Section: OBG

Original Research Article

TEENAGE PREGNANCY: A PROSPECTIVE STUDY ON MATERNAL AND NEONATAL OUTCOMES IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Background: Teenage pregnancy remains a significant public health concern, particularly in developing countries, associated with increased maternal and neonatal complications. Our objective is to evaluate maternal complications during antepartum, intrapartum, and postpartum periods, analyze mode of delivery, assess neonatal outcomes, and identify contributing factors for teenage pregnancy in a rural tertiary care setting. **Materials and Methods:** A prospective observational study was conducted at a tertiary care teaching hospital. Three hundred teenage primigravidas (13-19 years) admitted for delivery were enrolled. Data on demographic characteristics, antenatal complications, delivery outcomes, and neonatal parameters were collected using a structured proforma. **Result:** The incidence of teenage pregnancy was 6.74%. Most participants were 18-19 years old (88%), married (100%), and belonged to lower socioeconomic status (88%). Anemia affected 53% of mothers, with hypertensive disorders in 18%. Cesarean section rate was 48%, with fetal distress (29%) and cephalopelvic disproportion (27%) being major indications. Low birth weight occurred in 42% of babies, with 51% requiring NICU admission. Perinatal mortality was 3%. **Conclusion:** Teenage pregnancy is associated with significant maternal complications including anemia, pregnancy-induced hypertension, increased operative deliveries, and adverse neonatal outcomes. Comprehensive health education, enforcement of minimum marriage age laws, and multidisciplinary approach are essential for improving adolescent reproductive health.

INTRODUCTION

Teenage pregnancy, defined as pregnancy occurring in females under 19 years of age, represents a critical public health challenge worldwide, particularly in developing nations. Globally, approximately 16 million girls aged 15-19 years and one million girls under 15 give birth annually, predominantly in low and middle-income countries. Complications during pregnancy and childbirth constitute the second leading cause of death among 15-19-year-old girls worldwide.

In India, teenage pregnancy accounts for 8-14% of total pregnancies, with significant regional variations. While the national average stands at 8%, Tamil Nadu reports a relatively lower prevalence of 5.9%. Despite this, teenage pregnancy remains a serious concern as complications during pregnancy and childbirth represent the leading cause of mortality among women aged 15-19 years in India. Teenage mothers aged 10-19 years' experience a maternal mortality rate approximately five times higher than mothers aged 20-24 years.

The adverse outcomes associated with teenage pregnancy stem from multiple factors including biological immaturity, unintended pregnancy, inadequate perinatal care, poor maternal nutrition, and psychosocial stress. Teenage mothers face increased risks of anemia, preeclampsia, preterm labor, cephalopelvic disproportion, and postpartum hemorrhage. Their infants are at higher risk for prematurity, low birth weight, birth asphyxia, and neonatal mortality.

Several socioeconomic factors contribute to teenage pregnancy, including low educational status, poverty, early marriage, lack of awareness about contraception, and inadequate parental supervision. In rural areas, where early marriage is more prevalent, the problem is particularly acute. Understanding the specific complications and

outcomes in this vulnerable population is crucial for developing targeted interventions.

While numerous studies have been conducted in various parts of India, limited recent data exists on teenage pregnancy outcomes in rural Tamil Nadu, particularly in areas with improving healthcare infrastructure and government initiatives for early pregnancy registration and maternal care.

Based on this the present study was undertaken to study maternal complications specific to teenage mothers during antepartum, intrapartum, and postpartum periods. Also to analyze the mode of delivery and determine whether cesarean section rates are increased in teenage pregnancy and evaluate neonatal outcomes in teenage pregnancy.

MATERIALS AND METHODS

A hospital-based prospective observational study was conducted in the Department of Obstetrics and Gynaecology at Government Medical College Hospital, Krishnagiri, Tamil Nadu, over a six-month period. The study protocol received approval from the institutional ethics committee, and informed written consent was obtained from all participants and their parents in the local language.

The study included all teenage pregnant women aged 13-19 years who were primigravidas admitted for delivery in the labor room after 28 weeks of gestation. A sample of 300 consecutive cases meeting the inclusion criteria was enrolled. Exclusion criteria included primigravidas less than 28 weeks of gestation, primigravidas greater than 28 weeks admitted for causes other than labor, multigravidas, and antenatal mothers above 19 years of age.

