Published by
Saidu Medical College

OPEN ACCESS

Original Article

Perinatal and Maternal Outcomes in Teenage Pregnancy: A Prospective Observational Study from a Tertiary Care Hospital in Swat, Pakistan

Hina Zada[1] & Uzma Khan[2]
[1]Gulrang International Hospital, Swat, Pakistan
[2]Jalil International Hospital, Swat, Pakistan

https://doi.org/10.52206/jsmc.2026.16.1.1277

Abstract

Background: Teenage pregnancy remains a significant public health concern worldwide, particularly in low- and middle-income countries, where early childbearing is influenced by social, cultural, and economic determinants. Adolescent mothers are at increased risk of adverse maternal and perinatal outcomes, including preeclampsia, preterm delivery, and low birth weight. Despite its clinical relevance, local evidence from Pakistan, especially from rural settings, remains limited.

Objective: To determine the frequency of adverse maternal and perinatal outcomes among teenage pregnancies presenting to a tertiary care hospital in Swat.

Methodology: This descriptive prospective observational study was conducted from 15 November 2021 to 15 May 2022 at the Department of Obstetrics and Gynecology, Saidu Group of Teaching Hospital, Swat. A total of 139 pregnant adolescents aged 13–19 years were enrolled through non-probability consecutive sampling. Maternal and perinatal outcomes, including cesarean delivery, preeclampsia, preterm delivery, small for gestational age, and low birth weight, were recorded using standardized clinical definitions. Data were analyzed using SPSS version 23, and associations were assessed through stratification and multivariate logistic regression analysis.

Results: Cesarean delivery was observed in 44.6% of cases, preeclampsia in 25.2%, preterm delivery in 15.8%, small for gestational age in 18.7%, and low birth weight in 24.5%. Gestational age showed a statistically significant association with preterm delivery ($p = 0.001$) and small for gestational age ($p = 0.002$). Multivariate analysis confirmed gestational age as a significant predictor of preterm delivery and SGA, while maternal age and residential status were not significantly associated with adverse outcomes.

Conclusion: Teenage pregnancy is associated with a high burden of adverse maternal and perinatal outcomes. Strengthening targeted antenatal care, early identification of high-risk pregnancies, and focused health education interventions are essential to improve outcomes in this vulnerable population.

Keywords: Cesarean Section, Gestational Age, Infant, Low Birth Weight, Pre-Eclampsia, Premature Birth, Teenage Pregnancy.

ISSN (P): 1819-4583
ISSN (E): 3007-9470

Copyright © Copyright (c) 2026 The authors retain the copyrights. Authors are permitted and encouraged to post their work online (e.g. in institutional repositories or on their website), as it can lead to productive exchanges, as well as greater citation of published work.

Citation:
Zada H, Khan U. Perinatal and Maternal Outcomes in Teenage Pregnancy: A Prospective Observational Study from a Tertiary Care Hospital in Swat, Pakistan. *J Saidu Med Coll.* 2026;16(1):142–149.

Corresponding Author:
Dr. Hina Zada
Consultant Gynaecologist,
Department of Obs/Gynae,
Gulrang International Hospital, Swat, Pakistan
hinazada123@gmail.com

Funding:
The authors received no external funding for this study.

Conflicts of Interests:
The authors have declared that no competing interests exist.

Data Sharing Statement:
The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

Received: March 25, 2025
1st Revision: October 07, 2025
Accepted: December 02, 2025

Introduction

Teenage pregnancy, defined as pregnancy occurring in girls younger than 20 years of age, remains a significant global public health concern, particularly in low- and middle-income countries [1]. Social, cultural, and economic determinants play a pivotal role in the high prevalence of adolescent pregnancies in these regions [2]. Early initiation of sexual activity, inadequate sexual and reproductive health education, and improper or inconsistent use of contraceptives are widely recognized contributors [3]. In addition, peer influence, prevailing social norms, and, in some circumstances, coercion or abuse further increase adolescents' vulnerability to early pregnancy [4].

