Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol.14, Issue 32s(2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Determine Frequency of Adverse Maternal and Fetal Outcomes of Adolescent Pregnancy

Romaisa Anser[1], Fatima Sarwar[2], Tabassum Firdous[3], Huma Fiaz[4], Bisma Maryam[5], Nadia Zulfiqar[6], Shandana Mustafa Jadoon[7]

[1]Senior Clinical Fellow, Obstetric and Gynaecology Department, Frimley Park Hospital, UK
[2]Department of Obstetrics and Gynaecology, Mayo Hospital/ King Edward Medical University, Lahore, Pakistan
[3]Assistant Professor, Department of Obstetrics and Gynaecology, Rai Medical College, Sargodha, Pakistan
[4]Assistant Professor, Obstretrics and Gynaecology, Liaquat College of Medicine and Dentistry
Darulsehat Hospital, Karachi, Pakistan
[5]Women Medical Officer (WMO), Department of Obstetrics and Gynaecology, Mother and Child Healthcare Hospital, Mianwali, Pakistan
[6]Assistant Professor, Department of Obstetrics and Gynaecology, Sahara Medical College, Narowal, Pakistan
[7]Associate Professor, Ayub Teaching Hospital, Abbottabad, Pakistan

Corresponding author:

Shandana Mustafa Jadoon,
Associate Professor, Ayub Teaching Hospital, Abbottabad, Pakistan
Email ID ; shandana86@gmail.com

Cite this paper as: Romaisa Anser, Fatima Sarwar, Tabassum Firdous, Huma Fiaz, Bisma Maryam, Nadia Zulfiqar, Shandana Mustafa Jadoon, (2025) Determine Frequency of Adverse Maternal and Fetal Outcomes of Adolescent Pregnancy. *Journal of Neonatal Surgery*, 14 (32s), 5134-5141.

ABSTRACT

Background: Adolescent pregnancies are associated with significant maternal and fetal risks due to physiological immaturity, limited antenatal care, and socioeconomic challenges. This study explores maternal and fetal complications in adolescent pregnancies, highlighting the influence of maternal age and gestational period.

Objective: To determine the frequency of adverse maternal and fetal outcomes in adolescent pregnancies and assess the association of these outcomes with maternal age and gestational period.

Material and Methods: This cross-sectional study was conducted at Rai Medical College Sargodha, on 378 adolescent pregnant females aged 15-19 years. Data were collected via structured questionnaires and medical records. Maternal outcomes assessed included anemia, PIH, preeclampsia, eclampsia, and preterm labor, while fetal outcomes included low birth weight, stillbirth, early neonatal death, and NICU admission. Participants were grouped by age (15-17 and 18-19 years) and gestational period (preterm <37 weeks and full-term 37-40 weeks).

Results: The mean age and mean gestational age was 17.01 ± 1.42 years and 34.05 ± 3.77 weeks, respectively. Anemia was the most common complication (57.4%), followed by PIH (32.5%) and preterm labor (16.9%). For fetal outcomes, 34.7% of neonates had low birth weight, with NICU admissions in 7.1% of cases. Age groups showed no significant difference in outcome frequencies. However, preterm birth was significantly associated with NICU admissions (p=0.006).

Conclusion: Adolescent pregnancies are associated with high maternal and fetal risks, particularly anemia, preterm labor, and low birth weight. Enhanced prenatal care is essential to mitigate these risks in this vulnerable population

Keywords: Adolescent pregnancy, maternal outcomes, fetal outcomes, anemia, preterm labor, low birth weight, Pakistan..

1. INTRODUCTION:

Adolescent pregnancy is still a major public health concern worldwide, most particularly in developing countries with limited health resources. The mothers have high risk of eclampsia, preterm delivery and other severe complications because of their physiological and psychological immaturity [1]. In addition, these young mothers are at risk of obstetric fistulas and other childbirth complications [2].