Data collection was performed using a structured proforma that captured comprehensive information including demographic characteristics (age, education, occupation, socioeconomic status, marital status), obstetric parameters (gestational age, parity, antenatal booking status, timing of first antenatal visit), anthropometric measurements (height, weight, body mass index), antenatal complications (anemia, hypertensive disorders, gestational diabetes, intrauterine growth restriction), labor and delivery details (spontaneous versus induced labor, mode of delivery, indications for operative intervention), postpartum complications, and neonatal outcomes (birth weight, APGAR scores, NICU admission, complications, perinatal mortality).

Special attention was given to maintaining confidentiality, and the marital status of subjects was not disclosed. All participants received standard antenatal care according to institutional protocols, including regular antenatal check-ups, supplementation with iron and folic acid, tetanus immunization, and appropriate investigations. Hemoglobin levels were classified as: not anemic (≥11 g/dL), mild anemia (9-10.9 g/dL), moderate anemia (7-8.9 g/dL), and severe anemia (<7 g/dL). Hypertensive disorders were classified according to standard definitions. Low birth weight was defined as birth weight less than 2.5 kg, and very low birth weight as less than 1.5 kg.

Knowledge assessment regarding pregnancy, delivery, breastfeeding, and contraception was conducted through structured interviews. Mothers were counseled about breastfeeding techniques, newborn care, and family planning methods during the postpartum period. Statistical analysis was performed using descriptive statistics, with results expressed as frequencies and percentages. The incidence of teenage pregnancy was calculated as the proportion of teenage deliveries among total deliveries during the study period.

RESULTS

During the six-month study period, 4,446 deliveries occurred at the institution, of which 300 were teenage pregnancies, yielding an incidence of 6.74%. This rate is slightly higher than the Tamil Nadu state average of 5.9% but lower than the national Indian average of 7.9%.

The majority of teenage mothers (88%, n=264) belonged to the 18-19 years age group, while 9% (n=26) were 16-17 years old, and only 3% (n=10) were less than 16 years of age. All participants (100%) were married at the time of study enrollment. Regarding type of marriage, 73% (n=218) had arranged marriages while 27% (n=82) reported love marriages. Analysis of consanguinity revealed that 73% (n=220) had non-consanguineous marriages, 18% (n=54) had second-degree consanguinity, and 9% (n=26) had third-degree consanguinity.

The interval between menarche and marriage showed that 74% (n=223) of teenage primigravidas were married 5-6 years after menarche, while 26% (n=77) were married within 2-4 years of menarche. Educational status analysis revealed that only 1% (n=2) were illiterate, 3% (n=9) had primary education (grades I-V), 47% (n=141) had middle school education (grades VI-X), 41% (n=125) had higher secondary education (grades XI-XII), and 8% (n=23) were graduates. Occupationally, 92% (n=275) were not working (students or housewives), while only 8% (n=25) were employed.

Socioeconomic assessment revealed that the overwhelming majority (88%, n=263) belonged to lower-middle socioeconomic class, with only 12% (n=37) from upper-middle class. When assessed for knowledge about pregnancy and delivery, only 34% (n=102) demonstrated adequate understanding, while 66% (n=198) had poor knowledge.

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Table 1: Demographic and Social Characteristics of Teenage Mothers (N=300)

Characteristic	Category	Number	Percentage
Age Distribution	<15 years	10	3%
	16-17 years	26	9%
	18-19 years	264	88%
Marital Status	Married	300	100%
	Unmarried	0	0%
Type of Marriage	Love marriage	82	27%
	Arranged marriage	218	73%
Educational Status	Illiterate	2	1%
	Primary (I-V)	9	3%
	Middle (VI-X)	141	47%
	Higher secondary (XI-XII)	125	41%
	Graduate	23	8%
Socioeconomic Status	Lower middle class	263	88%
	Upper middle class	37	12%
Knowledge about Pregnancy	Poor	198	66%
	Fair	102	34%

All mothers (100%, n=300) were booked cases and had received tetanus immunization. Regarding the timing of first antenatal visit, 27% (n=80) registered in the first trimester, 65% (n=196) in the second trimester, and 8% (n=24) only in the third trimester. Anthropometric assessment showed that 6% (n=19) had height less than 145 cm, while 94% were taller. Body mass index analysis revealed that 4% (n=14) had BMI <20, 89% (n=266) had BMI 21-25, and 7% (n=20) had BMI 26-30.

