

# Prevalence, trends, and factors associated with teen motherhood in Nigeria: An analysis of the 2008-2018 Nigeria Demographic and Health Surveys.

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## Research Article

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# Abstract

**Backgrounds:** Teen pregnancy and childbearing are common in Nigeria, and understanding the complexities such as sociodemographic and economic factors including sexual and reproductive health knowledge and awareness among adolescents over time can trigger innovative approaches and interventions. This study intends to capture the patterns and associated factors of teen motherhood among sexually active adolescents (15-19 years) between 2008-2018.

**Methods:** The study data was extracted from 2008, 2013, and 2018 Nigeria Demographic and Health Surveys. Descriptive analysis was presented using frequencies and percentages; multivariable analysis was conducted using log-binomial logistic regression at a p-value <0.05. All analyses were performed using Stata 15.0, weighted and adjusted for the complex survey design and the population size.

**Results:** The prevalence of teen motherhood increased between the three successive survey waves, (50.9% vs 52.4% vs 55.2%) from 2008, 2013, and 2018. Although, the pooled adjusted analysis revealed no significant change over the 10-year period. Knowledge of modern contraceptive methods, primary education, non-Catholic Christians, residing in the South-South region, and those currently or formerly married were associated with increased risk of teen motherhood.

**Conclusion:** This study revealed an increase in the proportion of teen pregnancy and childbearing in Nigeria. Notably, there exist variations across age groups, geographic location, educational level, religious belief, marital and economic status. Interventions that ensure comprehensive sexuality education, girl child education and economic empowerment especially for school dropouts are advocated to reduce this menace.

## Introduction

Teenage pregnancy and childbirth is a global public health concern posing serious threats to the health and the general wellbeing of teenagers [1]. Teenage pregnancy and childbirth and their associated challenges are disproportionately endemic in low-and-middle income countries (LMICs) and remain the leading cause of death among adolescents aged 15–19 years [2]. While the global adolescent fertility rate is gradually declining, the number of childbirths to adolescents 15–19 years has increased [3, 4]. West Africa accounts for the highest proportion of childbirths to adolescents after East Asia, partly due to the increasing population of female adolescents in these regions[3–7]. It is forecasted that by 2030, Nigeria will have the highest population of adolescent girls between the ages 10 to 17 [7].

Indeed, each year in LMICs, adolescent girls aged 15 to 49 years have an estimated 21 million pregnancies, nearly half of which – 10 million are unintended while just more than a quarter – an estimated 5.7 million end in abortion, the majority of which occur in unsafe condition. This translates to an estimated 20,000 girls under the age of 18 giving birth [1, 8].

Also, these pregnancies are associated with adverse obstetric and perinatal outcomes such as episiotomy, puerperal endometritis, premature delivery, postpartum hemorrhage, preterm delivery, obstructed labor, low birth weight, and perinatal death [8–11].

Several factors account for the prevalence of teenage pregnancy, some of these factors include rural-urban differentials, poor socioeconomic status, early onset of menarche, peer pressure, limited education, poor reproductive health knowledge, and unsafe sexual practices [12–15]. Teenage girls often engage in unsafe behaviors just to conform to widely held societal stereotypes of what is deemed attractive by the opposite sex. Also, prior research has shown that several teenagers have poor knowledge of birth control measures due to the cultural inappropriateness of sex education in many places of the world [16]. Moreover, higher levels of teenage pregnancies are recorded in rural areas compared to urban settings and among girls from poor socioeconomic backgrounds [12, 15, 17].

In Nigeria, the adolescent fertility rate of 102 live births per 1,000 in 2020 was the highest in Africa and the growing size of the youthful population is likely to escalate an already worsening situation of maternal and child health outcomes as a result of increased teenage pregnancies [7, 18, 19]. This makes teenage pregnancies and births a major public health concern in Nigeria and the Federal Government has taken drastic steps to control this public health menace. For instance, in order to improve access to family planning and reproductive health services, the Federal Government allocated \$3 million for the procurement of reproductive health commodities in 2015 with an additional annual commitment of \$8.35 million proceeding the next four years following 2015 (Government of Nigeria, 2017), while UNFPA has supported the government of Nigeria with about \$75 million between 2011–2022 towards reproductive health commodities procurement and supply.

However, it remains unclear how these efforts aimed at controlling teenage pregnancy and childbirth in Nigeria are impacting the rate of teenage pregnancies and childbirth over time. Specifically, very little is known about the trend and factors associated with teen pregnancy and childbearing. Such knowledge is necessary to help policymakers and public health practitioners assess, directly or indirectly, the progress of the country in these very crucial outcomes of sexual and reproductive health after several years of targeted preventive interventions by the Federal Government. It will also be important to determine where higher burdens exist for strengthening control efforts. The authors therefore examined the patterns and associated factors of adolescents' pregnancy and childbearing between 2008–2018 in Nigeria.

