to follow such practices because they themselves are still growing and unable to control their own lives (Warren et al., 2006). Even though some of the young ones are not keen to follow these cultural practices, they have no choice because they live with their families. One study on postpartum beliefs and practices conducted in Northern Nigeria reported that almost half of the respondents would continue with their contemporary postpartum beliefs and practices (Iliyasu et al., 2006). However, mothers with formal education who participated in this study were significantly more likely to believe that these practices were nonbeneficial compared with mothers without formal education (Iliyasu et al., 2006).

Apart from promoting the use of skilled attendants at birth and healthy behaviour such as breastfeeding and planning for optimal pregnancy spacing, ANC is an opportunity to encourage early postnatal care. In the present study, less than 35.0% of the adolescent mothers who had ≥ 4 ANC visits and received health education on pregnancy complications attended the immediate postnatal care visit. One possible reason is the lack of community awareness about the importance of postnatal care services because some community members perceived health services to be necessary only if obstetric complications occurred. For some adolescents, being aware of the health consequences of not attending PNC does not necessarily mean that they comprehend and comply. This is probably due to inadequate health literacy which has been reported among pregnant adolescents from a low-income area of Northeast Brazil (Franca et al., 2020)

Early ANC is important for the early detection of diseases and prophylaxis, health education and prevention of complications. In the current study, as few as 35% of adolescents who came early for their antenatal check-up attended the immediate postnatal care visit. A study conducted with a volunteer sample of 49 pregnant adolescents aged between 13 and 18 in primary care settings found that the reasons for delaying care included not recognising pregnancy symptoms, denying being pregnant, fear of parents' response to the pregnancy and lack of financial resources. In contrast, those who sought early prenatal care had adequate family support and a stronger knowledge base about pregnancy than those who delayed care (Heaman et al., 2014; Lee & Grubs, 1995).

When comparing all the factors that determined attendance of up to 6 weeks and immediate postnatal care visits, the only difference found between the two outcomes was the 'skilled birth attendant' factor. Based on the multivariate regression model, the 'skilled birth attendant' determined adolescents' attendance at postnatal care visits of up to six weeks but not for immediate postnatal care. This result in contrast to a previous study carried out in Nepal, where the presence of skilled birth attendance increased the likelihood for immediate postnatal care (Khanal et al., 2014). Besides preventing and dealing with complications during pregnancy, a skilled birth attendant also delivers postnatal care for the mother and child (Belaid et al., 2020). Thus, one reason for such a finding in the current study was perhaps because adolescents who attended the six weeks postnatal care lived in urban areas, where skilled birth attendants were commonly present. Another reason may be because of the fact that adolescents who came for postnatal visits had some formal education and were more likely to deliver with a skilled birth attendant present. In addition, there was a huge difference between services provided by a trained birth attendant and an untrained traditional midwife. However, in the present study, there was a possibility that adolescents who attended immediate postnatal care were forced to go to a traditional birth attendant because the community in which they lived did not have a properly equipped healthcare centre (Amutah-Onukagha, 2017).

Strengths and limitations

There are several strengths to the current study that should be considered. Data were obtained from a national survey and a relatively large sample size that covered both rural and urban areas in Nigeria, the six geo-political zones, the 36 states, and the Federal Capital Territory. Therefore, the current findings can be generalised to apply to the entire adolescent population in Nigeria. The present study utilised internationally validated and nationally adapted demographic and health surveys. The current study has also provided updated knowledge on the factors associated with the utilisation of postnatal care. In addition, this is the first study to report the prevalence and determinants of immediate and six-week postnatal care among adolescents in Nigeria. However, the current study has several limitations. The cross-sectional nature of the DHS limits the capacity to draw any causal inferences. Also, because the survey asked for the information retrospectively, this may have yielded some recall bias. This bias was considered significant because some of the adolescent mothers may not remember the timing of follow-up care for a baby delivered up to five years before. The influence of other related factors such as the level of maternal knowledge, accessibility of health facilities in the community and influence of other community gatekeepers such as local leaders, traditional birth attendants and support groups should be evaluated in future studies.

The current study found that less than half of adolescent mothers utilised postnatal care in Nigeria. Therefore, it is essential to increase adolescents' awareness of the importance of managing their own health during the postnatal period. Besides this, there is a need for a transdisciplinary approach allowing the members of educational teams to contribute knowledge and skills, collaborate with other health care providers, train volunteers and family members and mutually determine the postnatal services that would benefit all adolescent mothers in Nigeria.

CONCLUSION

There were 1,533 babies born to 1,268 adolescent mothers in the past five years preceding the survey. The percentage of adolescent mothers in Nigeria was 16%. Less than one-third of the pregnancy by adolescent mothers (30.5%) attended postnatal care visits up to six weeks after birth, with 56.3% of them having an immediate postnatal care visit. Significant positive predictors of attending immediate postnatal care visits included adolescent mothers aged 16 years, those with a high wealth index, professing the Islamic religion, who had ≥ 4 ANC visits and who delivered at a health facility. In general, the utilisation of PNC services in Nigeria is still inadequate. Prevention strategies, including healthcare education and provision of funding by the government for postnatal care facilities, are needed to promote the attitudes, beliefs and behaviour that ultimately encourage adolescent mothers to

attend postnatal care visits and improve their access to the facilities.

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