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Burden and Delivery Outcomes Among Adolescent Mothers at a Tertiary Hospital in Ado-Ekiti, Nigeria: A Retrospective Comparative Analysis

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Abstract:

- ***Background***

Adolescent pregnancy remains a significant public health concern in low- and middle-income countries, contributing substantially to maternal and perinatal morbidity and mortality. Understanding its burden and outcomes is crucial for improving care and guiding interventions.

- ***Objective***

To determine the burden and delivery outcomes among adolescent mothers managed at Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti, over a 5-year period, and to compare these outcomes with those of older mothers.

- ***Methods***

A retrospective review of delivery records at EKSUTH from 2020 to 2025 was conducted. Data were extracted from the labour ward register and analyzed with SPSS using descriptive and comparative statistics. Adolescent mothers were defined as those aged 10–19 years. Variables included sociodemographic characteristics, obstetric profile, mode of delivery, maternal complication, and perinatal outcomes such as birth weight, gestational age, APGAR scores, and stillbirths. Statistical significance was set at $p < 0.05$.

- ***Results***

Of 5,731 deliveries during the study period, 5,613 (97.9%) had complete data for analysis out of which Eighty-five (1.5%) were adolescent mothers. Most adolescents were primigravidae (83.5%), nulliparous (91.8%), and unbooked (64.7%). Vaginal delivery was the predominant mode of delivery (65.9%). Primary postpartum hemorrhage occurred in 3.5% of cases, with one maternal death recorded accounting for 1.18%. The mean birth weight of babies of adolescent mothers was 2.69kg with stillbirths occurring in 8.2% of the deliveries. Although neonatal mortality was almost twice as high in adolescent mothers (4.2%), the difference did not reach statistical significance. The maternal outcomes were comparable. Twin gestations represented 3.5% of cases, and no triplets were recorded.

- ***Conclusion***

Adolescent pregnancies at EKSUTH constitute a small but important proportion of deliveries, with generally favorable maternal but poorer perinatal outcomes. Strengthening adolescent reproductive health education, improving antenatal care access, and providing adolescent-friendly obstetric services are essential to mitigate these risks and enhance outcomes.

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Keywords: *Adolescent Pregnancy, Delivery Outcomes, Maternal Health, Perinatal Outcomes, Ekiti State University Teaching Hospital, Nigeria.*

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I. INTRODUCTION

➢ *Background*

Adolescent pregnancy remains a major global public health challenge affecting both developed and developing nations and with profound social, economic, and health implications(1,2). Adolescence, is the period between 10 and 19 years of age and is a transitional phase from childhood to adulthood which is characterized by rapid physical, physiological and psychological development and pregnancy during this stage is associated with unique risks as adolescents are not yet fully developed physically or mentally to cope with the demands of pregnancy and childbirth(3).

Globally, about 11% of childbirths occur amongst adolescents between the age of 15–19 years, with 95% of these births occurring in low- and middle-income countries, giving an average of 12 million yearly adolescent deliveries in these regions(4). The global adolescent fertility rate stands at about 44 births per 1,000 girls aged 15–19 years, but the burden is disproportionately higher in sub-Saharan Africa(5,6). In Nigeria, adolescent pregnancy remains a major reproductive health issue. The Nigeria Demographic and Health Survey (NDHS) 2018 reported that 19% of adolescent girls aged 15–19 years had begun childbearing, and the adolescent fertility rate was 106 births per 1,000 girls(7). Contributing factors identified include early marriage, poverty, low educational attainment, limited access to family planning services, and prevailing cultural norms that encourage early childbearing(8).

Pregnancy is an adolescent mother can be froth with complications stemming from poor nutritional status. They are also prone to obstructed labour due to short stature and inadequate pelvises(9). Although findings from previous studies have been inconsistent, wherein large population based cohort study carried out in low- and middle-income countries showed similar risk of adverse maternal outcome between adolescent and older women, as different from a study carried out in Zambia that showed a higher risk of complications for adolescent mothers in terms of anaemia, pre-eclampsia, prolonged labour and post-partum hemorrhage(10).