## **Methods**

### **Data source and sampling procedure**

The data used for this study was extracted from 2008, 2013, and the most recent (2018) Nigeria Demographic and Health Surveys (NDHS). These three survey rounds were utilized to ascertain the patterns of pregnancy and childbearing among sexually active adolescents over the 10-years period as well as factors associated with this event. The DHS usually collects data that are comparable across

several survey waves to provide information on the country's demographic and health indicators, and these data are used to inform policies, monitor the progress and impact of programmes. The DHS adopts a multi-stage stratified cluster sampling. The first stage involves the selection of enumeration areas after the stratification of the country into urban and rural. Then, the next stage involved the selection of respondents from the selected households. Before pooling the datasets from the three DHS rounds, we denormalized the weight and adjusted for the population size of the adolescents for the different surveys using the World Bank Staff Estimates [20]. The total sample size of the pooled datasets was 9,106 adolescents and these included 2954, 3199, and 2953 adolescents from the 2008, 2013, and 2018 NDHS respectively.

## Variable description

### Outcome variable

This study captured the number of sexually active adolescents with either childbirth experience, are currently pregnant, or have had a terminated pregnancy. As a result, the following was extracted from the three surveys: **(1)** number of children ever born **(2)** currently pregnant, and **(3)** ever had a terminated pregnancy. In this study, adolescents who had at least a childbirth and/or are currently pregnant and/or ever had a terminated pregnancy were classified as teen motherhood. For the purpose of analysis, adolescents who have never had a terminated pregnancy, were not currently pregnant, and never experienced childbirth were coded as 0 whereas any adolescent with any of these experiences was coded as 1.

### Explanatory variable

The explanatory variables were: **(1)** survey rounds – 2008, 2013, and 2018 **(2)** sexual and socio-demographic variables which include – age at first sex classified as (< 15, 15–17 and 18–19), number of lifetime sexual partners (single vs multiple), marital union (never, currently and formerly in a union), level of education (none, primary, secondary and tertiary), wealth quintile (poorest, poorer, middle, richer and richest) and religion (Catholic, other Christians, Islam, and others) **(3)** Geographic characteristics – region (North Central, North East, North West, South East, South South, and South West), place of residence (urban and rural), ethnicity (Fulani, Hausa, Igbo, Yoruba, and other ethnic communities) and **(4)** knowledge and awareness – ever heard of STI (yes and no), knowledge of any contraceptive method (knows none, knows only folkloric or traditional method, knows modern method), comprehensive knowledge about HIV (yes and no) and exposure to mass media (yes and no).

The comprehensive knowledge about HIV was computed using 5 questions – **(I)** knowledge about the consistent use of condoms during sexual intercourse, **(II)** knowing that having only one uninfected faithful partner can reduce the chances of getting HIV, and **(III)** knowing that a healthy-looking person can have HIV positive, and rejecting the two most common local misconceptions about transmission or prevention of HIV, that **(IV)** one can be infected by HIV through mosquito bites or **(V)** by sharing foods with a person infected with AIDS. All respondents who answered correctly to all these questions were said

to have comprehensive knowledge about HIV. Also, we measured exposure to mass media using three questions – frequency of listening to the radio, watching television, and reading newspapers or magazines. Respondents without access to any of these three sources were referred to as not having access to mass media while those who had access to any of these sources less than once a week or at least once a week were classified as having access to mass media.

## Descriptive and Inferential Analysis

The percentage and frequency distribution of teen motherhood and sexual, demographic, geographic, awareness and knowledge of sexual and reproductive health characteristics of the respondents were computed for each of the three survey waves and also for the pooled years (2008, 2013, and 2018). Similarly, the prevalence of teen motherhood by respondents' background characteristics was computed for each of the three survey waves and also for the pooled datasets. We further presented the prevalence of teen motherhood by states within the 10 years of study using the spatial map. Also, collinearity among variables was inspected for the pooled datasets using the variance inflation factor [Mean VIF = 1.59; Minimum = 1.11 and Maximum = 2.99] and no multicollinearity issues were observed. The log-binomial regression was used to compute crude and adjusted relative risk of the association between teen motherhood and the sociodemographic, economic, sexual and reproductive health, knowledge and awareness factors. Similarly, we modelled the likelihood of each of the outcome variables (currently pregnant, had terminated pregnancy, and childbirth experience) with the selected risk factors.

## Results

### Descriptive results

The descriptive statistics of the adolescents' sexual, demographic, geographic, awareness and knowledge of sexual and reproductive health were presented in **Table 1**. More than half of the adolescents have had a motherhood experience (about four in 10 adolescents have had a childbirth experience, almost one in 10 are currently pregnant and one in 20 have had a terminated pregnancy – see Fig. 1) in the three survey rounds. Almost three in 10 adolescents initiated sex before age 15, while three in five were currently in a union and one in 10 adolescents had multiple sexual partners. A higher proportion of the adolescents (45.8%) had no education, were Muslims (60.4%), from the Northwestern region (37%), belonged to the Hausa ethnic group (35.3%), and resided in rural areas (73.4%). More than half of the respondents were in the poorest and poorer wealth quintiles. About one in four had no knowledge of any contraceptive methods, seven in 10 had no comprehensive knowledge about HIV and two in five had no exposure to mass media.

**\*\*Figure 1\*\***

**\*\*Insert Table 1\*\***

The trends in the prevalence of teen motherhood for the three survey waves were presented in **Table 2**. The prevalence of teen motherhood increased from 50.9% in 2008 to 52.4% in 2013 and 55.2% in 2018. Teen motherhood was highest among adolescents who initiated sex before age 15 compared to those who initiated sex at a latter age. Almost seven in 10 adolescents who were currently or formerly in a union had pregnancy or childbirth experience. Teen motherhood was highest among those with no education or primary education (almost seven in 10 adolescents) compared to those with secondary or higher education. There was an inverse relationship between teen motherhood and wealth status; lower wealth status was associated with a high adolescent pregnancy and childbearing. Almost seven in 10 of adolescents in the North East and North West region, and Hausa's or Fulani's' as well as those with no exposure to mass media have had a pregnancy or childbirth experience. Also, six in 10 adolescents residing in rural areas had been exposed to pregnancy and childbearing.

