

Prevalence Associated Factors and Maternal-Perinatal Outcomes of Teenage Pregnancy in Nigeria: A Secondary Analysis of Maternal and Perinatal Database for Quality, Equity and Dignity Data

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Abstract

Background

Teenage pregnancy is a high-risk condition with unique health needs. Understanding the characteristics and outcomes of teenage pregnancies can support evidence-based strategies to improve adolescent maternal health in Nigeria.

Objectives

To determine the prevalence of teenage pregnancy across regions in Nigeria, assess the socio-demographic and obstetric profiles of pregnant teenagers, evaluate maternal and perinatal outcomes, and compare these outcomes with those of non-teenage pregnancies.

Methods

This was a secondary analysis of data from the Maternal and Perinatal Database for Quality, Equity and Dignity (MPD-4-QED) network involving 54 tertiary hospitals across Nigeria. Data were collected electronically from women admitted for delivery at ≥ 28 weeks' gestation between September 2019 and August 2022. Information on socio-demographic characteristics, obstetric history, and maternal and perinatal outcomes was analysed using generalised linear mixed models to estimate odds ratios (ORs) and adjusted odds ratios (aORs) with 95% confidence intervals (CIs). Statistical analysis was performed using R version 4.3.2, with $p < 0.05$ considered significant.

Results

Among 171,125 women analysed, 5,944 were teenagers, giving a prevalence of 3.5% (95%CI 3.39–3.56%). Most teenage pregnancies occurred in the North (83.5%). Compared with non-teenagers, teenagers were more likely to be single, unemployed, and without formal education. They also had higher rates of primigravidity, preeclampsia, and eclampsia. Teenagers had increased odds of postpartum eclampsia (aOR 1.85, 95%CI 1.39–2.50) but lower odds of caesarean section (aOR 0.73, 95%CI 0.68–0.78). Maternal mortality did not differ significantly between groups. Adverse perinatal outcomes were more common among teenagers, including stillbirth (aOR 1.31, 95%CI 1.09–1.57), low birth weight (aOR 1.12, 95%CI 1.04–1.20), severe birth asphyxia (aOR 1.20, 95%CI 1.10–1.32), and preterm delivery (aOR 1.25, 95%CI 1.15–1.35). Congenital anomalies and early neonatal death were similar between groups.

Conclusion

Teenage pregnancy remains a major public health concern in Nigeria, with marked regional disparities. Although maternal outcomes were generally favourable, teenagers experienced significantly higher rates of preeclampsia/eclampsia and poorer perinatal outcomes, highlighting the need for targeted interventions to improve adolescent reproductive health.

Introduction

Teenage pregnancy has been defined by the World Health Organization (WHO) as any pregnancy in a female aged 10–19 years.¹ Teenage pregnancies occur worldwide with varying rates. According to the WHO, the global teenage pregnancy rate in 2023 was 41.3 births per 1000 women aged 15–19 years, with the highest rate of 97.9 births per 1000 women in Sub-Saharan Africa.¹ In Nigeria, a recent scoping review found a national teenage pregnancy prevalence of between 7.5% and 49.5% in 2023.² Despite the variations in definition, pregnancies in women 20 years or more were considered adult pregnancies in all the studies.²

Teenage pregnancy is a high-risk pregnancy associated with unique health risks and poorer maternal and neonatal outcomes due to a combination of biological and psychosocial factors.^{3,4} In addition, it may have a negative impact on education and

livelihood.^{3,4} The pelvis of adolescent bodies may not be fully developed, increasing complications like obstructed labour and obstetric fistulae.³ Pregnant teenagers are also at higher risk of anaemia in pregnancy, preeclampsia/eclampsia, preterm births and low-birth-weight babies.⁴ Limited access to healthcare and nutritional deficiencies further exacerbate these risks, as teens may lack prenatal care and adequate nutrition for healthy development. Additionally, psychological stress of being pregnant early in life and the relative lack of health education may make it difficult for them to have a healthy pregnancy.²

In collaboration with partners, the World Health Organization (WHO) is advancing adolescent health by advocating for greater focus on adolescents, building research and epidemiological foundations, and developing supportive tools and programmes.¹ Nigeria has an estimated population of 229.5 million.⁵ Of this, about 23% are estimated to be 10 to 19-year-olds,⁶ 49% of which are estimated to be females.⁷ This gives an estimated population of 10 to 19-year-old females as 25.9 million. Teenage pregnancy in Nigeria is a major public health issue, with about one in seven girls aged 15 to 19 years having begun childbearing, according to the recent Nigeria Demographic and Health Survey (NDHS).⁸ It is more common in northern regions and among girls who are poor, less educated, live in rural areas, or experience early marriage. The condition is driven by factors such as early sexual debut, low contraceptive use, and sociocultural norms, and it leads to outcomes like school dropout and poorer maternal and child health.

There are several studies on teenage pregnancy in Nigeria, many of which have documented the prevalence rates and associated factors.² These studies and the current NDHS are often fragmented, limited by their sample sizes with inadequate adjustments for confounders, and are region-specific.² Though existing studies are mainly descriptive, cross-sectional with some qualitative, there are few nationally representative studies.

The need for a nationally representative evidence comparing maternal and perinatal outcomes of teenage pregnancies with those of adult women in Nigeria cannot be overemphasised.² This nationwide study may clearly quantify the true risks associated with teenage pregnancy and provide stronger evidence for policy making and planning of interventions.

Hence, this study sought to determine the prevalence of teenage pregnancy by region, the socio-demographic characteristics and obstetric features of pregnant teenagers by region, and the maternal and perinatal outcomes of teenage pregnancies in Nigeria.

Methods

Study setting and design

This was a secondary analysis of data collected from the MPD-4-QED network. The MPD-4-QED network consists of 54 tertiary hospitals that serve as referral centres for neighbouring secondary healthcare facilities. These hospitals are distributed across Nigeria's six geopolitical zones: Northcentral, Northeast, Northwest, Southeast, Southsouth, and Southwest. Figure 1 presents a map of Nigeria with the participating facilities.⁹ These zones are based on socio-cultural and geo-political reasons. The Country is home to over 250 ethnic groups with three major groups – Yoruba, Igbo and Hausa. Islam and Christianity are the main religion practiced across the nation.

The northern and southern regions of the country have distinct sociocultural and ethnic backgrounds. Northern Nigeria is predominantly inhabited by Hausa-Fulani Muslims, while the Southern Nigeria is religiously diverse, with Christianity being dominant, especially among the Yoruba, Igbo, and other ethnic groups, and it is a more urbanized.

Study population

This comprised all women (and their babies) who were admitted for delivery at or after 28 weeks of gestation between 1 September 2019 and 31 August 2022 in the participating hospitals.