An overview to the vulnerability of adolescent pregnancies in developed countries is made, with concentration on the prevalence of adolescent pregnancies and socioeconomic challenges, which is caused predominantly by socio-economic challenges like communities having less educational level and less access to health care services. Early childbearing is related to cycles of poverty and is frequently the result of young mothers whose opportunities for economic independence and.

education are virtually limited by them [3-4]Biological and medical risk for adolescents from pregnancy and delivery include higher maternal and infant mortality. These mothers are often quite young, which is associated with early labour, low birth weight infants and higher neonatal morbidity and mortality [5, 6]. The outcomes demand a hardline medical attention towards dealing with and avoiding the negative impacts that come with adolescent child bearing.

Likewise, adolescent pregnancy has a burden that is psychological. There is a greater risk of depression, anxiety, social exclusion amongst teenage mothers and these lead to a negative impact on parenting capabilities and psychosocial development of their children [7, 8]. To support these adolescents in being fully effective, as women and as mothers, we need to address these mental health aspects as part of effective public health interventions.

Comprehensive educational programs about sexual and reproductive health are necessary to fight the high rates of adolescent pregnancy. Increased access to contraception, as well as these programs, can greatly reduce unintended adolescent pregnancies [9–10]. Additionally, young mothers require community and/or policy level support to get the resources they need to succeed postpartum care and educational opportunities [11].

Investigating adverse maternal and fetal outcomes in the adolescent pregnant population is justified by the unique difficulties associated with this population. Adolescents are at greater risk for nutritional deficiencies, lack of prenatal care and socioeconomic disadvantages, that may contribute to greater complications, such as anemia, hypertension, and preterm labor. In addition, pregnancy and childbirth can be further complicated by physiological immaturity, which increases the risk to both mother and child. The study focuses on this vulnerable group, with the intention of understanding the particular needs and associated risks for adolescent pregnancies in order to guide targeted healthcare interventions to mitigate such risks and improve the outcomes. This outcome not only fills a crucial maternal and child health literature gap, but in addition helps inform the creation of health policies and programs directed at young mothers

2. MATERIAL AND METHODS

This cross-sectional study was conducted at Rai Medical College Sargodha from June 2022 to December 2024. Written informed consent was obtained from all participants. The study recruited total 378 adolescent pregnant females aged 15-19 years, having singleton pregnancy confirmed on ultrasound. The sample size was calculated based on the frequency of anemia in adolescent pregnancies as 56.3% (as reported by Khatoon et al.), using a 5% margin of error and a 95% confidence level. [12]

Exclusion Criteria: Patients with pre-existing chronic conditions, such as diabetes mellitus or chronic hypertension, those with multiple gestations or any conditions predisposing them to high-risk pregnancies outside adolescent age-related complications were also excluded.

Data were collected using structured questionnaires and medical records to document demographic details, gestational age, and maternal and fetal complications, with gestational age confirmed by ultrasound. Maternal outcomes included anemia (hemoglobin < 11 g/dL), pregnancy-induced hypertension (PIH), preeclampsia, eclampsia, and preterm labor (defined as delivery before 37 weeks of gestation), while fetal outcomes included low birth weight (< 2.5 kg), stillbirth, early neonatal death, and NICU admission. Participants were categorized into two age groups (15-17 years and 18-19 years) and two gestational age groups: preterm (<37 weeks) and full-term (37-40 weeks).

Data analysis was conducted using SPSS Version 24. Descriptive statistics were used for demographic data, with frequencies and percentages calculated for categorical variables. Chi-square tests assessed the associations between age groups and gestational categories with maternal and fetal outcomes. A p-value of ≤0.05 was considered statistically significant, and additional stratification was performed to control for potential confounders.

3. RESULTS

Total 378 adolescent pregnant females were recruited for this study. The mean age and mean gestational age were 17.01 ± 1.42 years and 34.05 ± 3.77 weeks, respectively.