➢ *Problem Statement*

Despite global and national efforts to reduce teenage pregnancy through implementation of policies, education, and improved access to reproductive health services, adolescent pregnancies continue to pose a significant challenge. In Africa, adolescent deliveries still account for a measurable proportion of all births with increased risks of poor obstetric outcomes(11). At Ekiti State University Teaching Hospital (EKSUTH), Nigeria, anecdotal observations suggest that adolescent pregnancies contribute to considerable obstetrics and neonatal morbidity, yet comprehensive data quantifying this burden are scarce. The absence of local evidence limits the ability to develop targeted interventions aimed at improving maternal and perinatal outcomes among adolescent mothers in this setting.

While numerous studies have been carried out on adolescent pregnancy across Nigeria, limited data exist for Ekiti State and the southwestern region, particularly within tertiary healthcare settings. Understanding the burden, obstetric characteristics, and outcomes in this population is essential for designing context-specific interventions. This study therefore aims to fill this gap by providing empirical evidence from Ekiti State University Teaching Hospital (EKSUTH), contributing to regional and national data on adolescent pregnancy outcomes.

➢ *Aims and Objectives:*

- *Primary Aim*

To determine the burden and delivery outcomes among adolescent mothers managed at Ekiti State University Teaching Hospital, Ado-Ekiti, over a 5-year period.

- *Objectives*

✓ To describe the obstetric characteristics of adolescent mothers who delivered at the hospital.
✓ To assess and compare the pattern of maternal outcomes such as mode of delivery, occurrence of complication-postpartum hemorrhage, and maternal mortality between adolescent and adult mothers.
✓ To evaluate and compare perinatal outcomes, including birth weight, if pregnancy was term, APGAR scores and stillbirth between adolescent and adult mothers.
✓ To generate evidence-based recommendations for improving maternal and perinatal care among adolescent mothers in the study setting.

II. METHODOLOGY

➢ *Study Design*

This study was a retrospective descriptive and comparative study conducted to determine the burden and delivery outcomes among adolescent mothers managed at the Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti, over a 5-year period. The study also compared outcomes between adolescent and older mothers delivered during the same period.

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➢ *Study Setting*

The study was carried out in the Department of Obstetrics and Gynaecology, Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti, the main tertiary health facility in Ekiti State, southwest Nigeria. EKSUTH serves as a referral center for primary and secondary health facilities within the state and neighboring areas. The hospital has a well-equipped maternity unit comprising antenatal, labour, postnatal, and neonatal care sections. On average, the labour ward conducts between 1,000 and 1,200 deliveries annually.

➢ *Study Population*

The study population comprised all women who delivered at EKSUTH between 1st April 2020 and 31st March 2025, as recorded in the labour ward register.

Adolescent mothers were defined as those aged 10–19 years, while older mothers were those aged 20 years and above at the time of delivery.

➢ *Inclusion and Exclusion criteria*

- *Inclusion Criteria*

All deliveries recorded in the labour ward register between 1st April 2020 and 31st March 2025 Cases with complete demographic and obstetric data, including maternal age, mode of delivery, and neonatal outcomes.

- *Exclusion Criteria*

Records with missing maternal age or incomplete delivery information. Women delivered outside EKSUTH but recorded for referral purposes only.

➢ *Sample Size and Sampling Technique*

A total of 5,731 delivery records were reviewed. After data cleaning and exclusion of incomplete entries, 5,613 records (97.9%) were analyzed. From these, 85 mothers (1.5%) were adolescents aged 10–19 years, while 5,528 (98.5%) were aged 20 years and above.

A census sampling technique was employed, meaning all eligible cases within the study period were included.

➢ *Data Collection*

Data were extracted from the labour ward register using a structured proforma. The extracted variables included:

- Maternal sociodemographic and obstetric data: age, parity, booking status, gestational age at delivery, and plurality.
- Maternal outcomes: mode of delivery, presence of primary postpartum hemorrhage (PPH), and maternal survival or mortality.
- Perinatal outcomes: birth weight, APGAR scores at 1 and 5 minutes, term/preterm status, stillbirths, and neonatal survival.
- Data extraction was carried out by the researcher and other trained assistants under supervision to ensure accuracy and completeness.