Eligibility criteria:

Women who gave birth at less than 20 years of age were included in the teenage group, while those who delivered at 20 years or older were included and classified as the non-teenage group. Women who were admitted after birth, or at less than 28 weeks of

gestational age were excluded from this analysis.

Data collection and electronic capture

A customized electronic data platform was developed using the open-source District Health Information Software (DHIS-2), the officially endorsed Health Management Information System of Nigeria's Federal Ministry of Health. This platform collected data from patient medical records via an electronic case report form, capturing details on women's sociodemographic characteristics, medical history, antenatal records, labour and delivery (including the newborn's clinical condition), and immediate postpartum observations. At each hospital, two trained Medical Record Officers (MROs) conducted daily monitoring of medical records across various units, including the obstetric ward, gynaecological emergency unit, delivery room, and operating theatre. The details have been described by Tukur et al.⁹

For each woman admitted, data entry began at admission, continued throughout her hospital stay, and was finalised either at discharge or upon death, whichever occurred first. Data were collected from patient medical records using a tablet-based case report form specifically designed for the project. A unique identifier was employed to accurately link information between the mother and her newborn within the database.

The collected data were synchronised in real-time from the internet-enabled tablet to a secure central cloud-based server. Each participant's record remained open for 60 days post-admission, allowing hospital coordinators to make corrections, address data entry errors, and complete maternal or perinatal death audit forms when applicable.

Definitions and Outcome Measures

Teenage pregnancy: pregnancy in females less than 20 years. All the pregnant teenagers were 10–19-year-olds, except three who were 9 years old. The data from the three 9-year-olds were included in the teenage group.

Non-teenage pregnancy: pregnancy in females 20 years and above.

Maternal outcomes: Intrapartum and postpartum outcomes that were considered included induction of labour, spontaneous vaginal delivery (SVD), prolonged labour (labour lasting more than 12 hours in the active phase), caesarean section, any complication (presence of at least one complication during labour or puerperium), third and fourth degree perineal tears, preeclampsia, postpartum eclampsia, postpartum haemorrhage (vaginal bleeding of 500mls or more following vaginal delivery or bleeding of 1000mls or more following caesarean section, or any amount of bleeding leading to haemodynamic instability in the woman), maternal intensive care unit (ICU) admission and maternal death.

Perinatal outcomes: stillbirth, any complication (presence of at least one complication in the neonate within the first seven days of life), birth weight > 4000g, birth weight < 2500g, preterm birth (any birth that occurs between gestation ages of 28⁺0 weeks to 36⁺6 weeks), congenital anomalies (the presence of at least one congenital anomaly in the neonate as diagnosed by the neonatologist), severe birth asphyxia (APGAR score of three or less at the first minute of birth), hypoxic ischaemic encephalopathy (HIE), neonatal intensive care unit (NICU) admission (admission of the neonate into the NICU within the first seven days of birth regardless of the indication for admission) and early neonatal death (death of a neonate within the first seven days of birth).

Statistical analysis

Categorical variables were summarised and presented as frequencies and percentages. The chi-square test or Fisher's exact test, where appropriate, was used to compare socio-demographic and obstetric variables between groups. For the maternal and perinatal outcomes, generalized linear mixed models were used to determine the odds ratios with 95% CIs. Using the same models, the adjusted odds ratios with adjusted 95% CIs were determined after controlling for the woman's educational levels, husband/partner's occupation, presence of chronic medical conditions, referral status, booking status and presence of pregnancy complications. A p-value of < 0.05 was considered statistically significant. The data were analysed using R/RStudio programming for statistical analysis (version 4.3.2).

Missing Data

The number of women with missing variables varied for different variables. For the sociodemographic and obstetric characteristics, all the variables had missing data of less than 3.0%, except the educational status of the woman which had 7.7% of the data missing. For the maternal outcomes, the variable with the highest proportion of missing data was caesarean section with 0.8% of the data missing. Regarding the perinatal outcomes, all the variables had less than 2.0% missing data, except preterm births, where the missing data was 7.8%.

Results

Data from 171,125 women were analysed, of which 5,944 were teenagers, giving a prevalence of teenage pregnancy to be 3.5% (95%CI 3.39%-3.56%). Of these teenage pregnancies, 83.5% were women living in the North, while 16.5% were women living in the South. In the North, there were 4,962 teenage pregnancies out of 103,434 women giving a prevalence of 4.8%, while in the South there were 982 teenage pregnancies out of 67,691 giving a prevalence of 1.5%. The proportion of teenage pregnancies was significantly higher in the Northern compared to the Southern regions ($p < 0.001$). The highest proportion of teenage pregnancies were found in the Northeast (36.5%) and Northwest (36.0%) regions, while the lowest were in the Southeast (3.7%) and Southsouth (3.8%). Table 1 shows the prevalence of teenage pregnancies by regions in Nigeria. Most of the teenage pregnancies in all the regions were women aged 18–19 years (69.7% to 80.0%).

Table 2 shows the comparison of sociodemographic and obstetric characteristics of the teenage and non-teenage pregnancies by regions in Nigeria. All the sociodemographic characteristics studied in the teenage pregnancies showed significant differences between the North and the South. Teenage pregnant women in the North had lower levels of education compared to those in the South, with 33.1% having no formal education in the North compared with only 1.6% in the South ($p < 0.001$). Also, a higher proportion of those in the North had no employment (76.5%) compared to the South (60.5%), and the difference was significant ($p < 0.001$). There were significantly more Muslims in the North and Christians in the South ($p < 0.001$).

Significant differences were also observed in the obstetric characteristics of pregnant teenage women in the North and South. In the North, 14.6% were multiparous compared with 6.8% in the South ($p < 0.001$). In the South, 7.9% had a history of a previous miscarriage, which is higher than 4.9% reported in the North ($p < 0.001$). Pregnancy complications also occurred more frequently in the North (18.2%) compared to the South (10.3%), and the difference was significant ($p < 0.001$). Preeclampsia and antepartum/intrapartum eclampsia occurred more frequently in the North than in the South ($p < 0.001$). A higher proportion of pregnant teenagers in the North had no antenatal care compared to the South ($p < 0.001$). No significant differences were observed between the North and the South teenage pregnant women regarding presence of chronic medical disorder before pregnancy, as well as the occurrence of PIH and abruptio placenta.

The comparison of socio-demographic and obstetric characteristics between teenage and non-teenage pregnancies is shown in Table 3. Up to 7.2% of the teenage pregnant women were single, compared with 0.8% among the non-teenage pregnancies ($p < 0.001$). Also, 27.5% and 73.8% of the teenage pregnant women had no formal education and no employment, respectively, and these were higher than 7.5% ($p < 0.001$) and 36.3% ($p < 0.001$) respectively, found in the older women.