In this study, we observed a high prevalence of adverse maternal and fetal outcomes among adolescent pregnancies. Among the maternal outcomes, anemia was the most common complication, affecting 217 cases (57.4%), followed by pregnancy-induced hypertension (PIH) in 123 cases (32.5%), 64 cases (16.9%) of preterm labor, 62 (16.4%) of preeclampsia and 45 (11.9%) experienced eclampsia. For fetal outcomes, low birth weight was recorded in 131 infants (34.7%), Stillbirth was relatively uncommon, occurring in 10 cases (2.6%), and early neonatal death was observed in 16 cases (4.2%) and 27 infants (7.1%) required NICU admission. (Table 1)

we explored the association between maternal age groups (15-17 years and 18-19 years) and various adverse maternal outcomes in adolescent pregnancies. Anemia was the most prevalent complication among the maternal outcomes assessed, affecting 135 (59.2%) of participants aged 15-17 years and 82 (54.7%) of those aged 18-19 years. The difference between these groups was not statistically significant (p=0.382), suggesting that both younger and older adolescents in this study experienced a similar high risk of anemia. Pregnancy-induced hypertension (PIH) was reported in 72 (31.6%) of adolescents in the 15-17-year age group and in 51 (34.0%) of those aged 18-19 years. With a p-value of 0.623, there was no significant difference in PIH prevalence between the two age groups, indicating that age within the adolescent range did not contribute

notably to the risk of developing PIH. For preterm labor, 37 (16.2%) of the participants aged 15-17 years and 27 (18.0%) of those aged 18-19 years experienced this outcome. The p-value of 0.653 suggests no statistically significant difference between the age groups, implying that the risk of preterm labor was comparable across the adolescent age range. Preeclampsia was observed in 34 (14.9%) of those aged 15-17 years and 28 (18.7%) of the 18-19-year group, with a p-value of 0.335. This finding indicates no significant association between age group and preeclampsia, highlighting that both age groups faced a similar risk for this condition. Finally, eclampsia was reported in 26 (11.4%) of adolescents aged 15-17 years and 19 (12.7%) of those aged 18-19 years, with a p-value of 0.711, indicating no significant difference in eclampsia rates between the two age groups. Overall, these findings show that there is no statistically significant association between maternal age group within the adolescent range (15-17 years versus 18-19 years) and the prevalence of anemia, PIH, preterm labor, preeclampsia, or eclampsia. This suggests that both younger and older adolescents in this study population carry similar risks for these adverse maternal outcomes. (Table 2)

In this study, we also examined the association between maternal age groups (15-17 years and 18-19 years) and adverse fetal outcomes in adolescent pregnancies, specifically analyzing low birth weight, stillbirth, early neonatal death, and NICU admission. Low Birth Weight was observed in 83 (36.4%) participants aged 15-17 years and 48 (32.0%) participants aged 18-19 years. With a p-value of 0.379, there was no statistically significant difference between the two age groups in terms of low birth weight, suggesting that age within this adolescent range did not influence the risk of delivering a low birth weight baby.

Stillbirth occurred in 7 (3.1%) of adolescents aged 15-17 years and 3 (2.0%) of those aged 18-19 years. The p-value of 0.526 indicates no significant association between age group and stillbirth incidence, implying that the risk of stillbirth was similarly low across both age groups.

Early Neonatal Death was reported in 11 (4.8%) of participants in the 15-17-year age group and 5 (3.3%) in the 18-19-year age group. With a p-value of 0.481, there was no statistically significant difference in early neonatal death rates between the age groups, suggesting that both younger and older adolescents faced comparable risks for this outcome.

NICU Admission was required for 16 (7.0%) of infants born to adolescents aged 15-17 years and 11 (7.3%) of infants born to those aged 18-19 years. The p-value of 0.907 indicates no significant difference in NICU admission rates between the two age groups, suggesting that maternal age within the adolescent range did not notably affect the likelihood of requiring NICU care for the newborn.

