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Beyond the Bump: Comparing Feto-Neonatal Outcomes in Teenage and Adult Pregnancies in South-East Nigeria

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Abstract

Introduction: Teenage pregnancy remains a global public health challenge, particularly in low-resource settings. Adolescents face a higher risk of adverse fetal and neonatal outcomes due to physical immaturity, limited education, inadequate antenatal care (ANC), and insufficient family support. The objective of this study was to determine the prevalence of teenage pregnancy, compare feto-neonatal outcomes between teenage and adult mothers, and examine the influence of maternal education, ANC attendance, and family support on these outcomes.

Methods: A retrospective comparative study was conducted at the Federal Teaching Hospital, Abakaliki, Nigeria. Hospital records of all teenage mothers aged 13–19 years who delivered between January 2013 and June 2014 were reviewed. Each case was matched with two controls aged 20–35 years. Data on maternal sociodemographic characteristics, ANC attendance, mode of delivery, and neonatal outcomes were extracted. Statistical analyses were performed using SPSS version 20, with statistical significance set at $p < 0.05$.

Results: Of the 4,235 deliveries recorded during the study period, 118 (2.8%) were teenage pregnancies. After exclusions, 90 teenage cases and 180 adult controls were included in the analysis. Teenage pregnancies were significantly associated with lower gestational age at birth, lower APGAR scores, lower birth weights, and higher perinatal mortality rates ($p < 0.05$). Logistic regression analysis showed that teenage pregnancy (OR = 10.53), fewer than two ANC visits (OR = 11.42), and lack of formal education (OR = 5.27) were strong predictors of perinatal death. Family support and socioeconomic status also had a significant influence on outcomes among teenage mothers.

Conclusion: Teenage pregnancy is associated with adverse neonatal outcomes. Strengthening adolescent reproductive health education, improving access to antenatal care, and enhancing family support systems are essential strategies for reducing these risks.

Keywords: Teenage pregnancy, neonatal outcomes, perinatal mortality, antenatal care, adolescent pregnancy, family support, maternal education, Nigeria.

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Background

Teenage pregnancy is rapidly becoming a significant social and public health challenge worldwide.¹ The rising incidence has been linked to earlier puberty, early sexual initiation, limited knowledge of reproductive health, and inadequate access to contraception among young girls.^{2–4} The Youth Risk Behavior Survey (YRBS) reported that approximately 7% of high school students in the United States initiated sexual intercourse before the age of 13 years,⁵ and nearly one million adolescents become pregnant annually in the country, more than half of whom are school-aged girls aged 11–19 years.⁶

In Nigeria, 48.6% of adolescents aged 15–19 years are sexually active.⁷ Among them, one in five sexually active females and one in twelve males have engaged in sexual intercourse by the age of 15 years.⁷ The incidence of teenage pregnancy in Nigeria has been estimated at 143 per 1,000 live births.

Teenage pregnancy refers to conception occurring in females aged 13–19 years. This is particularly concerning because maternal age plays a significant role in adverse pregnancy outcomes.^{8,9} Teenagers are considered a high-risk group in reproductive health because pregnancy imposes an additional burden on their ongoing physical growth and development. Beyond maternal age, it is important to explore other factors that may contribute to poor pregnancy outcomes.

Several studies have evaluated the risks of preterm delivery and low birth weight among teenage mothers. While some researchers have reported significantly higher risks of prematurity^{7–9} and low

birth weight,^{10,11} others have found no significant association between teenage pregnancy and adverse neonatal outcomes.^{12,13} Gilbert et al.⁷, in a study conducted in California, observed increased neonatal mortality among infants born to teenage mothers. Similar findings were reported by Ezegwui et al. in Enugu, south-eastern Nigeria.¹⁴

Although the obstetric outcomes of teenage pregnancy have been well documented, fewer studies have examined neonatal outcomes. Furthermore, the influence of potential confounding factors, such as family support and educational attainment, on pregnancy outcomes among teenagers has received limited attention. Against this background, the present study sought to determine the prevalence of teenage pregnancy at a Nigerian tertiary health institution, examine associated feto-neonatal outcomes, and assess the impact of factors such as family support, antenatal care attendance, and maternal educational level on pregnancy outcomes within this high-risk group.

Method

Study Site

This study was conducted in the Department of Obstetrics and Gynecology at the Federal Teaching Hospital Abakaliki (FETHA). The department has a total bed capacity of approximately 350, including beds in the gynecology, antenatal, labor, and postnatal wards. On average, 226 deliveries are conducted each month in the labor wards and obstetric theatre.

Study Design

This was a retrospective comparative study comparing teenage pregnancies with pregnancies among women aged 20–35 years.