The geographical distribution of teen motherhood across the states is shown in **Fig. 2**; the Northern region had the highest prevalence of teen motherhood between 2008 and 2018. Almost seven in 10 adolescents residing in Bauchi and Gombe state in the Northeastern region, as well as Katsina and Kaduna in the Northwestern region including Niger in the Northcentral region had experienced teen motherhood while Lagos state ( $P = 17.4\%$ ; 95%CI: 11.7–25.0) has the lowest prevalence of teen motherhood in Nigeria.

**\*\*Figure 2\*\***

**\*\*Insert Table 2\*\***

## Inferential analysis

The pooled crude and adjusted log-binomial regression analysis of the factors associated with teen motherhood was presented in **Table 3**. Also, we presented the pooled crude analysis of each event, that is; adolescent experience of a terminated pregnancy, currently pregnant, and childbearing in **Supplementary Table 1**, and their pooled adjusted analysis in **Supplementary Table 2**. For this section, we present only the findings from the adjusted model of the factors associated with teen motherhood.

The adjusted analysis from the pooled datasets revealed no significant difference in teen motherhood between the three survey years. Early sexual debut was associated with a higher risk of teen motherhood; those who initiated sex between 15–17 years and 18 years older were 14% and 41% less likely to experience teen motherhood. Adolescents with primary education (aRR 1.07; 95%CI 1.02–1.13) were at higher risk while those with a tertiary education (aRR 0.44; 95%CI 0.25–0.78) were less likely to experience teen motherhood compared to those with no formal education. Similarly, adolescents in the richest wealth quintile were 27% less likely to experience teen motherhood compared to those in the poorest group. Being married (aRR 5.30; 95%CI 4.80–5.86) or formerly married (aRR 4.38; 95%CI 3.77–5.10) was associated with a higher risk of teen motherhood.

**\*\*Insert Table 3\*\***

Also, adolescents who belonged to other Christian groups (aRR 1.18; 95%CI 1.06–1.31) as well as those who belonged to other religions (aRR 1.29; 95%CI 1.10–1.52) were more likely to experience teen motherhood compared to Catholics. Adolescents who resided in the North western region (aRR 0.91; 95%CI 0.83–0.99) had a lower likelihood while those in the South South (aRR 1.15; 95%CI 1.04–1.27) had a higher likelihood of experiencing teen motherhood compared to those in the North central region. Similarly, Hausas were 7% more likely to experience teen motherhood compared to the Fulanis'. Also, those with knowledge about modern contraceptive methods (aRR 1.23; 95%CI 1.16–1.30) were associated with a higher risk of teen motherhood compared to those who knew no contraceptive methods in the adjusted model.

## Discussion

Teen motherhood is a global public health and social concern, due to its enormous short and long-term socio-economic and developmental repercussions. According to the 2022 UNFPA report – Motherhood in Childhood: The Untold Story; after the birth of a first child, additional childbearing in adolescence is common for child mothers. Among girls with a first birth at age 14 or younger, nearly three-quarters also have a second birth in adolescence, and 40 percent of those with two births progress to a third birth before existing adolescence [8]. The phenomenon of teenage pregnancy is quite alarming in Nigeria, the most populous country in Africa [21]. The present study, therefore, investigated the spatial distribution and factors associated with teen motherhood in Nigeria, between 2008 and 2018. Within the period, the prevalence of teen motherhood increased from 50.9% in 2008 to 55.2% in 2018.

Adolescents with primary education were at higher risk of motherhood while those with a tertiary education were less likely to experience it compared to those who had no formal education. Our findings affirm previous studies that linked no education and low educational attainment to early motherhood [22–25]. When a female drops out school at primary level, she eventually joins her colleagues who are out of school and jointly get exposed to a wide array of circumstances leading to childbearing such as early marriage, cohabiting and prostitution [26]. Although our study design does not offer much insight into temporal sequence and how low level or no education directly influences teen motherhood, it suggests that education has enormous importance on the timing of motherhood.

Adolescents in the richest wealth quintile were 27% less likely to experience motherhood compared to the poorest adolescents. This is in consonance with some previous studies from Nigeria [27, 28] and other parts of sub-Saharan Africa [29, 30]. A couple of factors may explain why wealth serves as a protective factor against adolescent motherhood. Wealth facilitates healthcare access, since wealthy teenagers can access different varieties of and preferred reproductive health services and ascertain relevant knowledge relative to the poor, thereby reducing their chances of being at risk of teen motherhood [31].