These findings demonstrate that there is no statistically significant association between maternal age group within the adolescent range (15-17 years versus 18-19 years) and the prevalence of low birth weight, stillbirth, early neonatal death, or NICU admission. This suggests that both younger and older adolescents in this study population have similar risks for adverse fetal outcomes, indicating that the age difference within the adolescent group does not significantly impact fetal health outcomes in this sample. (Table 3)

We further analyzed the association between gestational age groups (preterm birth, defined as less than 37 weeks, and full-term birth, defined as 37-40 weeks) and various adverse maternal outcomes in adolescent pregnancies. The outcomes included anemia, pregnancy-induced hypertension (PIH), preterm labor, preeclampsia, and eclampsia.

Anemia was found to be significantly associated with gestational age group, with a higher prevalence in the full-term group (79 participants, 65.8%) compared to the preterm group (138 participants, 53.5%) (p=0.024). This finding suggests that adolescents who carry their pregnancies to full term may face an increased risk of anemia. This could be due to the increased iron demands during later stages of pregnancy or other physiological factors that accumulate over a longer gestational period.

Preterm Labor, by definition, was significantly associated with gestational age, occurring more frequently in the full-term group (28 participants, 23.3%) than in the preterm group (36 participants, 14.0%) (p=0.024). This finding may highlight the natural progression of labor onset in full-term pregnancies, where labor occurs as a physiological endpoint, whereas preterm births may often be induced due to complications or other health concerns, resulting in fewer cases of spontaneous labor.

For Pregnancy-Induced Hypertension (PIH), Preeclampsia, and Eclampsia, no significant differences were observed between preterm and full-term groups, with p-values of 0.645, 0.489, and 0.262, respectively. PIH affected 82 participants (31.8%) in the preterm group and 41 participants (34.2%) in the full-term group, while preeclampsia and eclampsia were present in 15.5% and 13.2% of preterm cases and 18.3% and 9.2% of full-term cases, respectively. These non-significant associations suggest that the risks of these hypertensive disorders and eclampsia may not be strongly influenced by gestational length among adolescent mothers.

Overall, the analysis indicates that anemia and preterm labor exhibit significant associations with gestational age group, while PIH, preeclampsia, and eclampsia do not show notable differences between preterm and full-term births. These findings provide insights into how gestational age may influence specific maternal outcomes in adolescent pregnancies, underscoring the need for targeted monitoring of anemia in adolescents reaching full term and managing labor risks in preterm cases. (Table 4)

We also examined the association between gestational age groups (preterm birth defined as less than 37 weeks, and full-term birth defined as 37-40 weeks) and various adverse fetal outcomes, including low birth weight, stillbirth, early neonatal death, and NICU admission.

Low Birth Weight did not show a statistically significant association with gestational age, with similar rates between preterm and full-term births. Among preterm births, 89 infants (34.5%) had low birth weight, compared to 42 infants (35.0%) in the

full-term group (p=0.924). This lack of significant difference suggests that low birth weight was equally likely in both gestational age groups, potentially influenced by factors other than gestational age in this adolescent population.

Stillbirth was observed in 9 cases (3.5%) among preterm births and 1 case (0.8%) in full-term births. Although the rate was slightly higher in the preterm group, the difference was not statistically significant (p=0.134). This finding suggests that gestational age alone may not be a major determinant of stillbirth risk in adolescent pregnancies, with other maternal or fetal health factors likely playing a role.

Early Neonatal Death occurred in 10 cases (3.9%) in the preterm group and 6 cases (5.0%) in the full-term group, showing no significant association with gestational age (p=0.613). The similar rates of early neonatal death across both gestational age groups indicate that preterm and full-term infants had comparable early neonatal survival outcomes in this adolescent cohort.

NICU Admission showed a significant association with gestational age. A higher percentage of full-term infants required NICU admission (15 cases, 12.5%) compared to preterm infants (12 cases, 4.7%), with a p-value of 0.006. This finding may reflect that full-term infants in this population experienced other complications requiring NICU care, potentially due to undiagnosed or late-pregnancy complications. It could also imply that the health risks leading to NICU admission were not solely related to prematurity but may involve additional perinatal issues among full-term infants.