Over four out of five (86.6%) of the teenage pregnant women were nulliparous compared with 29.3% in older women ($p < 0.001$). The rate of chronic medical disorders was significantly higher among older women ($p < 0.001$), while pregnancy complications were significantly more frequent among the teenagers ($p < 0.001$). Only PIH occurred more commonly among the older women ($p = 0.001$), while preeclampsia and antepartum/intrapartum eclampsia occurred significantly more frequently among the teenagers ($p < 0.001$). There were no significant differences in the rates of abruptio placenta. Among the teenagers, 26.1% had no antenatal care, and this was higher than 9.2% in the non-teenage population ($p < 0.001$).

Table 4 shows the maternal outcomes of teenage pregnancies compared with pregnancies in non-teenage women. The caesarean section rates were notably lower among teenagers, who had a 23% reduced likelihood of undergoing a caesarean section compared to non-teenage pregnancies (aOR 0.73, 95% CI 0.68–0.78). Postpartum eclampsia on the other hand occurred more frequently in the teenagers. There was an 85% increase in the odds of having an eclampsia in teenage pregnancies compared to non-teenage pregnancies (aOR 1.85, 95%CI 1.39–2.50). There were no significant differences observed in the rate of induction of

labour (aOR 0.98, 95%CI 0.81–1.18), spontaneous vaginal delivery (aOR 0.96, 95%CI 0.87–1.05) and prolonged labour (aOR 0.94, 95%CI 0.82–1.07). There were also no significant differences observed in the rates of 3rd and 4th degree perineal tears (aOR 0.84, 95%CI 0.49–1.41), postpartum haemorrhage (aOR 1.05, 95%CI 0.84–1.32), maternal intensive care unit (ICU) admission (aOR 0.95, 95%CI 0.57–1.56) and maternal death (aOR 1.02, 95%CI 0.72–1.45).

The comparison of perinatal outcomes of between teenage and non-teenage pregnancies is shown in Table 5. Stillbirth rate occurred in 2.6% of teenage pregnancies and 1.5% of non-teenage pregnancies. Following multivariate analysis, the odds of having a still birth were increased by 31% in the teenage women (aOR 1.31, 95%CI 1.09–1.57) and this was statistically significant.

Neonatal complications occurred more frequently among the teenage pregnancies (12.4%) compared with the adult pregnancies (9.2%). The odds of having neonatal complications were lower in the non-teenage women compared to the teenage women and this was statistically significant (aOR 1.16, 95%CI 1.06–1.28). Significant differences were also observed in the birth weights of babies born to teenagers and adult women. The odds of having a baby with macrosomia were reduced by 63% in the teenage women (aOR 0.37, 95%CI 0.28–0.49) while their odds of having a low-birth-weight babies was increased (aOR 1.12, 95%CI 1.04–1.20). Preterm births and severe birth asphyxia also occurred more frequently among the teenagers respectively in the non-teenage women (preterm birth aOR 1.25, 95%CI 1.15–1.35, birth asphyxia aOR 1.20, 95%CI 1.10–1.32).

There were no statistically significant differences observed in the rates of congenital anomalies (aOR 0.96, 95%CI 0.55–1.66), HIE (aOR 1.19, 95%CI 0.61–2.33), proportion of neonates dead by 7th day of life (aOR 1.12, 95%CI 0.98–1.28), and neonatal admission into SCBU (aOR 1.06, 95%CI 0.97–1.15).

Table 1
Prevalence of teenage pregnancy by regions in Nigeria

Characteristic	Teenage Pregnancy by region					
	9–11 yrs, N = 14	12–13 yrs, N = 13	14–15 yrs, N = 173	16–17 yrs, N = 1,175	18–19 yrs, N = 4,569	Overall, N = 5,944
Region, n/N (%)						
Northcentral	1/650 (0.2%)	1/650 (0.2%)	10/650 (1.5%)	118/650 (18.2%)	520/650 (80.0%)	650/650 (100.0%)
Northwest	8/2,142 (0.4%)	1/2,142 (0.0%)	69/2,142 (3.2%)	413/2,142 (19.3%)	1,651/2,142 (77.1%)	2,142/2,142 (100.0%)
Northeast	3/2,170 (0.1%)	3/2,170 (0.1%)	48/2,170 (2.2%)	444/2,170 (20.5%)	1,672/2,170 (77.1%)	2,170/2,170 (100.0%)
Southwest	2/535 (0.4%)	5/535 (0.9%)	17/535 (3.2%)	102/535 (19.1%)	409/535 (76.4%)	535/535 (100.0%)
Southsouth	0/228 (0.0%)	2/228 (0.9%)	18/228 (7.9%)	49/228 (21.5%)	159/228 (69.7%)	228/228 (100.0%)
Southeast	0/219 (0.0%)	1/219 (0.5%)	11/219 (5.0%)	49/219 (22.4%)	158/219 (72.1%)	219/219 (100.0%)

Table 2
Socio-demographic and obstetric characteristics of teenage pregnancies by regions in Nigeria

Characteristic	Teenage Pregnancy Characteristics between regions			p-value
	North, N = 4,962	South, N = 982	Overall, N = 5,944	
Marital Status, n/N (%)				< 0.0001*
Single	112/4,954 (2.3%)	314/978 (32.1%)	426/5,932 (7.2%)	
Married/Cohabiting	4,830/4,954 (97.5%)	664/978 (67.9%)	5,494/5,932 (92.6%)	
Separated/Divorced	9/4,954 (0.2%)	0/978 (0.0%)	9/5,932 (0.2%)	
Widowed	3/4,954 (0.1%)	0/978 (0.0%)	3/5,932 (0.1%)	
Woman's education level, n/N (%)				< 0.0001*
No formal education	1,458/4,403 (33.1%)	15/959 (1.6%)	1,473/5,362 (27.5%)	
Primary	345/4,403 (7.8%)	126/959 (13.1%)	471/5,362 (8.8%)	
Secondary	2,313/4,403 (52.5%)	731/959 (76.2%)	3,044/5,362 (56.8%)	
Tertiary	283/4,403 (6.4%)	86/959 (9.0%)	369/5,362 (6.9%)	
Postgraduate****	4/4,403 (0.1%)	1/959 (0.1%)	5/5,362 (0.1%)	
Woman's Occupation, n/N (%)				< 0.0001*
Not employed	3,672/4,803 (76.5%)	586/969 (60.5%)	4,258/5,772 (73.8%)	
Professional/technical/managerial	21/4,803 (0.4%)	21/969 (2.2%)	42/5,772 (0.7%)	
Civil Servant/Administrative/clerical	43/4,803 (0.9%)	13/969 (1.3%)	56/5,772 (1.0%)	
Sales/trading	232/4,803 (4.8%)	145/969 (15.0%)	377/5,772 (6.5%)	
Farmer/Manual	116/4,803 (2.4%)	140/969 (14.4%)	256/5,772 (4.4%)	
Unknown**	719/4,803 (15.0%)	64/969 (6.6%)	783/5,772 (13.6%)	
Husband's Occupation, n/N (%)				< 0.0001*
Not employed	112/4,803 (2.3%)	31/962 (3.2%)	143/5,765 (2.5%)	
Professional/technical/managerial	87/4,803 (1.8%)	40/962 (4.2%)	127/5,765 (2.2%)	
Civil Servant/Administrative/clerical	977/4,803 (20.3%)	42/962 (4.4%)	1,019/5,765 (17.7%)	
Sales/trading	1,520/4,803 (31.6%)	222/962 (23.1%)	1,742/5,765 (30.2%)	
Farmer/Manual/Labourer	1,054/4,803 (21.9%)	106/962 (11.0%)	1,160/5,765 (20.1%)	
Unknown***	929/4,803 (19.3%)	207/962 (21.5%)	1,136/5,765 (19.7%)	
Single	124/4,803 (2.6%)	314/962 (32.6%)	438/5,765 (7.6%)	