➢ *Data Analysis*

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 28. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the characteristics and outcomes. Statistical significance was set at $p < 0.05$.

➢ *Ethical Considerations*

Ethical approval for this study was obtained from the Ekiti State University Teaching Hospital Ethics and Research Committee. Permission to access the labour ward register was granted by the Head of the Department of Obstetrics and Gynaecology. Since the study utilized secondary data from hospital records without personal identifiers, patient confidentiality was strictly maintained.

➢ *Study Limitations*

As a retrospective review, the study was limited by incomplete documentation in some cases, resulting in exclusion of 118 records. Additionally, some clinical details such as socio-economic status, antenatal complications, and long-term neonatal outcomes were not consistently recorded. Nevertheless, the large sample size and 5-year review period provide a robust overview of adolescent pregnancy outcomes in this setting.

III. RESULTS

A total of 5,731 deliveries were recorded during the study period (April 2020 – March 2025).

Table 1 shows the burden of adolescent deliveries. 5,613 (97.9%) had complete age data out of which 85 mothers (1.5%) were adolescents aged 10–19 years, while 5,528 (98.5%) were aged 20 years and above.

Table 2 depicts the obstetric characteristics of Adolescent Mothers. Most adolescent mothers were primigravidae (83.5%) and nulliparous (91.8%). Over half (64.7%) were unbooked for antenatal care at the hospital. Many (72.9%) carried their pregnancy to 37 weeks and beyond. Majority (96.5%) were singleton pregnancies and twin gestations accounted for 3.5%, with no triplet deliveries recorded.

Table 3 demonstrates maternal outcomes among adolescent versus adult Mothers. Among adolescents, 56(65.9%) had vaginal and 29(34.1%) had caesarean sections (CS). Among older mothers, 2,941(53.2%) delivered vaginally and 2,587(46.8%) had CS. There was a statistically significant association between maternal age group and mode of delivery ($\chi^2 = 4.91$, $p = 0.026$), with adolescents less likely to undergo CS compared with older mothers.

Primary PPH occurred in 3(3.5%) adolescents and 112(2.0%) older mothers. The difference in PPH rates between groups was not statistically significant ($\chi^2 = 0.34$, $p = 0.565$).

Maternal survival was high in both groups. Among adolescents, 84(98.8%) survived with only 1(1.12%); among

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older mothers, majority (99.2%) survived with mortality occurring in just 0.8%. Fisher's exact test showed no significant difference in maternal outcome between groups (odds ratio = 0.64, p = 0.48).

Summary from table 3 shows that adolescents had a significantly lower CS rate than older mothers (p = 0.026). There were no statistically significant differences between adolescents and older mothers in the rates of primary PPH or maternal survival.

Table 4 reveals the neonatal outcomes of adolescent versus adult mothers. The mean birth weight differed significantly between adolescent and adult mothers, with adolescents delivering smaller babies. Infants of adolescent mothers had a mean birth weight of 2.69 ± 0.58 kg (95% CI: 2.56–2.82), compared with 2.99 ± 0.64 kg (95% CI: 2.97–3.02) among infants of adult mothers. A two-sample t-test showed a statistically significant difference (t = 4.42, p < 0.001).

The mean APGAR score at 1 minute was significantly lower among infants born to adolescent mothers (6.31 ± 2.34, 95% CI: 5.79–6.83) compared with those born to adult mothers (6.90 ± 1.90, 95% CI: 6.82–6.99). A t-test showed a significant difference (t = 3.42, p = 0.001). At 5 minutes, infants of adolescent mothers also had significantly lower APGAR scores (7.71 ± 2.68, 95% CI: 7.12–8.30) compared with infants of adult mothers (8.42 ± 2.05, 95% CI: 8.33–8.51). The difference remained statistically significant (t = 3.12, p = 0.002). Thus, adolescents had poorer neonatal condition at both 1 and 5 minutes.

In evaluating the neonatal outcome, adolescent mothers experienced a higher proportion of stillbirth (8.2%, 7/85) compared with adult mothers (4.2%, 236/5646). Although neonatal mortality was almost twice as high in adolescent mothers, the difference did not reach statistical significance ($\chi^2 = 2.47$, p = 0.116).

