Section: Obstetrics And Gynaecology

Original Research Article

STUDY OF FETOMATERNAL OUTCOME IN TEENAGE PREGNANCY

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Abstract

Background: Teenage pregnancy remains a significant public health challenge, particularly in low- and middle-income countries. Despite advancements in healthcare and education, systemic failures contribute to high adolescent birth rates. This study aimed to investigate the maternal and foetal outcomes of teenage pregnancy and its determinants. **Materials and Methods:** A prospective cross-sectional study was conducted among 499 primigravid women aged ≤19 years admitted for delivery, abortion, or medical termination of pregnancy at the Obstetrics and Gynaecology Department at Tirunelveli Govt Medical College from November 2019 to November 2021. Sociodemographic details, antenatal history, maternal complications, and neonatal outcomes were recorded. **Result:** Maternal and neonatal morbidity was significantly associated with younger maternal age and poor nutritional status. Anaemia affected 42.7% (moderate) and 16.2% (severe). Hypertensive disorders were reported in 24.6% of the cases, including gestational hypertension (12.6%), pre-eclampsia (8%), and eclampsia (4%). ICU admission was required in 30.6% of cases, primarily due to hypertensive disorders, heart disease, and sepsis. The caesarean section rate was 29.4%, mainly due to cephalopelvic disproportion (31.8%). Postpartum haemorrhage occurred in 12.4% of the cases, and obstructed/prolonged labour occurred in 6.3% of the cases. Neonatal complications included LBW (34.9% <2.5 kg), SGA (28.3%), and preterm birth (25.5%). Neonatal ICU admissions were required for 33.1% of newborns, with an increased neonatal mortality rate of 2.1%. **Conclusion:** Teenage pregnancy poses significant maternal and neonatal risks, including anaemia, hypertensive disorders, caesarean deliveries, and neonatal complications. Strengthening female literacy, enforcing child marriage laws, empowering women, and improving antenatal care are crucial for reducing these risks and improving outcomes.

INTRODUCTION

The World Health Organization (WHO) defines adolescents as individuals aged 10–19 years, whereas the Convention on the Rights of the Child considers anyone below 18 years of age to be a child.[1,2] Teenage pregnancy, occurring before 19 years of age at the time of delivery, remains a major public health challenge despite advancements in healthcare and education. Gender inequity is evident, with a significantly higher number of females experiencing early marriage related to males.[3,4]

The teenage years are a vital phase for personal and academic development, during which investment in education and delayed parenthood improve life outcomes. Conversely, early parenthood and illiteracy contribute to a poor quality of life in adulthood. Globally, 11% of births are to teenagers, with the vast majority (90%) taking place in nations classified as low- or middle-income.[5] Various demographic and socio-cultural factors, including poverty, illiteracy, rural residency, and traditional practices, contribute to teenage pregnancies.[4] A high incidence of adolescent pregnancy signifies systemic failures in health, education, and legal support.[6] Teenage pregnancy patterns vary across regions. In developed countries, out-of-wedlock pregnancies are common, whereas in developing nations, early marriages are the primary driver.[7] In India, WHO estimates that 40% of girls marry before turning 18; child marriages reinforce a cycle of poverty and adolescent motherhood, while female education and legislative empowerment significantly reduce their prevalence.[8]

Teenage pregnancy has severe maternal and foetal health consequences. Teenage mothers face a higher risk of developing urinary tract infections, experiencing anaemia, and suffering from placental

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insufficiency.[9] Their immature bodies struggle with pregnancy, leading to increased risks of LBW, miscarriages, and stillbirths.[10] Enduring consequences encompass postnatal depression, feelings of anxiety, thoughts of self-harm, and stress disorders following traumatic experiences.[11] In Western nations, unintended pregnancies account for 90% of all adolescent pregnancies, with half of these resulting in termination.[12]

The intergenerational cycle of teenage pregnancies is well documented. A girl is more likely to experience adolescent pregnancy if her mother or elder sibling has a similar history.[13] Western influences, impulsivity, and rising out-of-wedlock pregnancies in India further complicate the problem. Addressing teenage pregnancy requires a multifaceted approach, including enhanced education, better healthcare access, and socioeconomic development. Studies indicate that secondary and higher education significantly lower the risk of adolescent motherhood.[12]

Aim

This study aimed to investigate the maternal and foetal outcomes of teenage pregnancy and its determinants.