Characteristic	Teenage Pregnancy Characteristics between regions			p-value
	North, N = 4,962	South, N = 982	Overall, N = 5,944	
Tribe, n/N (%)				< 0.0001*
Hausa	2,908/4,920 (59.1%)	33/972 (3.4%)	2,941/5,892 (49.9%)	
Yoruba	106/4,920 (2.2%)	447/972 (46.0%)	553/5,892 (9.4%)	
Igbo	54/4,920 (1.1%)	274/972 (28.2%)	328/5,892 (5.6%)	
Others**	1,852/4,920 (37.6%)	218/972 (22.4%)	2,070/5,892 (35.1%)	
Religion, n/N (%)				< 0.0001*
Christianity	352/4,929 (7.1%)	795/973 (81.7%)	1,147/5,902 (19.4%)	
Islam	4,564/4,929 (92.6%)	178/973 (18.3%)	4,742/5,902 (80.3%)	
Traditional	10/4,929 (0.2%)	0/973 (0.0%)	10/5,902 (0.2%)	
Others***	3/4,929 (0.1%)	0/973 (0.0%)	3/5,902 (0.1%)	
Parity, n/N (%)				< 0.0001*
Nullipara (0)	4,230/4,961 (85.3%)	915/982 (93.2%)	5,145/5,943 (86.6%)	
Multipara (1–4)	722/4,961 (14.6%)	67/982 (6.8%)	789/5,943 (13.3%)	
Grandmultipara (> 4)	9/4,961 (0.2%)	0/982 (0.0%)	9/5,943 (0.2%)	
Woman has had a previous miscarriage, n/N (%)				< 0.0001*
No	4,607/4,845 (95.1%)	869/944 (92.1%)	5,476/5,789 (94.6%)	
Yes	238/4,845 (4.9%)	75/944 (7.9%)	313/5,789 (5.4%)	
Chronic medical disorder (pre-pregnancy), n/N (%)				0.3320
No	4,869/4,912 (99.1%)	969/974 (99.5%)	5,838/5,886 (99.2%)	
Yes	43/4,912 (0.9%)	5/974 (0.5%)	48/5,886 (0.8%)	
Pregnancy complications, n/N (%)				< 0.0001*
No	4,025/4,921 (81.8%)	875/976 (89.7%)	4,900/5,897 (83.1%)	
Yes	896/4,921 (18.2%)	101/976 (10.3%)	997/5,897 (16.9%)	
PIH, n/N (%)				0.4000
No	4,783/4,921 (97.2%)	943/976 (96.6%)	5,726/5,897 (97.1%)	

Characteristic	Teenage Pregnancy Characteristics between regions			p-value
	North, N = 4,962	South, N = 982	Overall, N = 5,944	
Yes	138/4,921 (2.8%)	33/976 (3.4%)	171/5,897 (2.9%)	
Preeclampsia, n/N (%)				< 0.0001*
No	4,533/4,921 (92.1%)	943/976 (96.6%)	5,476/5,897 (92.9%)	
Yes	388/4,921 (7.9%)	33/976 (3.4%)	421/5,897 (7.1%)	
Antepartum/intrapartum eclampsia, n/N (%)				< 0.0001*
No	4,551/4,921 (92.5%)	943/976 (96.6%)	5,494/5,897 (93.2%)	
Yes	370/4,921 (7.5%)	33/976 (3.4%)	403/5,897 (6.8%)	
Abruptio placentae, n/N (%)				0.3986
No	4,880/4,921 (99.2%)	964/976 (98.8%)	5,844/5,897 (99.1%)	
Yes	41/4,921 (0.8%)	12/976 (1.2%)	53/5,897 (0.9%)	
Antenatal care, n/N (%)				< 0.0001*
No antenatal care	1,337/4,909 (27.2%)	197/973 (20.2%)	1,534/5,882 (26.1%)	
ANC at the same health facility	2,191/4,909 (44.6%)	517/973 (53.1%)	2,708/5,882 (46.0%)	
ANC at another health facility	1,361/4,909 (27.7%)	244/973 (25.1%)	1,605/5,882 (27.3%)	
ANC at a non-health facility	20/4,909 (0.4%)	15/973 (1.5%)	35/5,882 (0.6%)	
Referral status, n/N (%)				< 0.0001*
Not referred or self-referred	3,669/4,961 (74.0%)	715/982 (72.8%)	4,384/5,943 (73.8%)	
Referred from public or private hospital	1,247/4,961 (25.1%)	238/982 (24.2%)	1,485/5,943 (25.0%)	
Referred from informal setting	45/4,961 (0.9%)	29/982 (3.0%)	74/5,943 (1.2%)	
Pearson's Chi-squared test/Fishers exact, Abbreviations: PIH=pregnancy induced hypertension *significant, **Others: Over 20 other minor ethnic groups in Nigeria ***Others: Buddhism, Atheism, Judaism ****Postgraduate: academic or professional qualification obtained after undergraduate degree				

Table 3
Comparison of socio-demographic and obstetric characteristics between teenage and non-teenage pregnancies