Table 1 Burden of Adolescent Deliveries

Age Group (Years)				
	10–19 yrs (Adolescent) N (%)	≥20 yrs (Older mothers) N (%)	Total N (%)	Statistical tests
Age group	85(1.5)	5528(98.5)	5613(100)	$\chi2$=4401.1, p<0.0001

Table 2 Obstetrics Characteristics

Gravidity						
	Gravida 1 N (%)	Gravida 2 N (%)	Gravida ≥3 N (%)	NaN N (%)	Total N (%)	Statistical tests
Gravidity	71(83.5)	6(7.1)	4(4.7)	4(4.7)	85(100)	$\chi^2 = 155.3$, p < 0.0001
NaN – Missing data						
Parity						
	Para 0 n(%)	Para 1 n(%)	NaN n(%)	Total n(%)	Statistical tests	
Parity	78(91.8)	3(3.5)	4(4.7)	85(100)	$\chi^2 = 130.6$, p < 0.0001	
Booking Status						
	Booked n(%)	Unbooked n(%)	Total n(%)	Statistical tests		
Booking Status	30(35.3)	55(64.7)	85(100)	$\chi^2 = 7.36$, p = 0.0066		
Gestational age						
	Preterm (<37 weeks) n(%)	Term (≥37 weeks) n(%)	NaN n(%)	Total n(%)	Statistical tests	
Gestational age	18(21.2)	62(72.9)	5(5.9)	85(100)	$\chi^2 = 65.28$, p < 0.0001	
Order of Pregnancy						
	Singleton n(%)	Twin n(%)	Total n(%)	Statistical tests		
Order of Pregnancy	82(96.5)	3(3.5)	85(100)	$\chi^2 = 73.3$, p < 0.0001		

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Table 3 Maternal Outcomes Among Adolescent Versus Adult Mothers

Mode of Delivery (Vaginal vs Caesarean)			
Maternal Age Group	**Vaginal Delivery n(%)**	**Caesarean Section n(%)**	**Total**
Adolescents (10 – 19 years)	56(65.9%)	29 (34.1%)	85
Older Mothers (≥20)	2941 (53.2%)	2587 (46.8%)	5528
$\chi^2 = 4.91$, $p < 0.026$			
Primary Postpartum Haemorrhage			
Maternal Age Group	**PPH n(%)**	**No PPH n(%)**	**Total**
Adolescents (10 – 19 years)	3 (3.5%)	82 (96.5%)	85
Older Mothers (≥20)	112 (2.0%)	5,403 (98.0%)	5515
$\chi^2 = 0.34$, $p < 0.565$			
Maternal Outcome			
Maternal Age Group	Alive n(%)	Dead n(%)	Total
Adolescents (10 – 19 years)	84 (98.82%)	1 (1.18%)	85
Older Mothers (≥20)	5601 (99.20%)	45 (0.80%)	5646
$\chi^2 = 0.000$, $p = 1.000$			

Table 4 Neonatal Outcomes of Adolescent versus Adult Mothers

Birth weight Comparison				
Age Group	Mean Birth Weight (Kg)	SD	95% CI	n
Adolescents	2.69	0.58	2.56 – 2.82	80
Adults	2.99	0.64	2.97 – 3.02	5450
Statistical Test A two-sample t-test showed: • $t = 4.42$, $p < 0.001$ • Interpretation: Adolescents delivered significantly smaller babies than adults.				
APGAR score at 1st minute				
Age Group	Mean	SD	95% CI	n
Adolescents	6.32	2.34	5.79 – 6.83	80
Adults	6.90	1.90	6.82 – 6.99	5451
t = 3.42, p = 0.001 **Interpretation:** Adolescents had significantly lower APGAR scores at 1 minute.				
APGAR score at 5th minute				
Age Group	Mean	SD	95% CI	n
Adolescents	7.71	2.68	7.12 – 8.30	79
Adults	8.42	2.05	8.33 – 8.51	5415
• **t = 3.12, p = 0.002** • **Interpretation:** Adolescents also had significantly lower APGAR scores at 5 minutes.				
Neonatal Outcome				
Age Group	Alive n(%)	Stillbirth n(%)	Total n(%)	
Adolescents	78(91.8%)	7(8.2%)	85(100%)	
Adults	5410(95.8%)	236(4.2%)	5646(100%6)	
• **$\chi^2 = 2.47$, p = 0.116** • **Interpretation:** Neonatal death was higher among adolescents, but **not statistically significant**.				