The analysis reveals that NICU admission rates differ significantly by gestational age, with full-term births showing a higher likelihood of requiring NICU care. However, other adverse outcomes—low birth weight, stillbirth, and early neonatal death—were not significantly associated with gestational age, suggesting that risks for these outcomes are consistent across preterm and full-term births in adolescent pregnancies. These findings highlight the complexity of fetal health outcomes in adolescent pregnancies, indicating that while some outcomes may be linked to gestational age, others are influenced by a broader range of factors. (Table 5)

Table 1: Frequencies for maternal and fetal outcomes

Outcome	Category	Frequency (n)	Percent (%)
Maternal Outcomes			
Anemia	Yes	217	57.4
	No	161	42.6
PIH	Yes	123	32.5
	No	255	67.5
Preterm Labor	Yes	64	16.9
	No	314	83.1
Preeclampsia	Yes	62	16.4
	No	316	83.6
Eclampsia	Yes	45	11.9
	No	333	88.1
Fetal Outcomes			
Birth Weight	Low	131	34.7
	Normal	247	65.3
Stillbirth	Yes	10	2.6
	No	368	97.4
Early Neonatal Death	Yes	16	4.2
	No	362	95.8
NICU Admission	Yes	27	7.1
	No	351	92.9

Table 2: Association of Age Groups with Adverse Maternal Outcomes in Adolescent Pregnancy.

Maternal Outcome	Age Group	Yes n(%)	No n(%)	Total	p-Value
Anemia	15-17 Years	135 (59.2%)	93 (40.8%)	228	0.382
	18-19 Years	82 (54.7%)	68 (45.3%)	150	
Pregnancy-Induced Hypertension (PIH)	15-17 Years	72 (31.6%)	156 (68.4%)	228	0.623
	18-19 Years	51 (34.0%)	99 (66.0%)	150	
Preterm Labor	15-17 Years	37 (16.2%)	191 (83.8%)	228	0.653

Maternal Outcome	Age Group	Yes n(%)	No n(%)	Total	p-Value
	18-19 Years	27 (18.0%)	123 (82.0%)	150	
Preeclampsia	15-17 Years	34 (14.9%)	194 (85.1%)	228	0.335
	18-19 Years	28 (18.7%)	122 (81.3%)	150	
Eclampsia	15-17 Years	26 (11.4%)	202 (88.6%)	228	0.711
	18-19 Years	19 (12.7%)	131 (87.3%)	150	

Table 3: Association of Age Groups with Adverse Fetal Outcomes in Adolescent Pregnancy.

Fetal Outcome	Age Group	Yes n(%)	No n(%)	Total	p-Value
Birth Weight (Low)	15-17 Years	83 (36.4%)	145 (63.6%)	228	0.379
	18-19 Years	48 (32.0%)	102 (68.0%)	150	
Stillbirth	15-17 Years	7 (3.1%)	221 (96.9%)	228	0.526
	18-19 Years	3 (2.0%)	147 (98.0%)	150	
Early Neonatal Death	15-17 Years	11 (4.8%)	217 (95.2%)	228	0.481
	18-19 Years	5 (3.3%)	145 (96.7%)	150	
NICU Admission	15-17 Years	16 (7.0%)	212 (93.0%)	228	0.907
	18-19 Years	11 (7.3%)	139 (92.7%)	150	

Table 4: Association of gestational Groups with Adverse Maternal Outcomes in Adolescent Pregnancy.

Maternal Outcome	Gestational Age Group	Yes n(%)	No n(%)	Total (n)	p-Value
Anemia	Preterm	138 (53.5%)	120 (46.5%)	258	0.024
	Full Term	79 (65.8%)	41 (34.2%)	120	
Pregnancy-Induced Hypertension	Preterm	82 (31.8%)	176 (68.2%)	258	0.645
	Full Term	41 (34.2%)	79 (65.8%)	120	
Preterm Labor	Preterm	36 (14.0%)	222 (86.0%)	258	0.024
	Full Term	28 (23.3%)	92 (76.7%)	120	
Preeclampsia	Preterm	40 (15.5%)	218 (84.5%)	258	0.489
	Full Term	22 (18.3%)	98 (81.7%)	120	
Eclampsia	Preterm	34 (13.2%)	224 (86.8%)	258	0.262
	Full Term	11 (9.2%)	109 (90.8%)	120	