MATERIALS AND METHODS

This prospective cross-sectional study included 499 women from the Department of Obstetrics and Gynaecology, Tirunelveli Government Medical College, from November 2019 to November 2021. Following approval from the Institutional Ethics Committee, the research commenced, with all female participants providing informed consent prior to their participation.

Inclusion and Exclusion Criteria

Primigravid women aged ≤19 years who were entering the maternity unit for childbirth, pregnancy termination, or induced miscarriage were included in the study. Women with multigravida were excluded from the study.

Methods: The study documented various sociodemographic factors influencing teenage pregnancy, such as the age at marriage, onset of menarche, level of education, and presence of consanguineous relationships. Data on antenatal checkups and antenatal history were also collected. A comprehensive examination was conducted, including general, systemic, and obstetric assessments of the patients. Measurements, including stature, mass, skin tone, lower limb swelling, and arterial pressure, were documented. Comprehensive physical and standard prenatal evaluations were also conducted. Relevant investigations were retrieved from antenatal records when available or were conducted as necessary. Gestational age was determined based on the last menstrual period, clinical examination, and ultrasonography.

Complications occurring during the antenatal, intrapartum, and postpartum periods were also documented. Information was documented on labour commencement, delivery method, foetal maturity, weight at birth, Apgar evaluation, congenital abnormalities, and admissions to neonatal care. The mothers were monitored until discharge, and their newborns were observed throughout the initial neonatal stage. All gathered information was methodically recorded in a pro forma and subsequently analysed. In cases of abortion, specific details were documented, including the type of abortion, pregnancy duration at termination, induction technique employed, and any resultant complications.

Statistical Analysis: The results are presented as averages, standard deviations, frequencies and percentages. For continuous variables, comparisons were made using independent sample t-tests. Statistical significance was set at $p < 0.05$, employing a two-tailed test. Data analysis was conducted using IBM SPSS version 21.0.

RESULTS

Regarding age distribution, the majority of women were aged 19 years (n = 249, 49.9%), followed by 18 years (n = 100, 20%), and 17 years (n = 83, 16.6%). A total of 71.5% were married at or before 18 years, with the highest proportion marrying at 17 years 182 (38.6%), followed by 16 years 106 (22.5%) and 18 years 134 (28.5%). The most common ages at menarche were 13 years 169 (33.9%) and 14 years 166 (33.3%).

Regarding education, 248 (49.7%) had completed middle school, 126 (25.3%) had finished high school, and 62 (12.4%) had primary-level education. None of them pursued or completed graduate education. Most married women were in non-consanguineous relationships, 370 (74.1%), while 101 (20.4%) had consanguineous marriages, and 28 (5.6%) were unmarried.

Table 1: Demographic and clinical characteristics.

		N (%)
Age (In years)	14	3 (6%)
	15	29 (5.8%)
	16	35 (7%)
	17	83 (16.6%)
	18	100 (20%)
	19	249 (49.9%)
Age at marriage	14	12 (2.5%)
	15	37 (7.9%)
	16	106 (22.5%)

