https://doi.org/10.29309/TPMJ/2025.32.10.9810

The Professional Medical Journal
www.theprofesional.com
2025, Volume, 32 Issue, 10

ORIGINAL ARTICLE

Comparison of frequency of obstetrical and neonatal outcomes in teenage versus adult pregnancy.

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Article Citation: Younas Z, Majeed S, Khan S, Maqsood S, Shaheen S. Comparison of frequency of obstetrical and neonatal outcomes in teenage versus adult pregnancy. Professional Med J 2025; 32(10):1330-1334. https://doi.org/10.29309/TPMJ/2025.32.10.9810

ABSTRACT… Objective: To determine and compare the frequency of maternal anemia, lower segment caesarian section and low birth weight in teenage and adult pregnancy. **Study Design:** Analytical Cohort study. **Setting:** Department of Obstetrics and Gynecology, Allied Hospital Faisalabad. **Period:** June 2024 to December 2024. **Methods:** After approval from ethical review committee, a total of 124 pregnant females up to the age of 35 years and fulfilling selection criteria were selected from outdoor department, labor room and operation theatre of Allied hospital Faisalabad. Based on the age of the pregnant females they were included in one of the two equal numbered groups having 62 participants in each i.e. "exposed teenagers group" if aged ≤19 years and "unexposed adults group" if aged 20-35 years. Informed consent and demographic information was obtained. Participants were screened for anemia defined as hemoglobin levels of <11g/dl and were assessed for mode of delivery i.e. caesarian section or normal vaginal delivery. All the neonates of the participants were weighed upon birth to screen for low birth weight defined as birth weight of ≤2500g. All the data was entered in the study pro forma and was analyzed using SPSS version-25. P value of ≤ 0.05 was taken as significant. **Results:** Data analysis showed that the frequencies of maternal anemia, lower segment caesarian section and low birth weight in exposed group were 51.6% (n=32), 69.4% (n=43) and 61.3% (n=38) respectively, while in the unexposed group the respective frequencies were 14.5% (n=9), 40.3% (n=25) and 24.2% (n=15). Comparison showed that the frequencies of maternal anemia, lower segment caesarian section and low birth weight were significantly high in exposed group as compared to those of in unexposed group as the calculated P values for these outcomes were 0.000, 0.001 and 0.000 respectively. **Conclusion:** There is a strong association of adverse obstetrical and neonatal outcome with teenage pregnancies when compared with adult age pregnancy.

Key words: Lower Segment Caesarian Section, Low Birth Weight, Maternal Anemia, Obstetrical and Neonatal Outcomes, Teenage Pregnancy.

INTRODUCTION

The World Health Organization (WHO) defines adolescent or teenage pregnancy as the occurrence of conception in females aged between 10 and 19 years.[1] Across both high-income and low- to middle-income countries, numerous epidemiological studies have consistently demonstrated that adolescent mothers are at elevated risk for maternal anemia and are more likely to deliver prematurely, thereby contributing to suboptimal obstetric and neonatal outcomes.[2,3] The prevalence of unfavorable perinatal events has been reported to be disproportionately higher among adolescent pregnancies when compared to adult counterparts. Broadly, teenage gestation is widely acknowledged to be associated with a heightened risk of maternal complications and adverse outcomes surrounding child birth.[4]

One investigation found a statistically significant elevation in pregnancy-related complications among adolescent mothers, including preterm birth (12.9% in adolescents versus 4.5% in adults), postpartum hemorrhage (3.8% vs. 5.5%), and low birth weight neonates (17.5% vs. 6.8%).[5] Nevertheless, subsequent advancements in perinatal and antenatal care have prompted re-evaluation of these outcomes. Some recent analyses have failed to identify significant disparities between early adolescents and older

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Article received on: 28/04/2025
Accepted for publication: 30/06/2025

adolescents, suggesting that chronological age within adolescence may not be a uniformly predictive factor for obstetric risk.[6]

Further evidence supporting the increased obstetric vulnerability of adolescent pregnancies comes from studies that report higher incidence of maternal anemia (30.9% vs. 17.2%), preterm labor (54.1% vs. 32.1%), postpartum hemorrhage (3.9% vs. 1.5%), and poor neonatal outcomes including low birth weight (50.8% vs. 71.4%) and suboptimal Apgar scores at birth (3.9% vs. 4.4%).[7] Another study confirmed that there is increased incidence of lower segment caesarian section (LSCS) in pregnant teenage mothers (35.6%) as compared to the adult pregnant mothers (22%) and P value was found to be <0.05.[8] These data suggest that adolescent parturients remain a clinically vulnerable group, especially in settings where obstetric care resources are limited or inconsistently utilized.