Characteristic	Socio-demographic and obstetric characteristics of all women			p-value
	9–19 years, N = 5,944	20–55 years, N = 165,181	Overall, N = 171,125	
Marital Status, n/N (%)				< 0.0001*
Single	426/5,932 (7.2%)	1,245/164,688 (0.8%)	1,671/170,620 (1.0%)	
Married/Cohabiting	5,494/5,932 (92.6%)	163,263/164,688 (99.1%)	168,757/170,620 (98.9%)	
Separated/Divorced	9/5,932 (0.2%)	160/164,688 (0.1%)	169/170,620 (0.1%)	
Widowed	3/5,932 (0.1%)	20/164,688 (0.0%)	23/170,620 (0.0%)	
Woman's education level, n/N (%)				< 0.0001*
No formal education	1,473/5,362 (27.5%)	11,481/152,650 (7.5%)	12,954/158,012 (8.2%)	
Primary	471/5,362 (8.8%)	4,587/152,650 (3.0%)	5,058/158,012 (3.2%)	
Secondary	3,044/5,362 (56.8%)	66,967/152,650 (43.9%)	70,011/158,012 (44.3%)	
Tertiary	369/5,362 (6.9%)	67,554/152,650 (44.3%)	67,923/158,012 (43.0%)	
Postgraduate****	5/5,362 (0.1%)	2,061/152,650 (1.4%)	2,066/158,012 (1.3%)	
Woman's Occupation, n/N (%)				< 0.0001*
Not employed	4,258/5,772 (73.8%)	58,476/161,038 (36.3%)	62,734/166,810 (37.6%)	
Professional/technical/managerial	42/5,772 (0.7%)	10,780/161,038 (6.7%)	10,822/166,810 (6.5%)	
Civil Servant/Administrative/clerical	56/5,772 (1.0%)	26,661/161,038 (16.6%)	26,717/166,810 (16.0%)	
Sales/trading	377/5,772 (6.5%)	39,870/161,038 (24.8%)	40,247/166,810 (24.1%)	
Farmer/Manual	256/5,772 (4.4%)	11,155/161,038 (6.9%)	11,411/166,810 (6.8%)	
Unknown	783/5,772 (13.6%)	14,096/161,038 (8.8%)	14,879/166,810 (8.9%)	
Husband's Occupation, n/N (%)				< 0.0001*
Not employed	143/5,765 (2.5%)	1,466/160,232 (0.9%)	1,609/165,997 (1.0%)	
Professional/technical/managerial	127/5,765 (2.2%)	15,013/160,232 (9.4%)	15,140/165,997 (9.1%)	
Civil Servant/Administrative/clerical	1,019/5,765 (17.7%)	54,929/160,232 (34.3%)	55,948/165,997 (33.7%)	

Characteristic	Socio-demographic and obstetric characteristics of all women			p-value
	9–19 years, N = 5,944	20–55 years, N = 165,181	Overall, N = 171,125	
Sales/trading	1,742/5,765 (30.2%)	44,335/160,232 (27.7%)	46,077/165,997 (27.8%)	
Farmer/Manual	1,160/5,765 (20.1%)	13,013/160,232 (8.1%)	14,173/165,997 (8.5%)	
Unknown	1,136/5,765 (19.7%)	30,051/160,232 (18.8%)	31,187/165,997 (18.8%)	
Single	438/5,765 (7.6%)	1,425/160,232 (0.9%)	1,863/165,997 (1.1%)	
Tribe, n/N (%)				< 0.0001*
Hausa	2,941/5,892 (49.9%)	44,002/163,345 (26.9%)	46,943/169,237 (27.7%)	
Yoruba	553/5,892 (9.4%)	35,290/163,345 (21.6%)	35,843/169,237 (21.2%)	
Igbo	328/5,892 (5.6%)	27,612/163,345 (16.9%)	27,940/169,237 (16.5%)	
Other**	2,070/5,892 (35.1%)	56,441/163,345 (34.6%)	58,511/169,237 (34.6%)	
Religion, n/N (%)				< 0.0001*
Christianity	1,147/5,902 (19.4%)	84,837/163,516 (51.9%)	85,984/169,418 (50.8%)	
Islam	4,742/5,902 (80.3%)	78,379/163,516 (47.9%)	83,121/169,418 (49.1%)	
Traditional	10/5,902 (0.2%)	164/163,516 (0.1%)	174/169,418 (0.1%)	
Others***	3/5,902 (0.1%)	136/163,516 (0.1%)	139/169,418 (0.1%)	
Parity, n/N (%)				< 0.0001*
Nullipara (0)	5,145/5,943 (86.6%)	48,445/165,164 (29.3%)	53,590/171,107 (31.3%)	
Multipara (1–4)	789/5,943 (13.3%)	103,037/165,164 (62.4%)	103,826/171,107 (60.7%)	
Grandmultipara (> 4)	9/5,943 (0.2%)	13,682/165,164 (8.3%)	13,691/171,107 (8.0%)	
Woman has had a previous miscarriage, n/N (%)				< 0.0001*
No	5,476/5,789 (94.6%)	117,871/161,365 (73.0%)	123,347/167,154 (73.8%)	
Yes	313/5,789 (5.4%)	43,494/161,365 (27.0%)	43,807/167,154 (26.2%)	
Chronic medical disorder (pre-pregnancy), n/N (%)				< 0.0001*
No	5,838/5,886 (99.2%)	158,767/163,353 (97.2%)	164,605/169,239 (97.3%)	

Characteristic	Socio-demographic and obstetric characteristics of all women			p-value
	9–19 years, N = 5,944	20–55 years, N = 165,181	Overall, N = 171,125	
Yes	48/5,886 (0.8%)	4,586/163,353 (2.8%)	4,634/169,239 (2.7%)	
Pregnancy complications, n/N (%)				< 0.0001*
No	4,900/5,897 (83.1%)	148,699/163,271 (91.1%)	153,599/169,168 (90.8%)	
Yes	997/5,897 (16.9%)	14,572/163,271 (8.9%)	15,569/169,168 (9.2%)	
PIH, n/N (%)				0.0001*
No	5,726/5,897 (97.1%)	157,227/163,271 (96.3%)	162,953/169,168 (96.3%)	
Yes	171/5,897 (2.9%)	6,044/163,271 (3.7%)	6,215/169,168 (3.7%)	
Preeclampsia, n/N (%)				< 0.0001*
No	5,476/5,897 (92.9%)	157,675/163,271 (96.6%)	163,151/169,168 (96.4%)	
Yes	421/5,897 (7.1%)	5,596/163,271 (3.4%)	6,017/169,168 (3.6%)	
Antepartum/intrapartum eclampsia, n/N (%)				< 0.0001*
No	5,494/5,897 (93.2%)	162,033/163,271 (99.2%)	167,527/169,168 (99.0%)	
Yes	403/5,897 (6.8%)	1,238/163,271 (0.8%)	1,641/169,168 (1.0%)	
Abruptio placentae, n/N (%)				0.3000
No	5,844/5,897 (99.1%)	162,000/163,271 (99.2%)	167,844/169,168 (99.2%)	
Yes	53/5,897 (0.9%)	1,271/163,271 (0.8%)	1,324/169,168 (0.8%)	
Antenatal care, n/N (%)				< 0.0001*
No antenatal care	1,534/5,882 (26.1%)	15,069/163,331 (9.2%)	16,603/169,213 (9.8%)	
ANC at the same health facility	2,708/5,882 (46.0%)	123,770/163,331 (75.8%)	126,478/169,213 (74.7%)	
ANC at another health facility	1,605/5,882 (27.3%)	24,028/163,331 (14.7%)	25,633/169,213 (15.1%)	
ANC at a non-health facility	35/5,882 (0.6%)	464/163,331 (0.3%)	499/169,213 (0.3%)	
Referral status, n/N (%)				< 0.0001*
Not referred or self-referred	4,384/5,943 (73.8%)	145,597/165,178 (88.1%)	149,981/171,121 (87.6%)	