Teenage mothers are frequently socioeconomically disadvantaged and have limited access to education and healthcare services, which intensifies both the short- and long-term consequences of early childbearing [5]. Effective management of adolescent pregnancy therefore requires a comprehensive and multidisciplinary approach that addresses medical, psychological, and social dimensions of care [6]. Timely and adequate antenatal care is essential for the early identification and management of pregnancy-related complications such as hypertension, gestational diabetes, and preterm labor, which occur more commonly in adolescent pregnancies [7]. However, psychological challenges including anxiety, depression, and lack of family or social support often complicate care and adversely affect pregnancy outcomes [8].

From a biological perspective, adolescents may be physiologically less prepared to meet the demands of pregnancy, predisposing them to complications such as anemia, preeclampsia, obstructed labor, and postpartum hemorrhage [9–11]. In addition, adolescent mothers are at increased risk of postpartum mental health disorders, including depression, which may further compromise maternal well-being and infant care [12]. Social stigma associated with early motherhood can lead to isolation and reduced emotional and financial support, thereby exacerbating adverse maternal and neonatal outcomes [13].

Adverse perinatal outcomes are also more frequently observed in teenage pregnancies. Infants born to adolescent mothers are at increased risk of prematurity, low birth weight, and small for gestational age status, conditions that are strongly associated with higher neonatal morbidity and mortality [14–16]. These outcomes may result from a combination of biological immaturity, suboptimal maternal nutrition, and inadequate antenatal care [17].

Previous studies have demonstrated considerable variation in maternal and perinatal outcomes among teenage pregnancies across different geographic and healthcare settings. Zhang et al. reported cesarean delivery in 39.1%, preeclampsia in 2.6%, preterm delivery in 7.5%, and small for gestational age infants in 14.4% of adolescent pregnancies [18]. In contrast, Indarti et al. documented substantially higher rates of cesarean delivery, preterm birth, small for gestational age infants, and low birth weight in a tertiary care setting [19]. These discrepancies underscore the influence of regional healthcare access, socioeconomic conditions, and quality of antenatal services on pregnancy outcomes.

Despite the high burden of adolescent pregnancy in Pakistan, particularly in rural and underserved regions, local data on maternal and perinatal outcomes remain limited. Therefore, the present study aimed to evaluate the frequency and determinants of adverse maternal and perinatal outcomes among teenage pregnancies presenting to a tertiary care hospital in Swat. By generating local evidence, this study seeks to inform targeted clinical interventions, strengthen antenatal care strategies, and support policy development aimed at improving maternal and neonatal health in this vulnerable population.

Methodology

Study Design

This study employed a descriptive prospective observational design to evaluate maternal and perinatal outcomes among teenage pregnancies. The prospective nature of the study allowed for systematic follow-up of participants from enrollment until delivery, ensuring accurate documentation of pregnancy-related outcomes as they occurred over time.

Ethics

Ethical approval was obtained from the relevant Institutional Ethical Review Board (Approval No. 78/ERB/SMC/005). All participants were informed in detail about the objectives, procedures, potential risks, and benefits of the study. Written informed consent was obtained prior to enrollment. Confidentiality of participant information was strictly maintained, and data were used solely for research purposes in accordance with ethical research standards.

Setting

The study was conducted in the Department of Obstetrics and Gynecology, Saidu Group of Teaching Hospital, Swat, a tertiary care teaching hospital that serves both urban and

predominantly rural populations. Data collection spanned a six-month period from 15 November 2021 to 15 May 2022, allowing adequate time to capture a representative spectrum of teenage pregnancy outcomes within the region.

Participants

A total of 139 pregnant adolescents aged 13–19 years were enrolled using a non-probability consecutive sampling technique. Inclusion criteria comprised teenage pregnant women with singleton pregnancies, confirmed by ultrasound, and a gestational age greater than 24 weeks. Exclusion criteria included women with pre-existing medical comorbidities such as chronic hypertension, diabetes mellitus, renal disease, unclear last menstrual period, or absence of reliable ultrasound dating, to minimize confounding effects on pregnancy outcomes.