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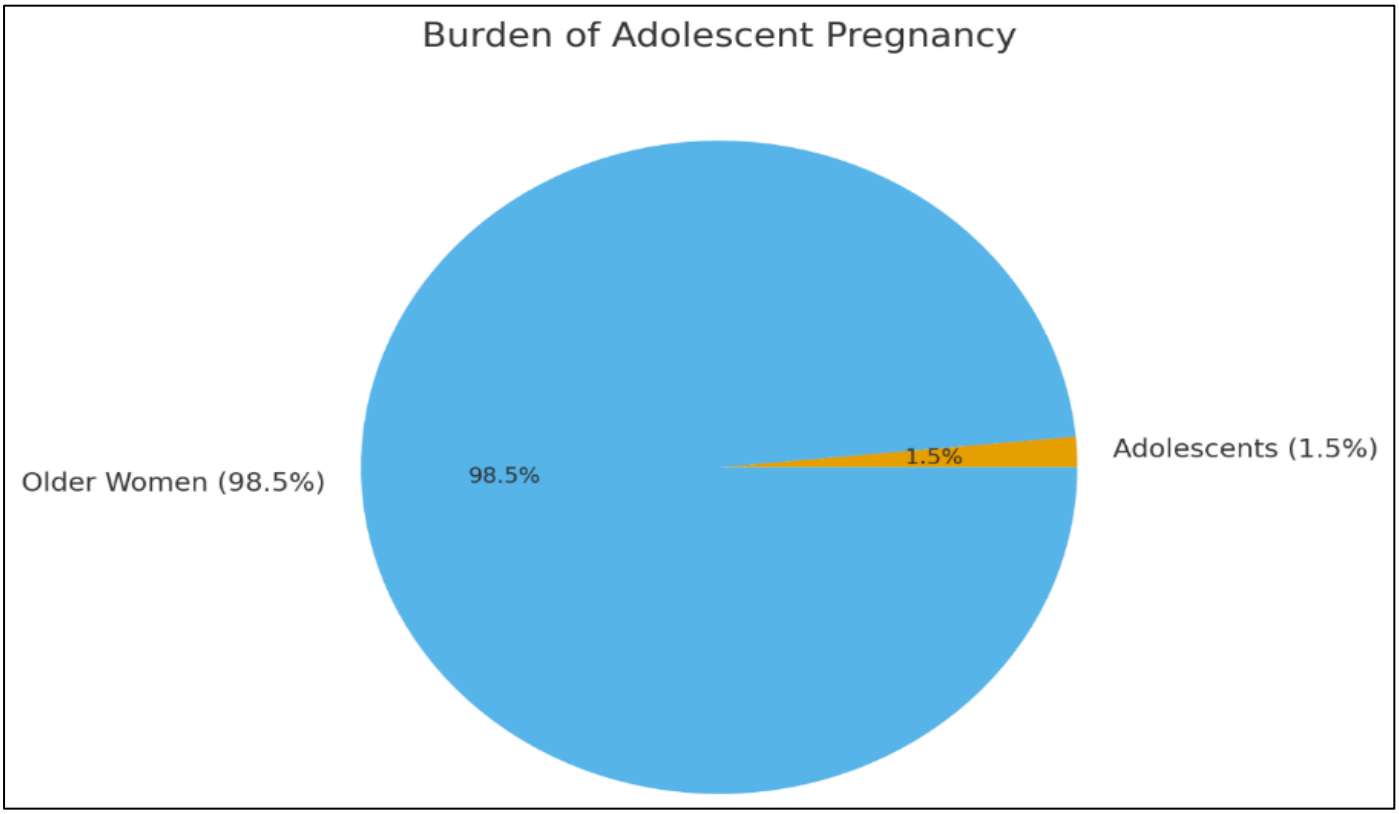