Characteristic	Socio-demographic and obstetric characteristics of all women			
	9–19 years, N = 5,944	20–55 years, N = 165,181	Overall, N = 171,125	p-value
Referred from public or private hospital	1,485/5,943 (25.0%)	18,718/165,178 (11.3%)	20,203/171,121 (11.8%)	
Referred from informal setting	74/5,943 (1.2%)	863/165,178 (0.5%)	937/171,121 (0.5%)	
Pearson's Chi-squared test/Fisher's exact test, Abbreviations; PIH= pregnancy induced hypertension; ANC= antenatal care				
*significant;				
**Others: Over 20 other minor ethnic groups in Nigeria				
***Others: Buddhism, Atheism, Judaism				

Table 4
Comparison of maternal outcomes of teenage and non-teenage pregnancies

Characteristic	9–19 years, N = 5,944	20–55 years, N = 165,181	Overall, N = 171,125	Unadjusted OR	Unadjusted P-value	Adjusted OR	Adjusted P-value
Induction of labour, n/N (%)	154/4,978 (3.1%)	5,170/125,964 (4.1%)	5,324/130,942 (4.1%)	0.75 (0.63;0.88)	0.0007	0.98 (0.81;1.18)	0.8346
Spontaneous vaginal delivery, n/N (%)	4,146/4,978 (83.3%)	107,588/125,964 (85.4%)	111,734/130,942 (85.3%)	0.85 (0.79;0.92)	< 0.0001	0.96 (0.87;1.05)	0.3478
Prolonged labour, n/N (%)	315/4,033 (7.8%)	8,255/103,470 (8.0%)	8,570/107,503 (8.0%)	0.98 (0.87;1.10)	0.7357	0.94 (0.82;1.07)	0.3205
Caesarean section, n/N (%)	1,649/5,893 (28.0%)	55,413/163,876 (33.8%)	57,062/169,769 (33.6%)	0.76 (0.72;0.81)	< 0.0001	0.73 (0.68;0.78)	< 0.0001*
Any complication, n/N (%)	496/5,943 (8.3%)	7,878/165,172 (4.8%)	8,374/171,115 (4.9%)	1.82 (1.65;2.00)	< 0.0001	1.01 (0.99;1.22)	0.0900
Third and fourth degree perineal tears, n/N (%)	16/5,663 (0.3%)	433/140,707 (0.3%)	449/146,370 (0.3%)	0.92 (0.56;1.51)	0.7418	0.84 (0.49;1.41)	0.5033
Postpartum eclampsia, n/N (%)	79/5,943 (1.3%)	307/165,172 (0.2%)	386/171,115 (0.2%)	7.23 (5.64;9.28)	< 0.0001	1.85 (1.39;2.50)	< 0.0001*
Postpartum haemorrhage, n/N (%)	99/5,943 (1.7%)	2,266/165,172 (1.4%)	2,365/171,115 (1.4%)	1.22 (0.99;1.49)	0.0566	1.05 (0.84;1.32)	0.6481
Maternal death, n/N (%)	41/5,944 (0.7%)	484/165,181 (0.3%)	525/171,125 (0.3%)	2.36 (1.72;3.25)	< 0.0001	1.02 (0.72;1.45)	0.9051
Maternal ICU admission, n/N (%)	17/5,926 (0.3%)	510/165,024 (0.3%)	527/170,950 (0.3%)	0.93 (0.57;1.51)	0.7703	0.95 (0.57;1.56)	0.8336
*significant							

Table 5
Comparison of perinatal outcomes of teenage and non-teenage pregnancies

Characteristic	9–19 yrs, N = 6,092	20–55 yrs, N = 171,485	Overall, N = 177,577	Unadjusted OR	Unadjusted P-value	Adjusted OR	Adjusted P-value
Stillbirth, n/N (%)	159/6,092 (2.6%)	2,509/171,482 (1.5%)	2,668/177,574 (1.5%)	1.83 (1.53;2.12)	< 0.0001	1.31 (1.09;1.57)	0.0034*
Any complication, n/N (%)	731/5,916 (12.4%)	15,479/168,099 (9.2%)	16,210/174,015 (9.3%)	1.39 (1.28;1.50)	< 0.0001	1.16 (1.06;1.28)	0.0013*
Birth weight > 4000g, n/N (%)	49/5,997 (0.8%)	5,180/169,684 (3.1%)	5,229/175,681 (3.0%)	0.26 (0.20;0.35)	< 0.0001	0.37 (0.28;0.49)	< 0.0001*
Birth weight < 2500g, n/N (%)	1,463/5,997 (24.4%)	24,546/169,684 (14.5%)	26,009/175,681 (14.8%)	1.91 (1.80;2.03)	< 0.0001	1.12 (1.04;1.20)	0.0020*
Preterm birth, n/N (%)	1,379/4,991 (27.6%)	24,917/158,679 (15.7%)	26,296/163,670 (16.1%)	2.05 (1.92;2.18)	< 0.0001	1.25 (1.15;1.35)	< 0.0001*
Congenital anomalies, n/N (%)	14/5,916 (0.2%)	462/168,099 (0.3%)	476/174,015 (0.3%)	0.86 (0.51;1.47)	0.6700	0.96 (0.55;1.66)	0.8798
Severe birth asphyxia, n/N (%)	705/5,879 (12.0%)	8,546/167,691 (5.1%)	9,251/173,570 (5.3%)	2.54 (2.34;2.75)	< 0.0001	1.20 (1.10;1.32)	0.0002*
HIE, n/N (%)	12/5,916 (0.2%)	161/168,099 (0.1%)	173/174,015 (0.1%)	2.12 (1.18;3.81)	0.0184	1.19 (0.61;2.33)	0.6152
Baby dead by 7th day of life, n/N (%)	322/6,092 (5.3%)	4,699/171,469 (2.7%)	5,021/177,561 (2.8%)	1.98 (1.76;2.22)	< 0.0001	1.12 (0.98;1.28)	0.1019
Admitted into NICU, n/N (%)	990/5,925 (16.7%)	21,309/168,666 (12.6%)	22,299/174,591 (12.8%)	1.39 (1.29;1.49)	< 0.0001	1.06 (0.97;1.15)	0.1727
*significant; Abbreviations: HIE= hypoxic ischaemic encephalopathy, NICU= neonatal intensive care unit							

Discussion

Despite the urgency of addressing teenage pregnancy, regional variations in prevalence, socio-demographics, and health outcomes remain underexplored in Nigeria. This study was motivated by the need to bridge this knowledge gap, providing region-specific evidence to inform targeted interventions and policy reforms aimed at improving teenage health and maternal-perinatal outcomes across Nigeria.