Variables

The primary maternal outcome variables included cesarean delivery and preeclampsia, while perinatal outcomes comprised preterm delivery, small for gestational age (SGA), and low birth weight (LBW). Independent variables included maternal age, gestational age, and residential status (urban or rural). These variables were selected based on their documented relevance to adverse outcomes in adolescent pregnancy.

Data Sources/Measurement

Data were collected using a structured, predesigned proforma. Maternal age, gestational age, and residence were recorded at enrollment. Preeclampsia was defined as blood pressure ≥140/90 mmHg on two occasions with proteinuria >300 mg/24 hours. Preterm delivery was defined as birth occurring before 37 completed weeks of gestation. SGA was classified as birth weight below the 10th percentile for gestational age using standard fetal growth charts, based on ultrasound-derived fetal biometric measurements. Low birth weight was defined as a neonatal weight <2.5 kg at birth. All participants were followed until delivery, and outcomes were recorded contemporaneously to reduce recall bias.

Bias

To reduce selection bias, consecutive eligible patients were enrolled throughout the study period. Measurement bias was minimized through the use of standardized clinical definitions and ultrasound-based assessments. Exclusion of participants with major comorbidities helped control confounding. However, as a single-center observational study, residual confounding due to unmeasured socioeconomic and nutritional factors cannot be completely excluded.

Study Size

The sample size of 139 participants was calculated using the WHO sample size calculator, assuming a 95% confidence level, a 5% margin of error, and an anticipated frequency of preeclampsia of 10% in teenage pregnancies, based on prior literature. This sample size was considered adequate to estimate the frequency of adverse maternal and perinatal outcomes within the study population.

Quantitative Variables

Quantitative variables such as maternal age and gestational age were expressed as mean ± standard deviation (SD). These variables were also categorized where appropriate (e.g., gestational age 24–30 weeks vs. >30 weeks) for stratified and regression analyses to explore associations with adverse outcomes.

Statistical Methods

Data were analyzed using SPSS version 23. Descriptive statistics were calculated for all variables. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations. Associations between demographic variables and maternal or perinatal outcomes were assessed using the chi-square test following stratification. Multivariate logistic regression analysis was performed to compute adjusted odds ratios (ORs) with 95% confidence intervals for key outcomes. A p-value ≤0.05 was considered statistically significant.

Results

Participants

A total of 139 teenage pregnant women met the inclusion criteria and were enrolled in the study during the defined study period. All participants were followed prospectively from enrollment until delivery, and complete maternal and perinatal outcome data were available for analysis. No participants were excluded after enrollment due to loss to follow-up or incomplete records.

Descriptive Data

The mean age of the participants was 17.63 ± 1.06 years, indicating that the majority were late adolescents. The mean gestational age at presentation was 29.52 ± 1.95 weeks. With respect to residential status, 94 participants (67.6%) belonged to rural areas, while 45 participants (32.4%) were from urban settings, reflecting the

predominantly rural catchment population of the study hospital (Table 01).

Outcome Data

Maternal and perinatal outcomes demonstrated a substantial burden of complications among teenage pregnancies. Cesarean delivery was recorded in 62 cases (44.6%), making it the most frequent maternal outcome. Preeclampsia occurred in 35 participants (25.2%). Regarding perinatal outcomes, preterm delivery was observed in 22 cases (15.8%), small for gestational age (SGA) infants were identified in 26 cases (18.7%), and low birth weight (LBW) was documented in 34 newborns (24.5%) (Table 02).

Main Results

Stratified analysis revealed that gestational age was significantly associated with adverse perinatal outcomes. Preterm delivery occurred exclusively in pregnancies with gestational ages between 24–30 weeks, showing a statistically significant association (p = 0.001). Similarly, SGA was significantly more frequent in pregnancies within the 24–30 week gestational age group (p = 0.002). No statistically significant associations were observed between maternal age or residential status and cesarean delivery, preeclampsia, SGA, or LBW (all p-values >0.05) (Table 03).