Although some investigations have posited that adolescent pregnancies may not be significantly associated with worsened maternal outcomes, these pregnancies are still correlated with inferior perinatal results, particularly among the younger subset of adolescent mothers. Such findings emphasize the impact of physiological immaturity over socio-demographic variables or disparities in access to antenatal care. This is particularly relevant in regions such as South Asia, where the declining prevalence of teenage pregnancy is largely confined to older adolescents. In these contexts, biological factors appear to play a more central role in shaping perinatal morbidity than previously assumed.[9]

Contrastingly, not all published data uniformly endorse a strong correlation between adolescent pregnancy and obstetric risk. One comparative analysis revealed comparable rates of complications between adolescent and adult mothers, including anemia (17.78% vs. 14.60%), preterm delivery (12.1% vs. 9.48%), postpartum hemorrhage (3.56% vs. 3.25%), low birth weight (10.34% vs. 7.6%), low Apgar scores (1.57% vs. 1.36%), and respiratory distress (1.82% in both groups).[10] A subsequent study further nuanced this debate, presenting relatively modest differences in outcomes between adolescent and adult pregnancies: anemia (24.5% vs. 25.2%), preterm birth (7.5% vs. 5.2%), postpartum hemorrhage (0.3% in both groups), low birth weight (14.4% vs. 11.9%), and low Apgar scores (0.3% vs. 0.25%).[11] These conflicting reports indicate that the risks associated with adolescent pregnancy may vary significantly depending on geographic, socioeconomic, and healthcare access contexts.

The overarching aim of the present study is to elucidate the relationship between teenage pregnancy and adverse maternal and neonatal outcomes within a defined local population by objectively comparing the frequency of three common and specifically defined outcomes: maternal anemia, lower segment caesarian section (LSCS) and low birth weight in teenage versus adult pregnancies. The ultimate goal was to optimize maternal and neonatal health metrics in adolescent pregnancies in our regional context and to establish protocols that effectively mitigate associated risks in similar healthcare settings.

METHODS

This analytical cohort study was conducted at the Department of Obstetrics and Gynecology, Allied Hospital Faisalabad, from June to December 2024. After ethical approval (48:ERC/FMU/2022-33/285 Date: 10-6-23) and informed consent, 124 pregnant females with gestational age >28 weeks were enrolled through non-probability consecutive sampling. Participants were assigned to either the exposed group (teenage females aged 16–19 years) or the unexposed group (adult females aged 20–40 years) and parity of each of the participant was noted. Exclusion criteria included a history of medications potentially affecting pregnancy outcomes (e.g., corticosteroids, antiepileptics, anticonvulsants, teratogenic drugs), molar pregnancies, prior abortions, and pre-existing conditions such as diabetes mellitus, hypertension, renal disease, cardiac disease, asthma, or tuberculosis.

Hemoglobin level was assessed through antenatal blood sample, with anemia defined as hemoglobin <11 g/dL and BMI was calculated

using the standard formula after recording height in meters and weight in kilograms of the participating female. At delivery, mode of delivery (normal vaginal or lower segment cesarean section) and neonatal birth weight were recorded; low birth weight was defined as <2.5 kg. All patients and neonates received standard clinical care. Data were documented using a structured pro forma and analyzed in SPSS version 25. Quantitative variables (e.g. chronological age, gestational age and BMI) were reported as mean ± standard deviation, while qualitative variables (e.g. parity, anemia, LSCS, low birth weight) were presented as frequencies and percentages. Group comparisons were performed using the chi-square test, with $p \leq 0.005$ considered statistically significant. The data was stratified for age, parity, mode of delivery and BMI. Post-stratification, Relative risk was calculated to measure association of teenage pregnancy with adverse obstetric outcome in each stratum. RR>1 was considered as significant.

RESULTS

Both the groups i.e. exposed and unexposed having 62 participants in each were comparable in terms of mean gestational age (P=0.399) but they differed significantly (P<0.001) in terms of BMI, parity status and mean chronological age. Comparison of these characteristics is represented in detail in Table-I.

Variable	Exposed (n= 62)	Unexposed (n=62)	P-Value
Mean gestational age (Weeks)	31.10±2.44	31.45±2.16	0.399
Mean chronological age (Years)	17.53±1.07	26.58±3.47	<0.001
Mean BMI (Kg/m^2)	28.66±1.91	30.45±2.93	<0.001
% of parity 0-1	87.1% (n= 54)	66.1% (n=41)	0.005
% of parity >1	12.9% (n= 8)	33.9% (n= 21)	0.005

Table-I. Descriptive characteristics of participants in exposed and unexposed groups.