Prevalence of Teenage Pregnancy

The prevalence of teenage pregnancy in Nigeria, based on this study, was 3.5%, with a notable regional disparity: over four-fifths (83.5%) of cases were in the northern region, while less than one-fifth (16.5%) were in the southern region. This prevalence is lower than the range of 7.5% to 49.5% reported in a scoping review of teenage pregnancy in Nigeria.² The scoping review analyzed 28 studies published between 2007 and 2015, encompassing 15 years. Several of the studies included in that review were community-based and employed varying definitions of adolescent pregnancy, with most defining it as pregnancy occurring in adolescents aged 10–19 years. The lower prevalence observed in our study could be attributed to its setting. Unlike community-based studies, which capture all pregnant adolescents within a given population, our study was conducted in tertiary health centers. As a result, it likely reflects only those adolescents who sought care at these health facilities. This difference in methodology and population scope may explain the discrepancy in prevalence rates. In addition, the lower prevalence found in this study compared to the scoping review may be a reflection of the declining prevalence of teenage pregnancy in Nigeria as reported in the last three National Demographic and Health Surveys (NDHS), which showed a declining prevalence of 23%, 19% and 15% among teenagers aged 15–19 years in 2013, 2018 and 2024 respectively.^{3,4,8}

Sociodemographic Characteristics

The study revealed a marked difference in the sociodemographic and obstetric characteristics between the teenagers and non-teenage population. Teenagers were more likely to be single, have no formal education and unemployed. They were also more likely to be nulliparous, unbooked with no known chronic medical disorder. They, however, were more likely to develop complications in the pregnancy, including preeclampsia and eclampsia. These findings agree with the findings of a national cross-sectional study using the 2018 NDHS data that was conducted to determine the socioeconomic inequalities in teenage pregnancy in Nigeria.¹⁰ Similar to this study, that study found that teenage pregnancies occur more predominantly in teenagers with low socio-economic status. Many of the teenagers in that study were also found to be single, with no formal education, with most residing in rural areas in the Northern part of the country. These are situations associated with poverty, and poverty is both a determinant and a consequence of teenage pregnancy.¹¹ A review of maternal health service utilization of adolescent women in sub-Saharan Africa revealed that a significant number of pregnant adolescents do not access or use maternity services during pregnancy, similar to the findings in this study.¹²

Comparing the sociodemographic characteristics of teenage pregnant mothers between the northern and the southern regions also revealed major differences. Understanding these differences may be useful in designing targeted, tailored interventions and policies for teenage pregnancy reduction and improving the pregnancy outcomes in this high-risk group in each region. The North had more married, Hausa, Muslims, with no formal education, while the South had more single, Yoruba, Christians, with a secondary level of education. Preeclampsia and eclampsia as well as unbooked status, were significantly more common among the pregnant teenagers in the North than in the South. The clinical significance of this finding lies in its potential to guide region-specific interventions and policies aimed at reducing teenage pregnancies and improving outcomes for this high-risk group. The findings buttress the need for culturally and contextually tailored strategies that address the distinct socio-demographic and obstetric differences between regions.

Maternal Outcomes

Many of the maternal intrapartum and postpartum outcomes evaluated in this study showed no significant differences between the teenage pregnant women and the non-teenage group of women. The proportion of women who had labour induction, spontaneous vaginal delivery, prolonged labour, any complication, third- and fourth-degree perineal tears, postpartum haemorrhage, maternal death and admission into the intensive care unit were similar between the two groups of women. A study in a tertiary hospital in Nigeria also found the obstetric outcomes of labour induction, spontaneous vaginal delivery, perineal tears, and postpartum haemorrhage in teenage pregnancy were comparable to their adult counterparts.¹³ Eclampsia on the other hand occurred significantly more frequently among the teenagers, while caesarean section was significantly more frequent among the non-teenage women. A review of maternal outcomes of teenage pregnancies compared to non-teenage pregnancies in sub-Saharan Africa showed largely similar findings with significantly higher rates of eclampsia among the teenagers, while the rates of labour induction, spontaneous vaginal delivery and postpartum haemorrhage were similar.¹⁴

The higher rate of preeclampsia/eclampsia among teenage pregnant women is not unexpected, as it is a well-documented phenomenon.¹ Research suggests that the increased risk of preeclampsia in teenage pregnancies may be linked to uterine immaturity, leading to defective placentation and adverse reproductive outcomes.¹⁵ A higher rate of PIH was observed among adult pregnancies. This may be attributable to undiagnosed chronic hypertension, first recognized during the second half of pregnancy in individuals previously unaware of their hypertensive status. Additionally, the presence of underlying chronic medical conditions, which was significantly higher among the adults, could have predisposed them to the development of PIH.

These comparable rates of adverse maternal outcomes between the teenagers and non-teenagers may not be surprising, as the women in this study were all managed in tertiary/referral level health facilities with good expertise and care. The higher rate of caesarean section among the non-teenage women was also found in another study.¹⁶ The non-teenage women had more fetal macrosomia, which may explain why they had more caesarean sections compared to the teenage pregnancies who had significantly more low birth weight babies. A six-year review of adverse maternal and neonatal outcomes in the United States, involving 12 clinical centres and 19 hospitals, revealed that teenagers had higher risks of preeclampsia and lower risks of caesarean section, similar to the findings in this study.¹⁷

Unlike the maternal outcomes, the perinatal outcomes evaluated in this study showed more significant differences between the teenage and non-teenage pregnant women. The rates of stillbirth, neonatal complications, low birthweight babies, preterm births and severe birth asphyxia were significantly higher among the teenagers, while the rate of fetal macrosomia was higher among the non-teenage population. The higher rates of preterm births may be associated with the increased incidence of low birth weight and severe birth asphyxia, as these conditions are often consequential outcomes of preterm delivery. Similarly, the higher rates of stillbirth might be due to higher rates of pregnancy complications. There were no differences in the rates of congenital anomalies, hypoxic ischaemic encephalopathy (HIE), early neonatal death and admission into the neonatal intensive care unit.