Study Population

The study population comprised all women aged 13–19 years who delivered at FETHA between 1 January 2013 and 30 June 2014. For each teenage mother included, two control participants aged 20–35 years were selected. Specifically, the mothers recorded immediately before and after the teenage mother in the labor ward register were chosen, resulting in a 1:2 case-to-control ratio.

Selection Criteria

All teenage mothers aged 13–19 years who delivered during the study period were included. For each case, the preceding and succeeding women aged 20–35 years, as recorded in the labor ward register, were selected as controls.

Exclusion Criteria

Women older than 35 years, those with pre-existing medical conditions or pregnancy complications, and those with multiple gestations were excluded from the study.

Data Collection

The total number of teenage mothers was obtained from the nursing records. Hospital numbers for both cases and matched controls were extracted from the labor ward register. Case notes were subsequently retrieved from the records department, and relevant information was extracted using a structured pro forma.

Data Analysis

Data were analyzed using IBM SPSS version 20.0. Descriptive statistics were used to summarize the characteristics of the study population. The Chi-square test (or Fisher's exact test, where appropriate) was used to assess associations between categorical variables. The independent-samples t-test was employed to compare means. Logistic regression analysis was conducted to identify predictors of perinatal death while controlling for potential confounding variables. The predictive performance of the regression model was further evaluated using sensitivity, specificity, positive predictive value, negative predictive value, and overall predictive accuracy. Statistical significance was set at $p < 0.05$.

Results

The prevalence of teenage pregnancy during the study period was 2.8% (118 out of 4,235 deliveries). However, 28 teenage mothers were excluded from the analysis: 10 had multiple births, 8 had chronic illnesses (such as sickle cell anemia or diabetes mellitus), and 10 had missing case notes.

The mean age of the teenage mothers (cases) was 17.8 ± 1.1 years (range: 15–19 years). Most participants (64; 71.1%) resided in rural areas, while 26 (28.9%) resided in urban areas. Regarding marital status, 52 (57.8%) were single, and 38 (42.2%) were married. Family support was provided by parents or relatives in 39 (43.3%) cases, by spouses in 38 (42.2%) cases, and by 13 (14.4%) with no form of support. The socioeconomic status of the support source was classified as upper in 7

cases (7.8%), middle in 11 (12.2%), and lower in 59 (65.6%).

With respect to educational attainment, 41 (45.6%) had completed secondary education, 40 (44.4%) had only primary education, and 9 (10.0%) had no formal education. Only 34 (37.8%) of the teenagers had attended two or more antenatal care (ANC) visits at a health facility (primary, secondary, or tertiary level), whereas 56 (62.2%) had not attended any ANC visits.

The mode of delivery among the cases was spontaneous vaginal delivery in 40 (44.4%), assisted vaginal delivery in 19 (21.1%), and emergency cesarean section in 31 (34.4%).

A total of 180 matched controls (women aged 20–35 years) were selected, with a mean age of 27.6 ± 1.9 years (range: 25–31 years). Table 1 presents a detailed comparison of the sociodemographic characteristics of the cases and controls.

Table 2 compares the mode of delivery, stillbirth rates, birth asphyxia, and mean birth weight between cases and controls. Significant differences were observed between the groups with respect to mean gestational age at birth ($t = -3.816$; $p = 0.000$), APGAR score ($t = -3.662$; $p = 0.000$), and birth weight ($t = -4.779$; $p = 0.000$). Stillbirths, abnormal birth weights, and birth asphyxia were significantly more common among cases than controls, as shown in Table 3. A higher proportion of controls attended two or more ANC visits. Perinatal deaths were also more frequent among teenage mothers.

Chi-square analysis showed that fewer than two ANC visits and the delivery of a low-birth-weight infant were significantly

associated with perinatal death among both cases and controls. Among teenage mothers, family support and a higher socioeconomic status of the support provider were significantly associated with better neonatal outcomes. In contrast, among controls, maternal educational attainment and parity were significantly associated with perinatal outcomes. Mode of delivery and marital status were not significantly associated with perinatal death in either group. These associations are presented in Table 4.

Table 5 presents the logistic regression analysis of predictors of perinatal death among the study participants. Teenage pregnancy was a significant predictor of perinatal death, with teenage mothers having approximately ten times greater odds of perinatal mortality than adult mothers (OR = 10.527; 95% CI: 2.055–53.934; $p = 0.005$). Mothers with fewer than two antenatal care visits also had significantly increased odds of perinatal death (OR = 11.420; 95% CI: 1.927–67.681; $p = 0.007$). In addition, lack of formal education was a significant predictor of perinatal death, as mothers without formal education had more than five times higher odds of adverse perinatal outcomes than those with formal education (OR = 5.267; 95% CI: 1.384–20.048; $p = 0.015$).