Those who were currently or formerly married were associated with a higher risk of childbearing. Childbearing outside marriage is usually treated with disdain, especially when the mother is a teenager [32, 33]. As a result, it is expected that teenagers who have ever married will have an increased prospect

of being married and giving birth. Unfortunately, the proportion of females in Nigeria who enter marriage before adulthood is on the increase, as also noted from some other countries in sub-Saharan Africa [34, 35]. Our finding confirms earlier reports from Nigeria that young females in marital unions have increased risk of being pregnant and giving birth [22] as also reported from other parts of the world such as Sweden [36], India [37], and Ethiopia [38]. A critical implication of this finding is that national, regional and local level interventions that seek to subsidize adolescent motherhood experiences and healthcare services need to prioritize measures that would make adolescent marital unions less attractive and less rewarding. One way to achieve this is to intensify existing human rights laws that prohibit early or forced child (under 18) marriage and the application of associated sanctions.

Other Christians and affiliates of other religions reported higher propensity of motherhood relative to Catholics. This may be linked to doctrinal variations within the Christian religion as well as the different beliefs held by adolescents of other religions. This finding is quite intriguing on the account that Catholicism do not support the use of contraception as an option of birth control, irrespective of the outcome and only permits natural birth control methods [39]. Other studies have shown that non-Catholics do not use contraceptive methods appropriately, partly due to poor knowledge and misconceptions [3, 40].

Residents of the North western region had lower likelihood while those in the South South had higher likelihood of experiencing teen motherhood compared to those in the North central region. Similarly, the Hausas' were 7% more likely to experience teen motherhood compared to the Fulanis'. In some related studies, however, early motherhood was profound among those in the Northern parts of Nigeria [22, 41]. Our findings highlight heterogeneity among Nigerian adolescents and specifically point to geographical and ethnic variation in teen motherhood. Besides, the findings have revealed the category of teens that require more focused anti-motherhood public health interventions in Nigeria.

We also noted that knowledge about modern contraceptive methods was associated with a higher risk of teen motherhood. This casts doubts about the content of the knowledge possessed by these teens as to whether they have the right knowledge or otherwise. Secondly, the finding may imply that possession of contraception knowledge does not necessarily guarantee knowledge application. It could also be that there is a knowledge gap about contraception coupled with misconceptions held by these adolescents as earlier reported by the WHO [3]. Studies have shown that adequate contraceptive knowledge does not translate to a high rate of contraceptive use [42, 43]. Besides, poor contraception knowledge has been reported from six communities in southeastern Nigeria, specifically Ebonyi state [40].

## **Strengths And Limitations**

This study has a number of strengths as well as limitations. One of the major strengths is that the sampling procedure ensured representativeness, thereby making the findings and conclusions representative of Nigerian adolescents, within the period studied. Second, considering the rigor of the methodology and analytical procedure employed, the robustness and reproducibility of our study and the



findings are not in doubt. Thirdly, the study was based on pooled data from three consecutive surveys. Conversely, a notable weakness is that the cross-sectional design makes it impossible to draw causal inference between the socio-demographic characteristics of adolescents and motherhood. Also, considering the sensitive nature of the questions posed to adolescents to ascertain their motherhood status, some of the responses might have been affected by social desirability bias, whereby some adolescents would respond to conform to social expectation as opposed to the reality. Finally, since the study was based on data from NDHS, only adolescent females aged 15–19 years were included. As a result, the estimation of adolescent pregnancy in this study might have been under- or overestimated.

## Conclusion

Having investigated patterns and associated factors of teen motherhood, our study revealed a surge in teenage motherhood in Nigeria between 2008 and 2018, from 50.9–55.2%. Poverty, low or no education, marital union, and being a resident in the South-South region contributed positively to teen motherhood in Nigeria.

The findings highlight the need for Government at all levels to strengthen efforts toward a favorable policy framework and system for free and compulsory education that will propel education to higher or tertiary level especially for adolescent girls, for Nigeria to derive the full benefit of the role of education in mitigating adolescent pregnancy [44]. This can help mitigate the chances of early marriage and associated economic hardships, which hitherto truncates female's negotiation power and thereby plunging them into diverse conditions leading to unplanned and premature motherhood.

Furthermore, sexual and reproductive health services including sex education programs like comprehensive sexuality education should be re-aligned to take care of the vulnerable poor, while access to universal health care coverage and SRHR information should be prioritized using affordable healthcare financing mechanisms, adolescent/youth-centered responsive policies and adolescent/youth-led innovative and digital methods to mitigate the existing inequality in sexual and reproductive health and right information and services.

In the light of the regional variations in teen motherhood, it is expedient for the health sector to review the distribution and allocation of adolescent-friendly reproductive health services within the country to make it easily accessible irrespective of location. We advocate for further studies to investigate the impact of regional level health systems, as well as social and cultural norms of adolescent sexual and reproductive health concerns that expose them to teen motherhood.

Knowledge of modern contraception was aligned with higher prospects of teen motherhood, and this suggests that knowledge does not directly translate to effective utilization. Consequently, government agencies and non-governmental agencies that focus on adolescent reproductive health and contraception education, would have to examine whether adolescents possess the right knowledge and sufficient factors required to translate contraception knowledge to effective contraception utilization. A nationwide study on this subject may be worthwhile to explore the content of the knowledge held by

these adolescents and possible reasons accounting for the gap between contraception knowledge and usage. With these measures, Nigeria's prospects of leaving no one behind and achieving the Sustainable Development Goal 3 may be enhanced.

### **Implications and contribution**

This study highlights the increasing risk of teen motherhood in Nigeria over a decade, particularly among sexually active adolescents who are at higher risk of getting pregnant. Increasing efforts toward teen contraceptive knowledge and use, early comprehensive sexuality education, and female education up to the tertiary level could help mitigate against this menace.