Anemia was present in 53% of teenage mothers: 47% (n=141) had mild anemia, 4% (n=11) had moderate anemia, and 2% (n=7) had severe anemia. Hypertensive disorders affected 18% of the study population: 12% (n=38) had gestational hypertension, 3% (n=8) had severe pre-eclampsia, 2% (n=5) had imminent eclampsia, and 1% (n=4) had antepartum eclampsia.

Other antenatal complications included intrauterine growth restriction in 11% (n=33), preterm labor in 11% (n=34), prolonged pregnancy in 8% (n=23), gestational diabetes in 3% (n=9), and heart disease in 1% (n=3). Intrauterine fetal death occurred in 2% (n=7) of cases, with abruption being the most common cause (57%, n=4), followed by meconium-stained amniotic fluid (29%, n=2) and oligohydramnios (14%, n=1).

Table 2: Antenatal Complications in Teenage Pregnancy (N=300)

Complication	Number of Patients	Percentage
Anemia		
Mild (9-10.9 g/dL)	141	47%
Moderate (7-8.9 g/dL)	11	4%
Severe (<7 g/dL)	7	2%
Total with anemia	159	53%
Hypertensive Disorders		
Gestational hypertension	38	12%
Severe pre-eclampsia	8	3%
Imminent eclampsia	5	2%
Antepartum eclampsia	4	1%
Total hypertensive disorders	55	18%
Other Complications		
Intrauterine growth restriction	33	11%
Preterm labor	34	11%
Prolonged pregnancy	23	8%
Gestational diabetes	9	3%
Intrauterine fetal death	7	2%

Regarding fetal presentation, 94% (n=281) had cephalic presentation, 4% (n=13) had breech presentation, 1% (n=4) had oblique lie, and 1% (n=2) had transverse lie. The majority of pregnancies (89%, n=266) reached term, while 11% (n=34) resulted in preterm delivery.

Labor was spontaneous in 52% (n=155) and required induction in 48% (n=145). Among induced labors, the most common method was Foley catheter with artificial rupture of membranes or oxytocin augmentation (70%, n=102), followed by PGE2 gel alone (22%, n=31), and Foley with gel (8%, n=12).

Mode of delivery analysis revealed that vaginal delivery occurred in 42% (n=126), cesarean section in 48% (n=143), instrumental delivery in 9% (n=28), and assisted breech delivery in 1% (n=3). Among instrumental deliveries, outlet forceps were used in 57% (n=16) and vacuum extraction in 43% (n=12).

The most common indications for cesarean section were fetal distress (29%, n=42), cephalopelvic disproportion (27%, n=38), oligohydramnios (11%, n=15), failed induction (11%, n=15), failed acceleration (6%, n=8), prolonged rupture of membranes >24 hours (6%, n=9), breech presentation

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(4%, n=6), unfavorable cervix (4%, n=6), transverse lie (1%, n=2), and oblique lie (1%, n=2).

Table 3: Labor and Delivery Characteristics (N=300)

Parameter	Category	Number	Percentage
Progress of Labor	Spontaneous	155	52%
	Induced	145	48%
Mode of Delivery	Normal vaginal delivery	126	42%
	Lower segment cesarean section	143	48%
	Instrumental delivery	28	9%
	Assisted breech	3	1%
Indications for LSCS (n=143)	Fetal distress	42	29%
	Cephalopelvic disproportion	38	27%
	Oligohydramnios	15	11%
	Failed induction	15	11%
	Failed acceleration	8	6%
	PROM >24 hours	9	6%
	Breech	6	4%
	Unfavorable cervix	6	4%
	Abnormal lie	4	2%

Complications during labor affected 76 mothers (25%). The most common intrapartum complications were premature rupture of membranes (33%, n=25), postpartum hemorrhage (17%, n=13), cephalopelvic disproportion (14%, n=11), complete perineal tear (12%, n=9), abruptio placentae (11%, n=8), retained placenta (9%, n=7), obstructed labor (3%, n=2), and cord prolapse (1%, n=1).