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	17	182 (38.6%)
	18	134 (28.5%)
Age at menarche	11	15 (3%)
	12	117 (23.4%)
	13	169 (33.9%)
	14	166 (33.3%)
	15	32 (6.4%)
Education	Illiterate	30 (6%)
	Primary school	62 (12.4%)
	Middle school	248 (49.7%)
	High school	126 (25.3%)
	Higher secondary level	33 (6.6%)
	Graduate	0 (0%)
Type of marriage	Consanguineous	101 (20.4%)
	Non-consanguineous	370 (74.1%)
	Unwed	28 (5.6%)
Booking status	Booked	419 (84%)
	Unbooked	80 (16%)
Height (cm)	<140	20 (4%)
	140-150	212 (42.5%)
	150-160	205 (41.1%)
	>160	62 (12.4%)
Weight (kg)	<40	8 (1.6%)
	40-50	161 (32.3%)
	50-60	185 (37.1%)
	>60	145 (29.1%)
Hb (g/dL)	>11.0	160 (32.1%)
	10-10.9	40 (8%)
	7.0-9.9	213 (42.7%)
	4.0-7.0	81 (16.2%)
	<4.0	5 (1%)
Blood pressure status	Normotensive	376 (75.4%)
	Gestational hypertension	63 (12.6%)
	Pre-eclampsia	43 (8%)
	Eclampsia	20 (4%)

Among the study group, 419 (84%) had booked antenatal care, while 80 (16%) had not. The mean height was 150.8 cm, with most women falling in the 140-150 cm range 212 (42.5%) and the 150-160 cm range 205 (41.1%). The average maternal weight was 54.2 kg, with 185 (37.1%) weighing between 50-60 kg and 145 (29.1%) weighing > 60 kg.

Moderate anaemia (haemoglobin 7.0-9.9 g/dL) was observed in 213 (42.7%) pregnant women, while 81 (16.2%) had severe anaemia (4.0-7.0 g/dL), and only 160 (32.1%) had haemoglobin levels above 11.0 g/dL. Hypertensive disorders of pregnancy were present in 126 (24.6%) women, including gestational hypertension (n = 63, 12.6%), pre-eclampsia (n = 43, 8%), and eclampsia (n = 20, 4%) [Table 1].

Regarding maternal characteristics, the mean height was 150.8±6.86 cm and the mean weight was 54.32±7.237 kg. The mean haemoglobin level was 9.35±2.2 g/dL. The mean birth weight of the newborns was 2.69±0.42 kg. In blood pressure measurements, the mean SBP was 127.27±18.84 mmHg, while the mean DBP was 78.59±9.95 mmHg [Table 2].

Table 2: Baseline characteristics

	Mean±SD
Height (cm)	150.8±6.86
Weight (kg)	54.32±7.237
Haemoglobin (g/dL)	9.35±2.2
Birth weight (kg)	2.69±0.42
SBP (mmHg)	127.27±18.84
DBP (mmHg)	78.59±9.95

Among the comorbidities, heart disease was observed in 54 (10.8%) women, gestational diabetes mellitus in 51 (10.2%), and epilepsy in 19 (3.8%). Regarding the mode of delivery, 234 (51.0%) women underwent vacuum-assisted delivery, breech delivery with assistance was performed in 17 (3.7%), and 73 (15.9%) deliveries involved the use of forceps and vacuum extraction. Additionally, 135 (29.4%) patients underwent LSCS.

The primary indications for LSCS were CPD in 43 (31.8%), foetal distress in 31 (22.9%), failed induction in 21 (15.5%), severe preeclampsia/eclampsia with an unfavourable cervix in 19 (14.1%), failed progression in 11 (8.1%), and malpresentation in 10 (7.4%). ICU admission was required for 153 (30.6%) women, mainly due to heart disease in 40 (26.1%), severe PIH in 33 (21.5%), and PPH in 32 (20.9%), whereas 346 (69.3%) did not require ICU care.