## **Abbreviations**

NDHS – Nigeria Demographic Health Surveys; LMICs – Low-and middle-income countries; CI – confidence interval; SRHR – Sexual and reproductive health and rights

## **Declarations**

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### **Availability of data and material**

The datasets used for this study are freely available from the DHS program website after request and can be downloaded from <https://dhsprogram.com/data/available-datasets.cfm>

### **Ethics approval and consent to participate**

Not applicable

### **Competing interests**

The authors declare they have no competing interests

### **Consent for publication**

Not applicable

### **Author's contributions**

Conceptualization, data curation, exploration, and analysis of the manuscript: YOK; Interpretation of results: YOK, ZA, BA, EKA, FYG, EG, UM, YS; Writing of the Manuscript: YOK, ZA, BA, EKA, FYG, EG, UM, OU. All authors agreed to the final draft of the manuscript and approve of its submission to the Journal.

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## Tables

**Table 1. Descriptive statistics of adolescents' background characteristics, NDHS 2008 - 2018**

Variables	NDHS 2008	NDHS 2013	NDHS 2018	N (%)
<b>Outcome variables</b>				
Teen motherhood				
No	1450 (49.1%)	1523 (47.6%)	1323 (44.8%)	4290 (47.1%)
Yes	1504 (50.9%)	1676 (52.4%)	1630 (55.2%)	4816 (52.9%)
<b>Sexual and demographic</b>				
Age at first sex				
<15	1007 (34.1%)	1170 (36.6%)	709 (24.0%)	2871 (31.5%)
15-17	1713 (58.0%)	1765 (55.2%)	1976 (66.9%)	5468 (60.1%)
18-19	234 (7.9%)	263 (8.2%)	268 (9.1%)	766 (8.4%)
Lifetime sexual partners				
Single	2452 (83.0%)	2714 (84.9%)	2458 (83.2%)	7625 (83.7%)
Multiple	502 (17.0%)	485 (15.2%)	495 (16.8%)	1481 (16.3%)
Current marital status				
Never in a union	1103 (37.3%)	1063 (33.2%)	1002 (33.9%)	3164 (34.8%)
Currently in union	1808 (61.2%)	2079 (65.0%)	1901 (64.4%)	5792 (63.6%)
Formerly in union	43 (1.5%)	57 (1.8%)	50 (1.7%)	150 (1.6%)
Educational status				
No education	1306 (44.2%)	1496 (46.8%)	1363 (46.2%)	4168 (45.8%)
Primary	420 (14.2%)	421 913.2%)	340 (11.5%)	1177 (12.9%)
Secondary	1202 (40.7%)	1238 (38.7%)	1187 (40.2%)	3627 (39.8%)
Higher	26 (0.9%)	44 (1.4%)	63 (2.1%)	135 (1.5%)
Wealth quintiles				
Poorest	801 (27.1%)	824 (25.7%)	703 (23.8%)	2323

				(25.5%)
Poorer	710 (23.9%)	865 (27.0%)	839 (28.4%)	2416 (26.5%)
Middle	591 (20.0%)	623 (19.5%)	641 (21.7%)	1858 (20.4%)
Richer	541 (18.3%)	496 (15.5%)	486 (16.5%)	1521 (16.7%)
Richest	313 (10.6%)	391 (12.2%)	284 (9.6%)	987 (10.8%)
<b>Religion</b>				
Catholic	265 (9.0%)	285 (8.9%)	264 (9.0%)	814 (8.9%)
Other Christians	1013 (34.3%)	898 (28.1%)	801 (27.1%)	2703 (29.7%)
Islam	1640 (55.5%)	1973 (61.7%)	1878 (63.6%)	5501 (60.4%)
Others	36 (1.2%)	43 (1.4%)	10 (0.3%)	88 (1.0%)
<b>Geographic</b>				
<b>Region</b>				
North Central	357 (12.1%)	355 (11.1%)	434 (14.7%)	1150 (12.6%)
North East	512 (17.3%)	605 (18.9%)	564 (19.1%)	1683 (18.5%)
North West	941 (31.8%)	1279 (40.0%)	1143 (38.7%)	3370 (37.0%)
South East	220 (7.5%)	249 (7.8%)	225 (7.6%)	694 (7.6%)
South South	554 (18.8%)	392 (12.3%)	317 (10.7%)	1254 (13.8%)
South West	369 (12.5%)	319 (10.0%)	271 (9.2%)	955 (10.5%)
<b>Place of residence</b>				
Urban	691 (23.4%)	878 (27.5%)	847 (28.7%)	2423 (26.6%)
Rural	2263 (76.6%)	2321 (72.5%)	2106 (71.3%)	6682 (73.4%)
<b>Ethnicity</b>				
Fulani	293 (9.9%)	347 (10.9%)	297 (10.1%)	937 (10.3%)
Hausa	916 (31.0%)	1113 (34.8%)	1170 (39.6%)	3210 (35.3%)