Multivariate logistic regression analysis further confirmed these findings. Gestational age emerged as a significant predictor of preterm delivery (adjusted OR = 1.939, 95% CI: 1.258–2.987, p = 0.003) and small for gestational age (adjusted OR = 0.747, 95% CI: 0.604–0.925, p = 0.007), indicating a protective effect with advancing gestational age. Maternal age did not demonstrate statistically significant associations with any maternal or perinatal outcome. For low birth weight, neither maternal age nor gestational age showed a significant relationship in the adjusted model, suggesting that LBW may be influenced by factors beyond the demographic variables assessed in this study (Table 04).

Table 1: Patient Demographics (n=139).

Variables		N (%)
Age (years); Mean ± SD		17.63±1.06
Gestational age (weeks); Mean ± SD		29.51±1.95
Residence	Rural	94 (67.6%)
	Urban	45 (32.4%)

Table 2: Perinatal and Maternal Outcome in Teenage Pregnancy.

Variables	Frequency	Percentage
Cesarean Delivery	62	44.6%
Preeclampsia	35	25.2%
Preterm Delivery	22	15.8%
Small for Gestational age	26	18.7%
Low Birth Weight	34	24.5%

Table 3: Association of Perinatal and Maternal Outcome with Demographic Factors.

Variables		Cesarean Delivery		p-value
		Yes, N (%)	No, N (%)	
Age (years)	13–16	11 (40.7)	16 (59.3)	0.653
	>16	51 (45.5)	61 (54.5)	
Gestational age (weeks)	24–30	40 (42.1)	55 (57.9)	0.384
	>30	22 (50.0)	22 (50.0)	
Residence	Rural	39 (41.5)	55 (58.5)	0.286
	Urban	23 (51.1)	22 (48.9)	
		Preeclampsia		
		Yes, N (%)	**No, N (%)**	
Age (years)	13–16	4 (14.8)	23 (85.2)	0.167
	>16	31 (27.7)	81 (72.3)	
Gestational age (weeks)	24–30	25 (26.3)	70 (73.7)	0.650
	>30	10 (22.7)	34 (77.3)	
Residence	Rural	24 (25.5)	70 (74.5)	0.890
	Urban	11 (24.4)	34 (75.6)	
		Preterm Delivery		
		Yes, N (%)	**No, N (%)**	
Age (yeas)	13–16	6 (22.2)	21 (77.8)	0.310
	>16	16 (14.3)	96 (85.7)	
Gestational age (weeks)	24–30	22 (23.2)	73 (76.8)	0.001*
	>30	0 (0.0)	44 (100.0)	
Residence	Rural	17 (18.1)	77 (81.9)	0.292
	Urban	5 (11.1)	40 (88.9)	
		Small for Gestational Age		
		Yes, N (%)	**No, N (%)**	
Age (years)	13–16	6 (22.2)	21 (77.8)	0.602
	>16	20 (17.9)	92 (82.1)	
Gestational age (weeks)	24–30	11 (11.6)	84 (88.4)	0.002*
	>30	15 (34.1)	29 (65.9)	
Residence	Rural	15 (16.0)	79 (84.0)	0.230
	Urban	11 (24.4)	34 (75.6)	
		Low Birth Weight		
		Yes, N (%)	**No, N (%)**	
Age (years)	13–16	5 (18.5)	22 (81.5)	0.424
	>16	29 (25.9)	83 (74.1)	
Gestational age (weeks)	24–30	25 (26.3)	70 (73.7)	0.455
	>30	9 (20.5)	35 (79.5)	
Residence	Rural	24 (25.5)	70 (74.5)	0.671
	Urban	10 (22.2)	35 (77.8)	

*p<0.05 is considered statistically significant

Table 4: Logistic Regression.