The classification statistics for the regression model are presented in Table Va. The model achieved a sensitivity of 72.5%, specificity of 97.3%, positive predictive value of 86.0%, and negative predictive value of 93.8%, resulting in an overall predictive accuracy of 91.4%.

Table 1 Description of socio-demography of cases and control.

Variable	Cases	Control
Mean age	17.8±1.1(15-19)years	27.6±1.9(25-31)years
Mean Parity of mothers	1.3 ± 0.6(1-3)	2.5 ± 1.5(1-6)
Mean Gestational age at delivery	37.6 ± 3.2(30-41)weeks	38.7 ± 1.4(36-41)weeks
Place of abode:		
Rural	64(71.1%)	76(42.2%)
Urban	26(28.9%)	104(57.8)
Marital status:		
Single	52(57.2%)	5(2.8%)
Married	38(42.2%)	169(93.9%)
Divorced/separated	0(0.0%)	6(3.3%)
Family support:		
Spouse	38(42.2%)	169(93.9%)
Parents/relatives	39(43.3%)	5(2.8%)
Self/none	13(14.3%)	6(3.3%)
Socioeconomic class of support:		
Upper	7(7.8%)	29(16.1%)
Middle	11(12.3%)	40(22.3%)
Lower	59(65.6%)	105(58.3%)
None	13(14.3%)	6(3.3%)
Highest educational attainment:		
No formal education	9(10.0%)	30(16.7%)
Primary	40(44.4%)	71(39.4%)
Secondary	41(45.6%)	68(37.8%)
Tertiary	0(0.0%)	11(6.1%)
≥2 antenatal visits:		
Yes	34(37.8%)	115(63.9%)
No	56(62.2%)	65(36.1%)

Table 2: shows the various morbidities and outcomes of cases and controls.

Variable	Case	Control
Mode of delivery:		
Vagina	40(44.4%)	140(77.8%)
Assisted vaginal	19(21.1%)	6(3.3%)
Em CS	31(34.4%)	14(7.8%)
El CS	0(0.0%)	20(11.1%)
Still birth:		
Yes	18(20.0%)	18(10.0%)
No	72(80.0%)	162(90.0%)
Mean birth weight	2.6±0.7(0.7-4.2)kg	3.0±0.4(1.9-4)kg
Birth weight classification:		
Normal	64(71.1%)	168(93.3%)
LBW	16(17.8%)	12(6.7%)
Very LBW	5(5.6%)	0(0.0%)
Extreme LBW	3(3.3%)	0(0.0%)
Macrosomia	2(2.2%)	0(0.0%)
Birth asphyxia:		
Yes	36(40.0%)	24(13.3%)
No	54(60.0%)	138(76.7%)
Neonatal jaundice:		
Yes	13(14.4%)	41(22.8%)
No		
Outcome:		
Death	33(36.7%)	18(10.0%)
Discharged	57(63.3%)	162(90%)

"Em CS" Emergency Cesarean Section, "El CS" Elective Cesarean Section, LBW Low birth weight

Table 3 χ^2 result of variables compared between cases with control.

Variable	χ^2 result	p-value
Still birth	5.192	0.035
Abnormal birth weight(low birth weight and macrosomia)	27.785	0.000
Perinatal asphyxia	20.230	0.000
≥2 ANC visits	27.849	0.000

Table 4: Showing the association of variables with the outcome of pregnancy in cases and controls

Variable	χ^2 result	p-value
≥2ANC Visits: Cases	11.348	0.001
Control	35.385	0.000
Birth weight: Cases	12.809	0.003
Control	13.935	0.000
Presence of family support: Cases	15.208	0.000
Control	1.302	0.482
SEC status of family support: Cases	20.214	0.000
Control	14.138	0.001
Highest educational attainment: Cases	3.695	0.159
Control	30.909	0.000
Marital status: Cases	3.034	0.121
Control	1.302	0.486
Mode of delivery: Cases	4.306	0.128
Control	2.592	0.250
Parity of mother: Cases	1.115	0.573
Control	43.772	0.000

Table 5: Logistic Regression Analysis of Predictors of Perinatal Death and cclassification Statistics for Logistic Regression Model Predicting Perinatal Death