Fig 1 Burden of Adolescent Pregnancy

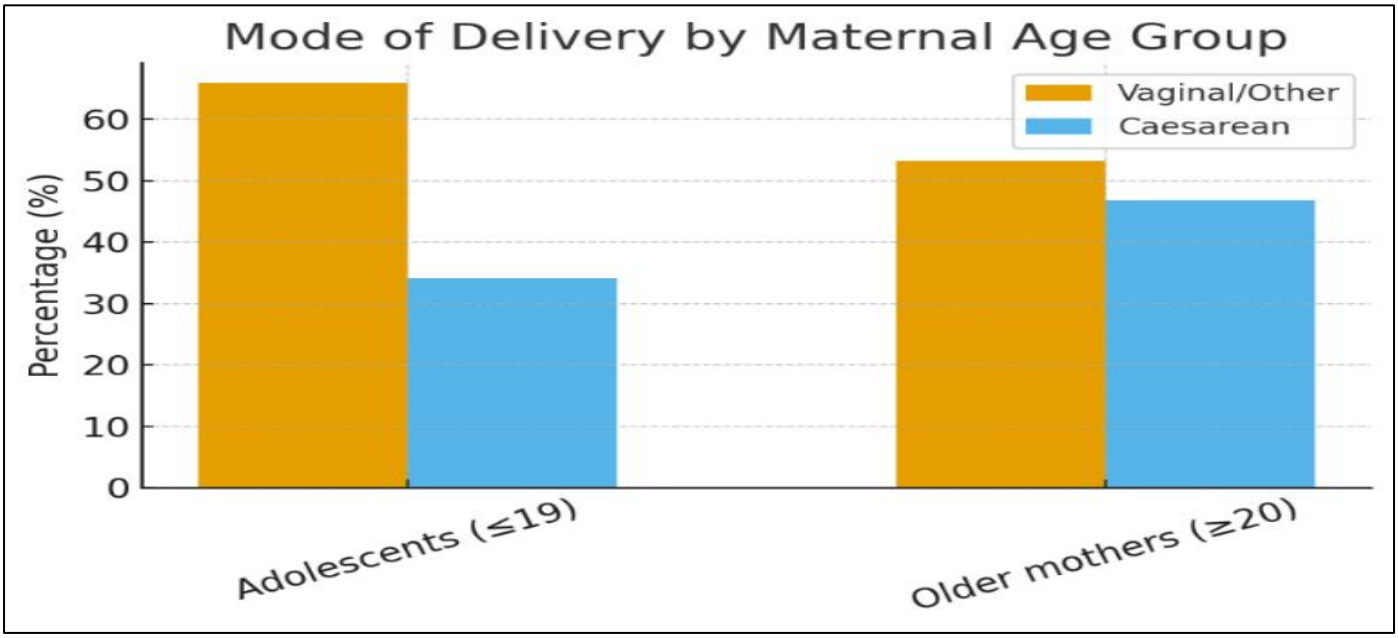

Fig 2 Mode of Delivery by Maternal Age Group

IV. DISCUSSION

This study assessed the burden, obstetric characteristics, and maternal and neonatal outcomes of adolescent mothers compared with adult mothers in a large tertiary healthcare facility. The prevalence of adolescent deliveries was 1.5%, indicating that adolescent childbearing contributes a small but significant proportion of institutional births. Although this prevalence is similar to the prevalence from a study carried out in Cameroon (1.3%), it is far less from a prevalence of 5.1% and 6.2% from Korle Bu Teaching Hospital and Southern Nigeria respectively(12). According to World Health Organization, WHO, the lowest rate of 0.7% has been reported in Japan, an economically developed nation while the highest rate of 28.8% has been reported in Nicaragua, a third-world country(13). The relatively lower prevalence in EKSUTH may reflect improved access to education, contraception, and adolescent reproductive health services; however, it also signals that existing preventive measures have not entirely eliminated early pregnancy.