Dependent Variable	Predictor	Regression Coefficient	Standard Error	p-value	OR	95% CI
Cesarean Delivery	Age (years)	-0.055	0.163	0.737	0.947	0.687 – 1.304
	GA (weeks)	-0.072	0.088	0.416	0.931	0.783 – 1.107
Preeclampsia	Age (years)	-0.22	0.199	0.269	0.803	0.544 – 1.185
	GA (weeks)	0.037	0.102	0.720	1.037	0.849 – 1.267
Preterm Delivery	Age (years)	0.229	0.225	0.309	1.257	0.809 – 1.953
	GA (weeks)	0.662	0.221	0.003	1.939	1.258 – 2.987
Small for Gestational age	Age (years)	0.101	0.208	0.628	1.106	0.736 – 1.663
	GA (weeks)	-0.291	0.109	0.007	0.747	0.604 – 0.925
Low Birth Weight	Age (years)	0.005	0.187	0.978	1.005	0.696 – 1.451
	GA (weeks)	0.059	0.105	0.576	1.06	0.864 – 1.302

Discussion

Labour induction is undertaken in approximately one-fifth of the present study demonstrates that teenage pregnancy is associated with a substantial burden of adverse maternal and perinatal outcomes. The high rate of cesarean delivery (44.6%) observed in this cohort reflects the increased obstetric risk commonly encountered in adolescent pregnancies. Similar findings have been reported in previous studies, where higher rates of cesarean section were attributed to complications such as preeclampsia, fetal distress, and labor abnormalities [18,20-22]. Although cesarean delivery was more frequent among rural residents in this study, no statistically significant association was identified between cesarean delivery and maternal age, gestational age, or residential status, suggesting that clinical decision-making and intrapartum factors may have played a greater role than demographic variables alone.

Preeclampsia was documented in 25.2% of the study population, indicating a notable maternal morbidity among teenage mothers. This finding aligns with previous reports that have highlighted hypertensive disorders as a frequent complication of adolescent pregnancy [9,23,24]. However, in contrast to some studies that have demonstrated a strong association between maternal age and preeclampsia [25], the present analysis did not reveal significant relationships between preeclampsia and maternal age, gestational age, or residence. This discrepancy may be explained by differences in antenatal care practices, early detection, and regional healthcare delivery systems.

Preterm delivery was observed in 15.8% of cases and was significantly associated with gestational age, with all preterm births occurring in pregnancies between 24 and 30 weeks. This finding is consistent with earlier studies reporting an increased risk of preterm birth among adolescent mothers [18,22]. The biological immaturity of the adolescent reproductive system, coupled with inadequate nutritional reserves and psychosocial stressors, may contribute to early onset of labor in this population [14,16]. Multivariate analysis further confirmed gestational age as a significant predictor of preterm delivery, underscoring the vulnerability of early gestation in teenage pregnancies.

Small for gestational age infants were identified in 18.7% of cases and showed a significant association with gestational age. This observation is in agreement with prior research indicating that adolescents are at greater risk of delivering growth-restricted infants [18,21]. Biological competition for nutrients between the growing adolescent mother and the fetus, as well as delayed or inadequate antenatal care, may explain the increased frequency of SGA in this group [17]. The protective effect of advancing gestational age against SGA observed in the regression analysis further supports the importance of prolonging pregnancy whenever clinically feasible.

Low birth weight was present in 24.5% of newborns, consistent with findings reported in other studies on adolescent pregnancy [15,25]. Although no significant associations were observed between LBW and maternal age, gestational age, or residence in the adjusted analysis, this outcome remains clinically relevant due to its long-term implications for infant growth and development. These findings suggest that factors beyond the demographic variables examined such as maternal nutrition, socioeconomic status, and quality of antenatal care may play a more prominent role in determining birth weight.

The findings of this study reinforce the concept that teenage pregnancy represents a high-risk obstetric condition. The observed associations between gestational age and adverse perinatal outcomes highlight the need for early identification, close monitoring, and targeted interventions for pregnant adolescents. Strengthening antenatal care services and addressing psychosocial and nutritional factors may help mitigate the risks associated with adolescent pregnancy [6,7,17].

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the single-center design and relatively small sample size limit the generalizability of the results to other populations and healthcare settings. Second, the observational nature of the study precludes causal inferences. Third, important confounding factors such as socioeconomic status, nutritional status, educational level, and access to antenatal care were not formally assessed and may have influenced the observed outcomes. Despite these limitations, the prospective design and standardized data collection strengthen the validity of the findings.