Table 5: Association of gestational Groups with Adverse Fetal Outcomes in Adolescent Pregnancy

Fetal Outcome	Gestational Age Group	Yes n(%)	No n(%)	Total	p-Value
Birth Weight (Low)	Preterm	89 (34.5%)	169 (65.5%)	258	0.924
	Full Term	42 (35.0%)	78 (65.0%)	120	
Stillbirth	Preterm	9 (3.5%)	249 (96.5%)	258	0.134
	Full Term	1 (0.8%)	119 (99.2%)	120	
Early Neonatal Death	Preterm	10 (3.9%)	248 (96.1%)	258	0.613
	Full Term	6 (5.0%)	114 (95.0%)	120	
NICU Admission	Preterm	12 (4.7%)	246 (95.3%)	258	0.006
	Full Term	15 (12.5%)	105 (87.5%)	120	

4. DISCUSSION

This study highlights significant maternal and fetal risks associated with adolescent pregnancy, consistent with global and regional findings on teenage pregnancies. Our cohort, with a mean maternal age of 17.01 ± 1.42 years and gestational age of 34.05 ± 3.77 weeks, exhibited high prevalence rates of anemia, pregnancy-induced hypertension (PIH), preterm labor, and low birth weight (LBW).

Anemia was the most common maternal complication in our study (57.4%), aligning closely with the findings of Khatoon et al., who reported anemia in 56.3% of adolescent mothers. This high prevalence highlights the nutritional challenges adolescent mothers face in meeting the increased iron demands of pregnancy [12]. Sabir et al. further corroborated the widespread prevalence of anemia among teenage mothers in Pakistan, underscoring how adolescent nutritional deficits and socioeconomic barriers contribute to inadequate iron levels during pregnancy [13]. The combined findings underscore a critical need for enhanced nutritional intervention programs for adolescent mothers, with an emphasis on iron supplementation.

Pregnancy-induced hypertension (PIH) affected 32.5% of participants in this study, a pattern observed in Brohi et al., who noted similar hypertension rates among adolescents and emphasized that physiological immaturity, vascular resistance, and stress factors could elevate PIH risks in this age group [14]. This aligns with Kawakita et al., who observed heightened risks of hypertensive complications, such as preeclampsia and postpartum hemorrhage, in adolescent pregnancies due to underdeveloped cardiovascular systems [15]. These findings highlight the need for early and routine blood pressure monitoring in adolescent pregnancies to prevent progression to severe hypertensive disorders.

Our findings also show that 16.9% of adolescent mothers experienced preterm labor, mirroring the rate observed by Shah et al. (16%), who attributed early labor onset to hormonal fluctuations and physiological immaturity in adolescents [16]. In comparison, Deo et al. reported a slightly higher rate of preterm labor (26.7%), which they associated with poor antenatal care and psychosocial stress, both common among adolescent mothers [17]. This further highlights the necessity for targeted interventions, particularly in lower-resource settings, to manage preterm labor risks in adolescent pregnancies.

Low birth weight (LBW) affected 34.7% of newborns in our study, a finding that aligns with the 31.97% LBW prevalence reported by Khatoon et al., who attributed LBW to maternal anemia and nutritional deficiencies [12]. Similarly, Yasmin et al. identified LBW as a common fetal outcome in adolescent pregnancies, linking it to inadequate prenatal care and maternal malnutrition [18]. Bushra et al. also observed a high LBW rate (41.7%) among infants of adolescent mothers, further supporting that nutritional deficiencies and physiological immaturity hinder optimal fetal growth [19]. Karaçam et al. supported this finding in their meta-analysis, noting that LBW and intrauterine growth restriction are prevalent among adolescent mothers, indicating a need for enhanced prenatal support and nutritional education for young mothers to mitigate LBW risks [20].