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Maternal complications included preterm labour in 90 (19.6%) women, PROM/PPROM in 85 (18.5%), oligohydramnios in 63 (13.7%), IUGR in 35 (7.6%), placental abruption in 15 (3.3%), and placenta previa in 7 (1.5%), while 164 (35.7%) had no complications. Most women (407, 88.7%) had no labour complications, whereas 29 (6.3%) had prolonged labour, 12 (2.6%) had CPD, 6 (1.3%) had obstructed labour, and 5 (1.1%) had cord prolapse. In the postpartum period, PPH was the most common complication, seen in 57 (12.4%) women, followed by retained placenta in 12 (2.6%) and complete perineal tear in 10 (2.2%) [Table 3].

Table 3: Maternal health profile: comorbidities, delivery outcomes, and complications

		N (%)
Comorbidity	Heart disease	54 (10.8%)
	Epilepsy	19 (3.8%)
	Gestational diabetes mellitus	51 (10.2%)
Mode of delivery	Vacuum-assisted	234 (51%)
	Assisted breech	17 (3.7%)
	Forceps and vacuum-assisted	73 (15.9%)
	LSCS	135 (29.4%)
Indication for LSCS	CPD	43 (31.8%)
	Failed induction	21 (15.5%)
	Failed progression	11 (8.1%)
	Severe preeclampsia/eclampsia with unfavourable cervix	19 (14.1%)
	Foetal distress	31 (22.9%)
	Malpresentation	10 (7.4%)
ICU requirement	Not ICU requiring	346 (69.3%)
	ICU requiring	153 (30.6%)
Indication for ICU admission	Abruption	15 (9.8%)
	Eclampsia	12 (7.8%)
	Severe PIH	33 (21.5%)
	Heart disease	40 (26.1%)
	Sepsis	11 (7.1%)
	PPH	32 (20.9%)
	Others	10 (6.5%)
Maternal complications (1st list)	No complications	164 (35.7%)
	PROM/PPROM	85 (18.5%)
	Abruption	15 (3.3%)
	Placenta praevia	7 (1.5%)
	Preterm labour	90 (19.6%)
	Oligohydramnios	63 (13.7%)
	IUGR	35 (7.6%)
Maternal complications (2nd list)	No complications	407 (88.7%)
	CPD	12 (2.6%)
	Obstructed labour	6 (1.3%)
	Cord prolapses	5 (1.1%)
	Prolonged labour	29 (6.3%)
Postpartum complications	Postpartum haemorrhage	57 (12.4%)
	Complete perineal tear	10 (2.2%)
	Retained placenta	12 (2.6%)

In the postpartum phase, the most prevalent complications were urinary tract infections (14.8%) and fever following surgery (11.1%). Cardiac failure affected 2.8% of patients, whereas 2.4% developed postpartum eclampsia. The mean weight of the newborns in this cohort was 2.69 kg. Among the infants, 32.4% were classified as having low birth weight (< 2.5 kg). The largest proportion of babies (37.3%) fell within the 2.5-3.0 kg weight range.

Most childbirths proceeded without complications. The most common irregularities observed were premature births and low birth weight, affecting 25.5% and 28.3% of deliveries, respectively. Intensive care was required for 33.3% of the newborns. The neonatal mortality rate was 2.1% of all live births, with ten infants not surviving. Abortions, either spontaneous or induced, occurred in 40% of the women. Of these, 70% occurred in the first trimester, and 30% occurred in the second trimester. Unsafe abortion methods were employed by nine women (22.5%). Within this group, 40% underwent medical termination of pregnancy (MTP), and 37.5% experienced spontaneous abortions [Table 4].