Conclusion

Teenage pregnancy is associated with a high frequency of adverse maternal and perinatal outcomes, including cesarean delivery, preeclampsia, preterm birth, small for gestational age infants, and low birth weight. Gestational age emerged as a key determinant of preterm delivery and fetal growth outcomes in this study. These findings underscore the importance of targeted antenatal care, early risk stratification, and comprehensive health education programs tailored to adolescent mothers. Strengthening reproductive health services and improving access to quality prenatal care may substantially reduce maternal and neonatal morbidity in this vulnerable population.

Authors' Contributions:

All authors meet the ICMJE criteria for authorship.

Author 1: Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 2: Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.

References

1. Mezmur H, Assefa N, Alemayehu T. Teenage pregnancy and its associated factors in eastern Ethiopia: a community-based study. *Int J Womens Health.* 2021 Feb 26;13:267-278. https://doi.org/10.2147/IJWH.S287715
2. Senkyire EK, Boateng D, Boakye FO, Logo DD, Ohaja M. Socio-economic factors associated with adolescent pregnancy and motherhood: analysis of the 2017 Ghana maternal health survey. *PLoS One.* 2022 Dec 30;17(12):e0272131. https://doi.org/10.1371/journal.pone.0272131
3. Bosire EN, Chiseri K, Comeau DL, Richter L, Stein AD, Norris SA. A qualitative study of risks and protective factors against pregnancy among sexually-active adolescents in Soweto, South Africa. *PLOS Glob Public Health.* 2021 Nov 10;1(11):e0000044. https://doi.org/10.1371/journal.pgph.0000044
4. Moshi FV, Tilisho O. The magnitude of teenage pregnancy and its associated factors among teenagers in Dodoma Tanzania: a community-based analytical cross-sectional study. *Reprod Health.* 2023 Feb 3;20(1):28. https://doi.org/10.1186/s12978-022-01554-z
5. Aluga D, Okolie EA. Socioeconomic determinants of teenage pregnancy and early motherhood in the United Kingdom: a perspective. *Health Promot Perspect.* 2021 Dec 19;11(4):426-429. https://doi.org/10.34172/hpp.2021.52
6. Vieira Martins M, Karara N, Dembiński L, Jacot-Guillarmod M, Mazur A, Hadjipanayis A, et al. Adolescent pregnancy: an important issue for paediatricians and primary care providers—a position paper from the European Academy of Paediatrics. *Front Pediatr.* 2023 Feb 7;11:1119500. https://doi.org/10.3389/fped.2023.1119500
7. Gardner ME, Umer A, Rudisill T, Hendricks B, Lefeber C, John C, et al. Prenatal care and infant outcomes of teenage births: a Project WATCH study. *BMC Pregnancy Childbirth.* 2023 May 24;23(1):379. https://doi.org/10.1186/s12884-023-05662-x
8. Ntshayintshayi PN, Sehularo LA, Mokgaola IO, Sepeng NV. Exploring the psychosocial challenges faced by pregnant teenagers in Ditsobotla subdistrict. *Health SA.* 2022 Nov 4;27:1880. https://doi.org/10.4102/hsag.v27i0.1880
9. Chakole S, Akre S, Sharma K, Wasnik P, Wanjari MB. Unwanted teenage pregnancy and its complications: a narrative review. *Cureus.* 2022 Dec 18;14(12):e32662. https://doi.org/10.7759/cureus.32662
10. Maheshwari MV, Khalid N, Patel PD, Alghareeb R, Hussain A. Maternal and neonatal outcomes of adolescent pregnancy: a narrative review. *Cureus.* 2022 Jun 14;14(6):e25921. https://doi.org/10.7759/cureus.25921
11. Radu MC, Manolescu LS, Chivu R, Zaharia C, Boeru C, Pop-Tudose ME, et al. Pregnancy in teenage Romanian mothers. *Cureus.* 2022 Jan 24;14(1):e21540. https://doi.org/10.7759/cureus.21540