Igbo	264 (8.9%)	250 (7.8%)	281 (9.5%)	796 (8.7%)
Yoruba	304 (10.3%)	294 (9.2%)	244 (8.3%)	839 (9.2%)
Other ethnic minorities	1177 (39.8%)	1194 (37.3%)	961 (32.6%)	3322 (36.5%)
<b>Knowledge and awareness</b>				
Ever heard of STI				
No	474 (16.1%)	347 (10.8%)	221 (7.5%)	1032 (11.3%)
Yes	2480 (83.9%)	2852 (89.2%)	2732 (92.5%)	8074 (88.7%)
Knowledge of any contraceptive method				
Knows none	1134 (38.4%)	746 (23.3%)	351 (11.9%)	2197 (24.1%)
Folkloric/traditional	36 (1.2%)	56 (1.8%)	15 (0.5%)	106 (1.2%)
Modern	1784 (60%)	2396 (74.9%)	2587 (87.6%)	6803 (74.7%)
Comprehensive knowledge about HIV				
No	2357 (79.8%)	2367 (74.0%)	1828 (61.9%)	6527 (71.7%)
Yes	597 (20.2%)	832 (26.0%)	1125 (38.1%)	2579 (28.3%)
Exposure to mass media				
No	946 (32.0%)	923 (32.4%)	1366 (46.3%)	3481 (38.2%)
Yes	2008 (68.0%)	1927 (67.6%)	1587 (53.7%)	5625 (61.8%)
Total	2954 (100%)	3199 (100%)	2953 (100%)	9106 (100%)

**Table 2. The prevalence of teen motherhood by background characteristics, NDHS 2008-2018**



Characteristics	2008	2013	2018
	Prevalence (95% CI)	Prevalence (95% CI)	Prevalence (95% CI)
<b>Total</b>	50.9(48.7-53.1)	52.4(49.9-54.9)	55.2(52.7-57.6)
<b>Sexual and demographic</b>			
Age at first sex			
<15	64.3(60.8-67.7)	62.2(58.2-66.0)	68.1(63.4-72.5)
15-17	46.5(43.8-49.1)	50.2(47.2-53.2)	53.2(50.3-56.0)
18-19	25.9(20.5-32.2)	23.7(18.6-29.7)	36.1(29.9-42.8)
Lifetime sexual partners			
Single	51.8(49.4-54.1)	53.3(50.6-55.9)	58.0(55.4-60.6)
Multiple	46.9(41.6-52.1)	47.6(41.9-53.4)	41.1(36.3-46.1)
Current marital status			
Never in a union	17.7(15.1-20.7)	16.6(14.3-19.3)	13.9(11.6-16.5)
Currently in union	70.7(68.2-73.1)	70.5(67.6-73.3)	76.6(74.1-79.0)
Formerly in union	70.3(55.2-82.0)	59.7(44.3-73.4)	67.6(53.2-79.3)
Educational status			
No education	66.3(63.4-69.1)	65.5(62.0-69.0)	72.2(69.0-75.1)
Primary	59.9(54.5-65.1)	67.5(62.2-72.4)	62.1(56.1-67.8)
Secondary	31.9(28.6-35.4)	33.1(29.9-36.4)	36.3(33.2-39.6)
Higher	11.1(3.47-30.2)	6.8(2.3-18.9)	5.8(2.2-14.3)
Wealth quintiles			
Poorest	64.7(60.8-68.3)	65.3(60.2-70.1)	66.7(62.1-71.0)
Poorer	55.9(51.9-59.9)	60.0(55.4-64.4)	66.0(62.1-69.7)
Middle	48.9(44.1-53.8)	53.1(48.5-57.7)	55.4(50.0-60.6)
Richer	42.2(36.9-47.7)	42.6(37.8-47.5)	39.2(33.6-45.2)
Richest	23.3(18.0-29.6)	19.9(15.2-25.7)	21.9(16.3-28.6)
Religion			
Catholic	35.0(28.5-42.1)	36.8(30.3-43.8)	33.7(27.5-40.4)
Other Christians	35.4(31.8-39.2)	32.9(29.0-37.0)	33.6(29.9-37.4)

Islam	62.7(60.0-65.3)	63.4(60.3-66.5)	67.3(64.3-70.2)
Others	69.0(50.3-83.1)	56.7(38.5-73.3)	86.4(66.3-95.4)
<b>Geographic</b>			
Region			
North Central	53.8(47.6-59.9)	53.4(47.3-59.5)	45.5(40.8-50.2)
North East	65.8(61.2-70.1)	59.1(52.9-65.1)	67.1(62.5-71.3)
North West	64.9(61.3-68.4)	65.6(61.8-69.2)	70.3(66.4-74.0)
South East	32.2(25.8-39.5)	27.0(19.8-35.8)	36.5(30.0-43.6)
South South	31.0(26.0-36.5)	33.7(28.3-39.5)	31.6(25.7-38.2)
South West	32.9(26.5-40.0)	28.5(23.5-34.1)	25.4(19.2-32.8)
Place of residence			
Urban	40.6(35.8-45.4)	35.4(30.8-40.2)	39.1(34.6-43.8)
Rural	54.1(51.6-56.5)	58.9(56.0-61.6)	61.7(58.9-64.3)
Ethnicity			
Fulani	65.3(59.1-71.1)	61.6(54.9-68.0)	67.2(61.6-72.3)
Hausa	66.1(62.6-69.5)	68.6(64.7-72.2)	72.2(68.2-75.9)
Igbo	28.2(22.6-34.6)	22.0(17.1-27.8)	34.7(28.6-41.2)
Yoruba	33.4(26.4-41.1)	26.4(20.1-33.9)	24.2(18.1-31.6)
Other ethnic minorities	45.1(41.5-48.7)	47.4(43.5-51.3)	44.7(41.1-48.3)
<b>Knowledge and awareness of SRH</b>			
Ever heard of STI			
No	57.9(52.9-62.6)	57.8(49.4-65.8)	59.8(53.2-66.2)
Yes	49.6(47.2-52.0)	51.8(49.3-54.2)	54.8(52.2-57.4)
Knowledge of any contraceptive method			
Knows none	59.3(56.1-62.3)	55.3(49.8-60.8)	55.5(50.4-60.4)
Folkloric/traditional	49.2(30.9-67.7)	75.4(54.3-88.8)	44.3(20.6-71.1)
Modern	45.7(42.8-48.6)	51.0(48.2-53.7)	55.2(52.6-57.9)
Comprehensive knowledge about HIV			