Comparison of maternal and fetal outcomes across exposed and unexposed groups revealed statistically significant differences in terms of frequency of maternal anemia (P<0.001), frequency of LSCS (P= 0.001) and low birth weight (P<0.001).Post stratification relative risk calculation proved a statistically significant association of teenage pregnancy with adverse maternal and fetal outcomes as is presented in detail in Table-II, Table-III, and Table-IV.

Anemia	Group		Total	P value	RR
	Exposed	Un-exposed			
Yes	32	9	41	0.000	6.281
	51.6%	14.5%	33.1%		
No	30	53	83		
	48.4%	85.5%	66.9%		

Table-II. Comparison of frequency of maternal anemia in both groups.

Mode of Delivery	Group		Total	P-Value	RR
	Exposed	Un exposed			
Vaginal	19	37	56	0.001	0.299
	30.6%	59.7%	45.2%		
LSCS	43	25	68		
	69.4%	40.3%	54.8%		

Table-III. Comparison of frequency of mode of delivery in both groups.

LBW	Group		Total	P value	RR
	Exposed	Un exposed			
Yes	38	15	53	0.000	4.961
	61.3%	24.2%	42.7%		
No	24	47	71		
	38.7%	75.8%	57.3%		

Table-IV. Comparison of frequency of low birth weight in both groups.

DISCUSSION

Adolescent pregnancy is widely recognized as being associated with unfavorable maternal and neonatal outcomes. In addition to biological immaturity, it often coexists with socioeconomic disadvantages such as poverty, low education levels, unemployment, and social isolation.

This study aimed to assess the association between maternal anemia, lower segment caesarean section (LSCS), and low birth weight with teenage pregnancies. While previous literature characterizes teenage pregnancy as high-risk due to multiple biological and psychosocial vulnerabilities, evidence remains inconsistent, particularly in local contexts. Our objective was to address this gap and generate locally applicable data to guide clinical and public health strategies.

In our findings, the mean age in the exposed (teenage) group was 17.53±1.07 years, with a mean gestational age of 31.10±2.44 weeks. The exposed group had a higher frequency of LSCS (69.4% vs. 40.3%), maternal anemia (51.6% vs. 14.5%), and low birth weight (61.3% vs. 24.2%) compared to the unexposed group, with statistically significant p-values and high relative risks (RR = 0.299, 6.281, and 4.961, respectively).

Our results align with earlier studies, such as one reporting high frequency of low birth weight in teenage pregnancies (17.5% vs. 6.8%)[5] and another documenting high frequencies of anemia (30.9% vs. 17.2%) and low birth weight (50.8% vs. 71.4%)[7] In our study, the high frequency of low birth weight in teenage pregnancy may reflect a combination of maternal anemia, poor nutrition, and possibly undetected preterm births. While some studies note no significant differences between early and late adolescents[6], others, like a UK-based study[12] conducted at Bradford Royal Infirmary, reported increased odds of extremely low birth weight in adolescents and found higher rates of caesarean and instrumental deliveries. Some studies have highlighted that spontaneous preterm delivery[13] and intrauterine growth restriction[14] have been shown to be associated with maternal undernutrition[13,15,16] and smoking that are more commonly seen in teenage pregnant population.

Taken together, our findings reinforce that teenage pregnancy is associated with significantly poorer obstetrical and neonatal outcomes, likely driven by a mix of physiological immaturity and modifiable risk factors such as nutrition and prenatal care access. These findings highlight the need for targeted interventions, including education, improved antenatal care, and preventive strategies to delay early childbearing in vulnerable populations. Further research is needed to target these mechanisms and develop effective interventions.

This study's strengths include its focused comparison and use of well-defined clinical outcomes. However, limitations include a relatively small sample size, single-center design, and lack of data on other confounding factors like socioeconomic status, nutritional history, antenatal care frequency, and pre-term deliveries.

CONCLUSION

This study demonstrates a clear association between teenage pregnancy and increased risk of maternal anemia, LSCS, and low birth weight in neonates. These findings advocate for categorizing teenage pregnancies as high-risk and underscore the importance of tailored antenatal, intra-partum, and postnatal care protocols for this vulnerable population.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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2	**Saira Majeed:** Concept and design, data collection, statistical analysis, draft proof reading.
3	**Shehreen Khan:** Concept and design, data collection, statistical analysis, draft.
4	**Sehrish Maqsood:** Concept and design, data collection, statistical analysis, draft proof reading.
5	**Shazia Shaheen:** Concept and design, data collection, statistical analysis, draft proof reading.