The rate of stillbirth in our cohort was 2.6%, which is consistent with the 2.16% rate observed by Sabir et al. [13]. Although relatively low, stillbirth remains a critical risk factor, particularly in adolescent pregnancies where undiagnosed infections or hypertensive complications are prevalent. Shah et al. documented a higher stillbirth rate (9%), suggesting that regional and healthcare disparities might influence this outcome [16]. These results imply that enhanced monitoring for potential complications, including infection prevention, is crucial in mitigating stillbirth risks in adolescent pregnancies.

Early neonatal death was recorded in 4.2% of cases, a finding supported by Kagawa et al., who identified a range of neonatal complications—such as low Apgar scores, birth asphyxia, and respiratory distress—as significant contributors to neonatal mortality in adolescent pregnancies [21]. Kagawa et al. observed that young mothers, particularly in low-resource settings, face compounded risks, as the healthcare support for neonatal resuscitation is often limited. This further supports the importance of perinatal care in improving neonatal outcomes in adolescent pregnancies.

NICU admissions were observed in 7.1% of cases, reflecting the need for specialized neonatal care due to complications like prematurity and low birth weight. Deo et al. reported a much higher NICU admission rate (29.3%) in teenage pregnancies, which they attributed to neonatal complications arising from maternal anemia, preeclampsia, and preterm labor [17]. Bushra et al. similarly found that 20% of newborns required NICU care, reinforcing the necessity for early intervention and specialized neonatal support for babies born to adolescent mothers [19]. Karaçam et al.'s meta-analysis also linked NICU admissions to adolescent pregnancies, emphasizing that maternal immaturity increases the likelihood of neonatal distress, requiring extended care [20].

When comparing maternal and fetal outcomes by maternal age within the adolescent range (15-17 years vs. 18-19 years), our results showed no statistically significant differences. Kawakita et al. similarly found no major differences in outcomes between younger and older adolescents, concluding that risks are relatively uniform across this age range [15]. However, Shah et al. suggested that younger adolescents (under 17) might be at a slightly elevated risk for certain outcomes, a finding not observed in our study [16].

Further analysis by gestational age highlighted a significant association between gestational age and maternal anemia, with higher anemia rates in the full-term group. This pattern is consistent with findings by Brohi et al., who noted that anemia rates increased as pregnancies advanced, given the higher iron demands of longer gestations [14]. NICU admissions, also associated with gestational age, were more common in full-term births in our cohort. Karaçam et al. suggested that NICU admissions in full-term infants may result from complications arising during labor or delivery rather than prematurity alone, indicating a need for comprehensive perinatal care [20].

The findings of this study emphasize the need for comprehensive prenatal care programs that address both nutritional and medical support for adolescent mothers. The high prevalence of adverse outcomes such as anemia, PIH, and preterm labor reflects underlying socioeconomic and physiological factors that compound pregnancy risks in this population. Consistent with the findings of previous studies, adolescent pregnancy poses significant maternal and fetal health challenges, underscoring the need for multi-faceted, proactive interventions

5. CONCLUSION

Adolescent pregnancy is associated with high rates of adverse maternal and fetal outcomes, including anemia, pregnancy induced hypertension, preterm labor and low birth weight, both of which reflect serious health issues for young mothers and their infants. The results of this study, consistent with other regional and international research, demonstrates that physiological immaturity in the mother, combined with nutritional and socioeconomic challenges, magnify risks for complications. Maternal and gestational age variations had little effect on the risk, which was pervasive across adolescent age ranges requiring targeted interventions. The risks in adolescent mothers are related to the state of comprehensive prenatal care programs emphasizing nutritional support and early screening and treatment of hypertensive disorders and early treatment of preterm labor, and could be reduced through such programs, including an improvement of the health outcome of adolescent mothers and their babies. These results reinforce the need for public health programs to reduce adolescent pregnancies and to offer these mothers focused programming.

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