Table 4: Postpartum complications, neonatal outcomes, and pregnancy loss characteristics

		N (%)
Postpartum complications	No complications	293 (63.8%)
	Post-op fever	51 (11.1%)
	Sepsis	10 (2.2%)
	UTI	68 (14.8%)
	Puerperal psychosis	6 (1.3%)

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	Postpartum eclampsia	11 (2.4%)
	Secondary postpartum haemorrhage	7 (1.5%)
	Heart failure	13 (2.8%)
Birth weight (kg)	>3.0	128 (27.9%)
	2.5-3.0	171 (37.3%)
	2.0-2.5	144 (31.4%)
	<2.0	16 (3.5%)
Neonatal outcome	Normal	166 (36.2%)
	Premature	117 (25.5%)
	Small for Gestational Age	130 (28.3%)
	Birth asphyxia	26 (5.7%)
	Early neonatal death	10 (2.2%)
	Congenital anomalies	10 (2.2%)
Neonatal ICU requirement	Not ICU requiring	307 (65.4%)
	ICU requiring	152 (32.4%)
	Neonatal mortality	10 (2.1%)
Trimester of abortion	First trimester	28 (70%)
Mode of abortion	Second trimester	12 (30%)
	Spontaneous	15 (37.5%)
	MTP (Medical Termination of Pregnancy)	16 (40%)
	Unsafe	9 (22.5%)

The mean SBP was significantly higher among women who conceived before the age of 17 years (131.37 mmHg) than among those who conceived at an older age (126.31 mmHg) ($p = 0.02$). However, no significant association was observed between the age at conception and diastolic blood pressure ($p = 0.951$) [Table 5].

Table 5: Relationship between age at conception and blood pressure

	Age at conception (Mean ± SD)		**P-value**
	<17 years	**≥17 years**	
SBP	131.37 ± 18.83	126.31 ± 18.73	0.02
DBP	78.53 ± 9.91	78.60 ± 9.97	0.951

Women undergoing LSCS for CPD had a significantly lower mean height (149.44 cm) than those with other indications (152.43 cm) ($p = 0.043$). No significant difference was found between the weights of women who underwent LSCS ($p = 0.174$) [Table 6].

Table 6: Relationship between maternal body measurements and pelvic-foetal head mismatch in women who underwent caesarean section

	Women who underwent LSCS (Mean ± SD)		**P-value**
	With CPD as the indication	**Other causes**	
Height (cm)	149.44 ±8.72	152.43 ±5.45	0.043
Weight (kg)	52.79 ±9.98	55.11 ±6.95	0.174

DISCUSSION

Our study found that 71.5% of participants were married at or before 18 years, with 32.9% marrying before the age of 16. This shows the continued prevalence of early marriage, which contributes to teenage pregnancy. These findings are aligned with those of Doddihal et al., who reported a mean age of 16 years at marriage and that 79.2% of the participants were primigravidae. The persistence of early marriage underscores the deeply ingrained sociocultural norms and economic pressures influencing adolescent reproductive health.[14]

We found that 74.1% of the women were in non-consanguineous marriages. Khan et al. showed that consanguineous marriages in India are associated with higher rates of congenital malformations, stillbirths, and reduced foetal growth. This emphasizes the potential health benefits of non-consanguineous marriages in improving pregnancy outcomes and reducing the burden of genetic disorders.[15]

Our research revealed that among secondary school scholars, 248 (49.7%) showed that illiteracy is a key factor contributing to underage marriage and adolescent pregnancies. Bennett et al. showed that poor reading abilities independently increase the risk of teenage pregnancy (HR 2.51). Higher education levels correlate with delayed marriage, and university graduates show markedly lower birth rates. Improving literacy levels is crucial for raising the average age at which women wed and bear children, thus mitigating complications from teenage pregnancies, curbing population growth, and reducing high fertility rates.[16]

In our study, among the maternal complications, anaemia was the most prevalent, affecting 42.7% of participants (moderate) and 16.2% (severe). This finding is aligned with that of Ahmad et al., who reported a 40% prevalence of anaemia in pregnant women. Low haemoglobin levels contribute to preterm labour, foetal growth restriction, and postpartum complications, making anaemia a critical concern in teenage pregnancies.[17]