Variable	B	S.E	Wald	df	Odds Ratio Exp(B)	95% ci for Exp(B) Lower-Upper	p-value
Teenage pregnancy(yes)	2.354	0.834	7.965	1	10.527	2.055 – 53.934	0.005*
<2ANC Visits	2.436	0.908	7.192	1	11.420	1.927 – 67.681	0.007*
No formal education	1.662	0.682	5.939	1	5.267	1.384 – 20.048	0.015*
*Statistically significant Dependent variable: Perinatal death Reference categories: Adult pregnancy, ≥2 ANC visits, and formal education.							
Va: Classification Statistics for Logistic Regression Model Predicting Perinatal Death							
Classification parameter				Value (%)			
Sensitivity				72.5			
Specificity				97.3			
Positive Predictive Value				86.0			
Negative Predictive Value				93.8			
Overall predictive accuracy				91.4			
Classification parameter				Value (%)			
Sensitivity				72.5			

Discussion

This study found that teenage pregnancy remains a significant public health concern, with a prevalence of 2.8% among the obstetric population studied. Although this rate is lower than the national estimate of 143 per 1,000 live births,⁷ it nevertheless represents a substantial burden, particularly in view of the associated adverse feto-neonatal outcomes.

The mean age of the teenage mothers was 17.8 years, and the majority resided in rural areas, were unmarried, and had either primary education or no formal education. These findings are consistent with previous studies, which have shown that teenage pregnancies are more prevalent among socioeconomically disadvantaged groups.^{2,7,10} Inadequate family support and low educational attainment, combined with limited access to antenatal care, further exacerbate the risks associated with adolescent pregnancies.^{1,3,4}

Our findings demonstrated that teenage pregnancies were associated with significantly poorer neonatal outcomes than pregnancies among adult women. Lower gestational age at birth, lower APGAR scores, and lower birth weights were more common among the teenage group. These findings are consistent with earlier studies that identified adolescent pregnancy as a risk factor for preterm delivery and low birth weight.^{8,9,10} Gilbert et al.⁸ and Bacci et al.¹¹ also reported higher rates of perinatal morbidity and mortality among infants born to teenage mothers. Similar findings were observed in the present study, where perinatal deaths occurred significantly more frequently among teenage mothers.

Furthermore, the logistic regression analysis demonstrated that teenage pregnancy, fewer than two antenatal care visits, and lack of formal education were strong predictors of perinatal death. These findings reinforce the importance of comprehensive antenatal care and maternal education as protective factors against adverse pregnancy outcomes among adolescents. Similar conclusions were reported by Gortzak-Uzan et al.⁹ and Satin et al.¹², who found that inadequate antenatal care contributes significantly to poor pregnancy outcomes among adolescent mothers.

Interestingly, family support and the socioeconomic status of the support provider were significantly associated with perinatal outcomes among teenage mothers but not among adult mothers. This finding underscores the importance of psychosocial and material support during pregnancy, particularly for this vulnerable population.^{1,5} The results support the observations of Slowinski and Hume¹ who emphasized the importance of targeted social support systems in mitigating the adverse effects of unintended teenage pregnancies.

While some studies, such as those conducted by Bukulmez and Deren¹³ and Olausson et al.¹⁵, reported no significant association between adolescent pregnancy and adverse neonatal outcomes, the present study's findings differ. These discrepancies may be attributable to regional variations in healthcare access, nutritional status, socioeconomic conditions, and cultural practices that

influence maternal and neonatal health outcomes.

Furthermore, our findings indicate that maternal educational attainment and antenatal care attendance significantly influence neonatal outcomes, highlighting areas where interventions may have the greatest impact. Programs aimed at improving female education, delaying the age at marriage and first pregnancy, and encouraging regular antenatal care attendance could substantially reduce the burden of adverse outcomes associated with teenage pregnancies.^{4,6,7}

Conclusion

In conclusion, this study confirms that teenage pregnancy is associated with significantly poorer fetal and neonatal outcomes, including higher rates of low birth weight, birth asphyxia, and perinatal death. These adverse outcomes are further compounded by inadequate antenatal care, low educational attainment, and insufficient family support. Interventions aimed at improving adolescents' access to education, reproductive health services, antenatal care, and social support systems are essential for improving outcomes for both teenage mothers and their infants. Strengthening these interventions may contribute significantly to reducing the burden of teenage pregnancy and its associated adverse perinatal outcomes.

Limitation of the Study

This study has several limitations that should be considered when interpreting the findings. First, the retrospective study design relied on the completeness and

accuracy of hospital records, which may have introduced information bias due to missing or incomplete data. Secondly, the study was conducted in a single tertiary health institution, which may limit the generalizability of the findings to the wider population, particularly adolescents who deliver outside formal healthcare facilities. In addition, selecting controls from the immediately preceding and succeeding deliveries recorded in the labor ward register may have introduced selection bias. Important potential confounding variables, such as maternal nutritional status, substance use, and underlying infections, were not consistently documented in the case records and therefore could not be assessed.

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