No	53.4(50.9-56.0)	54.2(51.3-57.2)	56.7(53.8-59.5)
Yes	40.9(36.7-45.3)	47.2(43.4-51.1)	52.8(48.9-56.7)
Exposure to mass media			
No	62.4(58.8-65.7)	60.6(56.5-64.6)	65.6(62.3-68.8)
Yes	45.5(42.9-48.2)	47.8(44.8-50.9)	46.2(43.1-49.4)

**Table 3. Pooled crude and adjusted log-binomial regression of factors associated with teen motherhood, NDHS 2008-2018**

Characteristics	Teen Motherhood	
	cRR (95% CI)	aRR (95% CI)
<b>Survey year</b>		
2008	Reference	Reference
2013	1.03(0.97-1.10)	0.96(0.91-1.02)
2018	1.08(1.02-1.15)**	1.01(0.96-1.07)
<b>Sexual and demographic</b>		
Age at first sex		
<15	Reference	Reference
15-17	0.77(0.74-0.80)***	0.86(0.82-0.89)***
18-19	0.44(0.39-0.50)***	0.59(0.53-0.66)***
Lifetime sexual partners		
Single	Reference	Reference
Multiple	0.83(0.77-0.89)***	1.13(1.06-1.21)
<b>Current marital status</b>		
Never in a union	Reference	Reference
Currently in union	4.52(4.11-4.97)***	5.30(4.80-5.86)***
Formerly in union	4.07(3.48-4.75)***	4.38(3.77-5.10)***
Educational status		
No education	Reference	Reference
Primary	0.93(0.88-0.99)**	1.07(1.02-1.13)**
Secondary	0.50(0.47-0.53)***	0.99(0.93-1.06)
Higher	0.10(0.06-0.19)***	0.44(0.25-0.78)**
<b>Wealth quintiles</b>		
Poorest	Reference	Reference
Poorer	0.93(0.88-0.98)**	0.98(0.94-1.04)
Middle	0.80(0.75-0.86)***	1.02(0.96-1.08)
Richer	0.63(0.58-0.69)***	0.94(0.87-1.02)
Richest	0.33(0.28-0.39)***	0.73(0.63-0.83)***

Religion		
Catholic	Reference	Reference
Other Christians	0.97(0.85-1.10)	1.18(1.06-1.31)**
Islam	1.84(1.64-2.06)***	1.04(0.92-1.17)
Others	1.87(1.49-2.33)***	1.29(1.10-1.52)**
<b>Geographic</b>		
Region		
North Central	Reference	Reference
North East	1.27(1.17-1.38)***	0.95(0.87-1.03)
North West	1.34(1.24-1.44)***	0.91(0.83-0.99)**
South East	0.63(0.54-0.74)***	1.04(0.92-1.17)
South South	0.64(0.56-0.72)***	1.15(1.04-1.27)**
South West	0.58(0.50-0.67)***	1.03(0.89-1.18)
<b>Place of residence</b>		
Urban	Reference	Reference
Rural	1.53(1.42-1.65)***	0.99(0.93-1.05)
Ethnicity		
Fulani	Reference	Reference
Hausa	1.07(1.01-1.14)**	1.07(1.00-1.15)**
Igbo	0.44(0.39-0.51)***	1.10(0.91-1.34)
Yoruba	0.44(0.37-0.51)***	1.09(0.92-1.29)
Other ethnic minorities	0.71(0.66-0.76)***	1.08(0.99-1.18)*
<b>Knowledge and awareness</b>		
Ever heard of STI		
No	Reference	Reference
Yes	0.88(0.83-0.95)**	1.04(0.97-1.11)
Knowledge of any contraceptive method		
Knows none	Reference	Reference
Folkloric/traditional	1.08(0.88-1.33)	1.15(0.95-1.39)

Modern	0.87(0.82-0.92)***	1.23(1.16-1.30)***
<b>Comprehensive knowledge about HIV</b>		
No	Reference	Reference
Yes	0.87(0.82-0.92)***	1.01(0.96-1.05)
<b>Exposure to mass media</b>		
No	Reference	Reference
Yes	0.74(0.71-0.78)***	1.01(0.96-1.04)

Each of the univariate analyses were adjusted for the survey years; \*p-value <0.1, \*\*p-value <0.05, \*\*\*p-value<0.01; cRR – crude relative risk, aRR – adjusted relative risk