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A majority of adolescent mothers were primigravid and nulliparous, consistent with global patterns in which adolescent pregnancy often represents a first pregnancy(14,15). The high rate of unbooked is particularly concerning and highlights persistent barriers to antenatal care utilization among adolescents, which are documented facts may stem from low socio-economic status, social stigma and lack of support(16). Poor antenatal attendance among adolescents is also well-documented risk for adverse outcomes due to missed opportunities for early detection and management of complications(3,17).

Preterm deliveries are established consequences of adolescent pregnancies amongst other complications(18,19). In this study, majority of adolescent pregnancies progressed to term, with preterm delivery rates of 21.2%. Although this preterm birth prevalence rate is comparable to 23% documented in a systematic review and meta-analysis by DeMarco et al. in 2021, significantly lower prevalence of 7 and 8.1% have been documented by Jain and Wong respectively(20).

Adolescents demonstrated a significantly lower caesarean section (CS) rate compared with adult mothers (34.1% vs 46.8%, p = 0.026). Caesarean section rate increases with increasing maternal age(21,22). However, from this study, the lower rate of CS in adolescents may indicate underutilization of CS due to delayed presentation, sociocultural reluctance, or systemic biases that prioritize vaginal delivery in younger mothers. Despite these differences, postpartum haemorrhage (PPH) rates were similar across both groups, aligning with literature which found out that increase in maternal age does not automatically translate to increased risk of PPH(23).

Maternal mortality was rare in both groups, with no significant differences just as was found by Zhang(13). Although adolescents showed a slightly higher proportional mortality (1.18% vs 0.80%), the small numbers limit interpretability. The overall favorable maternal outcomes may reflect improved obstetric care, particularly in tertiary settings. Neonatal outcomes, however, revealed notable disparities. Adolescents delivered significantly smaller babies. Low birth weight among adolescents is widely documented and may be attributable to factors such as poor maternal nutrition, inadequate antenatal care, low socioeconomic status and biological immaturity, amongst others(3,24–26).

Similarly, APGAR scores at both 1 and 5 minutes were significantly lower among infants of adolescent mothers. Low APGAR scores may reflect physiological immaturity associated with lower birth weight(27,28). These findings highlight the vulnerability of infants born to adolescent mothers and reinforce that early pregnancy carries heightened neonatal risks, even where maternal outcomes appear relatively favorable. Although adolescents recorded a higher proportion of stillbirths, the difference was not statistically significant. The lack of statistical significance may be due to the smaller adolescent sample size, but the trend is important and aligns with global evidence linking adolescent pregnancy with poorer neonatal survival.

V. IMPLICATIONS FOR PUBLIC HEALTH/ CLINICAL PRACTICE AND RECOMMENDATIONS

The findings demonstrated that while adolescent pregnancy may not substantially increase direct maternal complications in this setting, it is associated with significant neonatal vulnerabilities. The consistently poorer neonatal indices—lower birth weights, reduced APGAR scores, and higher stillbirth rates—suggest that adolescent mothers require targeted support to mitigate these risks. Interventions should prioritize community-based sexual and reproductive health education to prevent early pregnancy. enhanced antenatal care engagement, including adolescent-friendly services that reduce stigma, cost, and accessibility barriers. Early identification of fetal growth restriction and preterm labour risk, through strengthened antenatal surveillance. Train staff in adolescent-friendly care, confidentiality and non-judgmental communication. Provide integrated postpartum care: contraception, breastfeeding and psychosocial support. Link facility care with community and school reintegration programs.

- *Strengths and Limitations*

The study benefits from a large comparative adult sample, increasing the robustness of statistical comparisons. However, its retrospective design may introduce documentation biases. Missing data in parity and gestational age underscore challenges in routine record-keeping. Additionally, the relatively small number of adolescent pregnancies limits the power to detect differences in uncommon outcomes such as mortality.

VI. CONCLUSION

Adolescent pregnancy remains an important public health concern with significant neonatal consequences. Despite comparable maternal outcomes, the increased risk of low birth weight and depressed APGAR scores among infants born to adolescent mothers calls for intensified efforts to prevent early pregnancy and to enhance antenatal and perinatal care for pregnant adolescents. Strengthening adolescent-friendly health services and addressing the social determinants of early pregnancy will be essential for improving both maternal and neonatal outcomes in this population.

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