12. Modak A, Ronghe V, Gomase KP, Mahakalkar MG, Taksande V. A comprehensive review of motherhood and mental health: postpartum mood disorders in focus. *Cureus.* 2023 Sep 29;15(9):e46209. https://doi.org/10.7759/cureus.46209
13. Abdul Rahim K, Egglestone NJ, Tsagareli IG, Usmani W, Meherali S, Lassi ZS. Mental health outcomes beyond the post-partum period among adolescent mothers: a systematic review and meta-analysis. *Health Psychol Behav Med.* 2024 Jan 31;12(1):2305741. https://doi.org/10.1080/21642850.2024.2305741
14. Kawakita T, Wilson K, Grantz KL, Landy HJ, Huang CC, Gomez-Lobo V. Adverse maternal and neonatal outcomes in adolescent pregnancy. *J Pediatr Adolesc Gynecol.* 2016;29(2):130-136. https://doi.org/10.1016/j.jpag.2015.08.006
15. Jańczewska I, Wierzba J, Jańczewska A, Szczurek-Gierczak M, Domżalska-Popadiuk I. Prematurity and low birth weight and their impact on childhood growth patterns and the risk of long-term cardiovascular sequelae. *Children (Basel).* 2023 Sep 25;10(10):1599. https://doi.org/10.3390/children10101599
16. Diabelková J, Rimárová K, Dorko E, Urdzík P, Houžvičková A, Argalášová Ľ. Adolescent pregnancy outcomes and risk factors. *Int J Environ Res Public Health.* 2023 Feb 25;20(5):4113. https://doi.org/10.3390/ijerph20054113
17. Dutta K, Naskar S, Das DK, Banerjee N. Exploring challenges of teenage pregnancy and motherhood from beneficiaries and providers' perspectives: a qualitative study in a rural area of Purba Bardhaman District, West Bengal. *J Family Med Prim Care.* 2022 Nov;11(11):7272-7279. https://doi.org/10.4103/jfmpc.jfmpc_689_22
18. Zhang T, Wang H, Wang X, Yang Y, Zhang Y, Tang Z, et al. The adverse maternal and perinatal outcomes of adolescent pregnancy: a cross-sectional study in Hebei, China. *BMC Pregnancy Childbirth.* 2020;20(1):339. https://doi.org/10.1186/s12884-020-03022-7
19. Indarti J, Al Fattah AN, Dewi Z, Hasani RDK, Mahdi FAN, Surya R. Teenage pregnancy: obstetric and perinatal outcome in a tertiary centre in Indonesia. *Obstet Gynecol Int.* 2020;2020:2787602. https://doi.org/10.1155/2020/2787602
20. Shammi TK, Sultana M, Nancy FA, Sikder M, Anan N. Maternal and perinatal outcome of adolescent pregnancy. *Int J Clin Obstet Gynaecol.* 2023;7(5):97-103. https://doi.org/10.33545/gynae.2023.v7.i5b.1383
21. Khatoon F, Saba I, Ghafoor M, Rajpar AP, Mahmood A, Ali M. Adverse maternal and fetal outcomes of adolescent pregnancy. *J Soc Obstet Gynaecol Pak.* 2021;11(1):41-44.
22. Ramachandra C, Roopa NK, Rekha N, Shankaregowda, Nirupama YS. The impact of teenage pregnancy on maternal and perinatal outcome. *Int J Med Res Health Sci.* 2016;5(5):149-152.
23. Malek NN, Suharjono H, Shetty A. Maternal and perinatal outcomes in teenage pregnancy between indigenous and non-indigenous. *Clin Med.* 2019;19(3):s26-s28. https://doi.org/10.7861/clinmedicine.19-3s-s26
24. Gul S, Syed W, Saira S, Liaquat N. Maternal adverse outcomes of teenage pregnancy: a cross-sectional study from Peshawar. *J Postgrad Med Inst.* 2022;36(3):150-153. https://doi.org/10.54079/jpmi.36.3.3006
25. Aftab S, Baloch H, Komal, Rashid S, Ghafoor S, Waheed A. Maternal and perinatal outcome in adolescent and adult primigravida. *Int J Women Empower.* 2021;7(1):26-31. https://doi.org/10.29052/2413-4252.v7.i1.2021.26-31