While other studies in Nigeria have also reported increased perinatal complications associated with teenage pregnancies, the various complications found to be significantly associated with teenage pregnancies differ, with most reporting increased rates of stillbirths, preterm delivery and low birth weight associated with teenage pregnancies.^{18–20} The higher rates of preterm births among teenage mothers in this study may be attributed to several factors. Possible reasons include iatrogenic preterm deliveries following complications such as preeclampsia and eclampsia, as well as suspected micronutrient deficiencies, which may be linked to poor antenatal care attendance and the low socioeconomic status observed among the teenagers. Additionally, an increased rate of malaria, which has been identified in a previous study as a significant contributor to preterm births, could also play a role.²¹ Although micronutrient deficiencies and malaria were not specifically assessed in this study, they may be particularly expected given the higher proportion of primigravidae and unbooked cases in the teenage group, indicating that they did not benefit from antenatal supplementation or malaria prevention strategies. These factors may have contributed to the higher rates of preterm delivery observed, as micronutrient deficiency and malaria have been found to predispose to preterm delivery.^{21–24}

An observational multi-country review of data from four Sub-Saharan countries over four years also showed increased risk of adverse perinatal outcomes, particularly stillbirth, preterm birth and low birth weight, among teenage pregnancies compared to adult pregnancies.²⁵ However, studies conducted in high-income countries on maternal and perinatal outcomes of teenage pregnancies report similar findings, with higher rates of severe preeclampsia and preterm births, despite access to better antenatal care.²⁶ This highlights the critical importance of early pregnancy booking and timely initiation of preventive interventions for preeclampsia, as well as appropriate supplementation during pregnancy, to improve perinatal outcomes. The poorer perinatal outcomes likely stemmed from issues that were beyond prevention by the time of presentation in the labour room, complications that had developed earlier in pregnancy and could not be effectively mitigated at the point of delivery.

Implications for Healthcare Workers and Policy Makers

The findings from this study buttress the critical need for region-specific healthcare strategies to address the unique challenges faced by teenage mothers. Higher odds of adverse outcomes, such as preeclampsia, eclampsia, stillbirth, and preterm deliveries, reveal the importance of strengthening antenatal care services tailored for adolescents. Healthcare providers must prioritise early screening, prompt management of complications, and comprehensive counselling services for pregnant teenagers. Additionally, targeted community engagement and adolescent-focused reproductive health programmes could help reduce the burden of teenage pregnancies and associated complications in the short term.

Strengths and Limitations

To our knowledge, this is the first study investigating the comparison of the prevalence of teenage pregnancy by region, assessing the socio-demographic characteristics and obstetric profiles of pregnant teenagers across regions, and evaluating the maternal and perinatal outcomes of teenage and non-teenage pregnancies in a Nigerian national obstetrics population. The study's large sample size of 171,125 women across multiple regions in Nigeria, which includes both urban and rural settings, enhances the generalisability and reliability of the findings due to its robust, standardised data collection process. Regional stratification further enabled more multifaceted analysis, revealing disparities in teenage pregnancy outcomes. Given the strengths of the data and the robust methodology used in this study, our findings contribute to the growing body of literature on regional disparities and complications associated with teenage pregnancies. Despite these strengths, our study has some notable limitations. The study's reliance on secondary data, which was obtained from women attending referral/Tertiary health facilities, can only be generalised to teenagers attending these hospitals since the majority attend the primary and secondary level of care. Also, this being a cross-

sectional study where causality cannot be established, caution should be exercised in interpreting the findings regarding associations noted above. It should also be noted that a significant proportion of teenage pregnancies are unintended, and this may influence the outcome, however this was not considered in the analysis. Furthermore, a lack of qualitative insights restricts the exploration of unrecorded socio-cultural and contextual factors influencing teenage pregnancies. Additionally, potential inaccuracies in medical records and the exclusion of teenagers from tertiary hospitals may affect data quality and lead to underestimation of outcomes in less-equipped settings.

Future Studies

Based on the limitations highlighted above, we would recommend future prospective and mixed-method studies that would explore the pregnancy intentions, reasons for poor utilization and the barriers to antenatal care among teenagers.

Conclusion

Teenage pregnancy remains a critical issue in Nigeria, with marked regional disparities in prevalence and outcomes. Most cases are concentrated in the Northern region of the country, especially among married, Hausa, Muslim women with no formal education, while in the South, teenage mothers were more likely to be single, Yoruba, Christians with secondary education. Maternal outcomes were generally favourable, although the rates of preeclampsia and eclampsia were significantly higher. However, perinatal outcomes were poorer with higher rates of stillbirths, low birth weight, birth asphyxia, and preterm births.

Recommendation

Pregnant teenagers should be encouraged to seek care early in pregnancy and should routinely receive screening for preeclampsia at the time of booking, along with appropriate preventive measures and antenatal supplements.

Abbreviations

ANC
Antenatal Care
DHIS
2–District Health Information System 2
HIE
Hypoxic–Ischaemic Encephalopathy
ICU
Intensive Care Unit
MPD4QED
Maternal and Perinatal Database for Quality, Equity and Dignity
MRO
Medical Record Officer
NDHS
Nigeria Demographic and Health Survey
NHREC
National Health Research Ethics Committee
NICU
Neonatal Intensive Care Unit
OR
Odds Ratio
PIH
Pregnancy–Induced Hypertension
SCBU
Special Care Baby Unit
SVD

Declarations

Ethics approval and consent to participate:

This was a secondary analysis, and ethical clearance was deemed unnecessary. However, the primary study was approved by the WHO Human Reproduction Programme (HRP) Research Project Review Panel (protocol ID, A65930, 06 May 2018). WHO Ethics Review Committee (ID A65930, 05 June 2018) and the Nigerian National Health Research and Ethics Committee approved the study (ID NHREC/01/01/2007, 05 September 2018). Also, participating institutional review boards gave approval for the study while their management granted written approvals to participate in the programme's data collection, periodic analyses and reporting. At the individual level, consent was not required as the study did not involve direct interaction with women or their babies or interviews with medical staff. The data obtained from the primary study was well anonymised and did not contain any identifier for this secondary analysis. The study was performed according to the Declaration of Helsinki.

Consent for publication:

Not applicable

Competing interests:

The authors declare that they have no competing interests.

Funding:

This secondary analysis was privately funded by the authors.

Author Contribution

AA, AAO and ILM conceptualized the study, wrote and finalized the first draft of the proposal. GHS, TJ, IH read, edited and approved the final draft. All authors participated in the collection of the primary data. AA, AAO, ILM, NN, LT, GL, EE, EG and OA all participated in the secondary analysis of the data and drafted the tables, while AA and AAO wrote out the results and discussion. All authors read and approved the final manuscript.

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Data Availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Figures



Figure 1

Map of Nigeria showing the study sites