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In our study, hypertensive disorders were reported in 24.6% of the cases, including gestational hypertension (12.6%), pre-eclampsia (8%), and eclampsia (4%). This rate is higher than the 6.9% prevalence of hypertension reported by Mehta et al., possibly due to differences in study populations.[18] Das et al. also identified hypertensive disorders as a major reason for ICU admissions in obstetric cases, which aligns with our findings.[19]

The increased LSCS 135 (29.4%) among teenage mothers in our study is consistent with Harrison et al., who reported that OL/PL/FTP was associated with increased maternal morbidity, including higher risks of infection (RR 1.8, 95% CI 1.5–2.2) and antepartum (RR 2.8, 95% CI 2.1–3.7) and postpartum haemorrhage (RR 2.4, 95% CI 1.8–3.3). Neonatal complications, such as stillbirth (RR 1.6, 95% CI 1.3–1.9) and neonatal demise within 28 days (RR 1.9, 95% CI 1.6–2.1), were also significantly higher in cases of OL/PL/FTP.[20]

In our study, PPH occurred in 12.4% of the cases, making it the most common postpartum complication. These findings are consistent with those of Konar et al., who identified PPH as a leading cause of maternal morbidity.[21] In our study, ICU admission was necessitated in 30.6% of cases, predominantly due to hypertensive disorders (21.5%), cardiac conditions (26.1%), and sepsis (7.1%). Rathod et al. found that the main reasons for ICU admission were hypertensive disorders (28.88%), cardiac conditions (12.15%), and sepsis (7.97%).[22]

In our study, the mean birth weight of the newborns was 2.69 kg, with 34.9% classified as having low birth weight (<2.5 kg). Additionally, 28.3% were SGA, and 25.5% were preterm births. These findings confirm the increased risk of foetal growth restriction in teenage pregnancies, as previously reported by Harrison et al.[20] Our study found that NICU admissions were necessitated in 33.1% of cases, primarily due to prematurity, birth asphyxia, and sepsis. The observed neonatal mortality rate was 2.1% in our study, which is significantly lower than the 20.2% mortality rate reported by Shah et al. This difference may be attributed to advancements in neonatal care, early interventions, and improved access to healthcare facilities.[23]

In our study, 40% of the pregnancies resulted in abortion (spontaneous or induced), with 22.5% involving unsafe methods. The majority of abortions (70%) occurred in the first trimester, while 30% were second-trimester abortions. These findings mirror those of Raj et al., who emphasised the role of poor maternal care and sociocultural restrictions in influencing pregnancy termination outcomes.[24] We found that 16% of pregnancies were unbooked due to limited awareness of antenatal care. Mukherjee et al. reported that out-of-pocket spending on maternity care remains a heavy financial burden even after the implementation of the Janani Suraksha Yojana.[25]

Beyond financial constraints, inefficiencies in the healthcare system, including policy limitations and the underreporting of maternal deaths, hinder access to quality maternal care. Jat et al. emphasised the urgent need for policy reforms to improve antenatal and emergency obstetric care.[26] Similarly, Badalia et al. reported that delays in identifying warning signs and inadequate healthcare responses contribute to preventable maternal deaths.[27] Addressing these gaps requires improved maternal health policies, better healthcare infrastructure, and enhanced community awareness programs.

CONCLUSION

Our study highlights the significant maternal and neonatal risks associated with teenage pregnancy, including high rates of anaemia, hypertensive disorders, caesarean deliveries, and postpartum haemorrhage. The substantial proportion of neonatal complications, such as low birth weight, preterm births, and NICU admissions, further emphasises the adverse impact on foetal health. The findings highlight the urgent need for targeted interventions, including improving female literacy, enforcing laws against child marriage, empowering young women, and enhancing access to quality antenatal care. Preventive strategies should focus on improving literacy rates, enforcing laws against underage marriage, empowering women through education, and increasing access to quality antenatal care. Additionally, for pregnant adolescents, early and regular antenatal care, proper nutrition, and contraception counselling are vital for minimising adverse outcomes.

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