## Figures

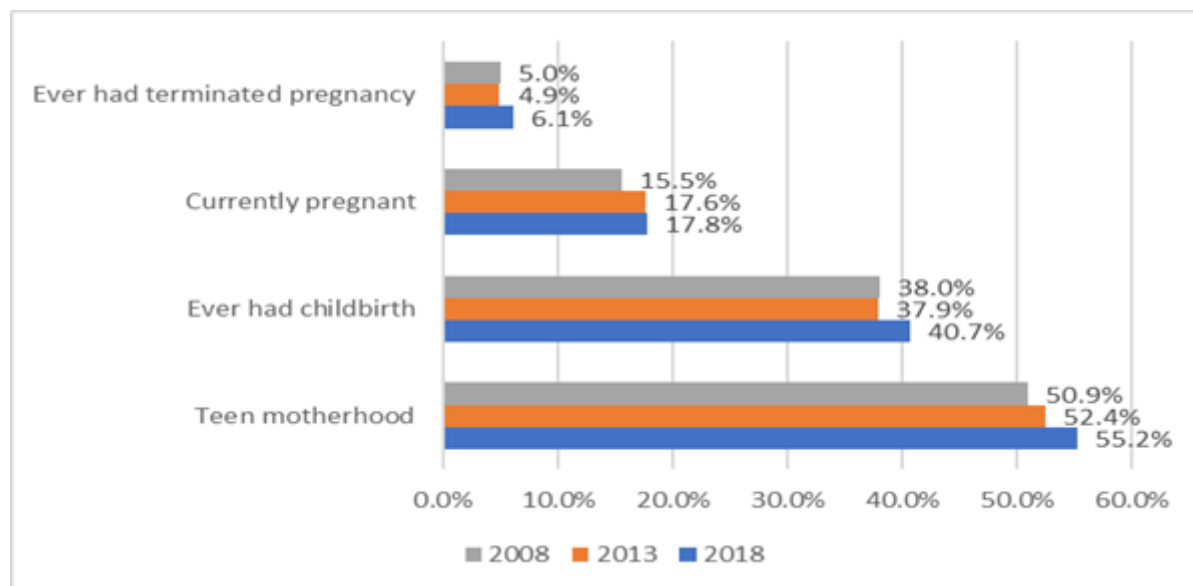


Figure 1

The proportion of adolescents who have terminated pregnancy, are currently pregnant, and have had childbirth (teen motherhood) from the NDHS 2008, 2013 and 2018

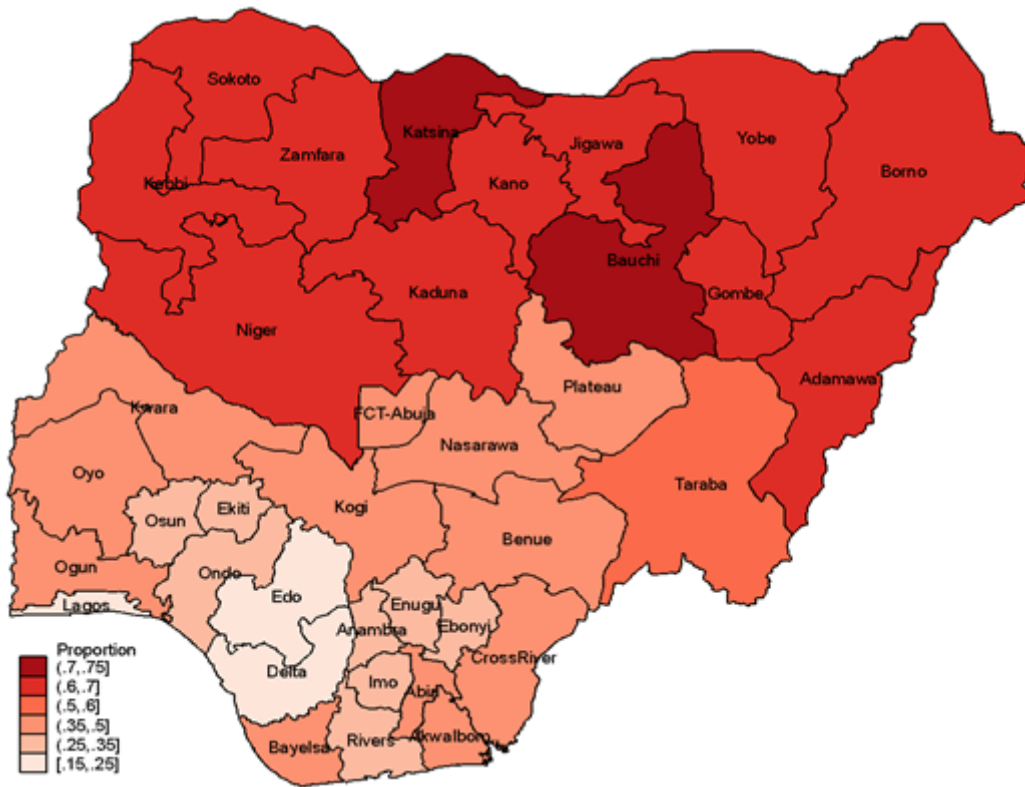


Figure 2

Prevalence of teen motherhood across states in Nigeria, NDHS 2008-2018

## Supplementary Files

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- [TeenmotherhoodBMCPHSupTables.docx](#)