Postpartum complications occurred in 63 mothers (21%). These included mastitis (28%, n=18), urinary tract infection (24%, n=15), post-operative fever (22%, n=14), local sepsis (21%, n=13), and septicemia (5%, n=3). Blood transfusion was required in 9% of cases: packed red blood cells in 4% (n=13) and fresh frozen plasma in 5% (n=16).

Knowledge assessment revealed that only 41% (n=122) of mothers had adequate knowledge about breastfeeding, while 59% (n=178) lacked this information. Similarly, only 35% (n=105) had knowledge about contraception, while 65% (n=195) did not. Regarding contraceptive adoption, 31% (n=93) accepted postpartum intrauterine contraceptive device, 2% (n=7) chose Antara (injectable contraceptive), 2% (n=7) opted for barrier methods, while 65% (n=193) did not adopt any contraceptive method immediately postpartum.

Table 4: Maternal Complications and Outcomes (N=300)

Complication Type	Specific Complication	Number	Percentage
Intrapartum (n=76)	Premature rupture of membranes	25	33%
	Postpartum haemorrhage	13	17%
	Cephalopelvic disproportion	11	14%
	Complete perineal tear	9	12%
	Abruptio placentae	8	11%
Postpartum (n=63)	Mastitis	18	28%
	Urinary tract infection	15	24%
	Post-operative fever	14	22%
	Local sepsis	13	21%
	Septicemia	3	5%
Blood Transfusion	Packed red blood cells	13	4%
	Fresh frozen plasma	16	5%
	Not required	282	91%

Birth weight distribution showed that 10% (n=30) of babies were very low birth weight (<2 kg), 32% (n=97) were low birth weight (2-2.5 kg), 34% (n=101) weighed 2.6-3 kg, 21% (n=63) weighed 3.1-3.5 kg, and 3% (n=9) weighed >3.5 kg. APGAR scores at one minute were less than 7 in 47% (n=142) of babies, while at five minutes, 45% (n=135) had scores less than 9.

NICU admission was required for 51% (n=152) of babies born to teenage mothers. The most common neonatal complications were low birth weight (35%, n=107), respiratory distress (26%, n=79), prematurity (11%, n=34), milk aspiration (3%, n=9), congenital anomalies (2%, n=6), neonatal sepsis (1.6%, n=5), neonatal jaundice (1.3%, n=4), and large for gestational age (1.3%, n=4).

Regarding perinatal outcome, 57% (n=172) of babies remained with mothers and were discharged home, 40% (n=120) required continued NICU care before discharge, and perinatal mortality occurred in 3% (n=8) of cases.

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Table 5: Neonatal Outcomes in Teenage Pregnancy (N=300)

Parameter	Category	Number	Percentage
Birth Weight	<2 kg (Very low birth weight)	30	10%
	2-2.5 kg (Low birth weight)	97	32%
	2.6-3 kg	101	34%
	3.1-3.5 kg	63	21%
	>3.5 kg	9	3%
APGAR Score at 1 minute	<7	142	47%
	≥7	158	53%
APGAR Score at 5 minutes	<9	135	45%
	≥9	165	55%
NICU Admission	Required	152	51%
	Not required	148	49%
Neonatal Complications	Low birth weight	107	35%
	Respiratory distress	79	26%
	Prematurity	34	11%
	Milk aspiration	9	3%
	Congenital anomalies	6	2%
Perinatal Outcome	Discharged with mother	172	57%
	Discharged after NICU care	120	40%
	Perinatal mortality	8	3%

DISCUSSION

The present study conducted at tertiary care teaching hospital over six months revealed an incidence of teenage pregnancy of 6.74% among all deliveries, which is slightly higher than the Tamil Nadu state average of 5.9% but lower than the national average of 7.9% reported in the National Family Health Survey-4. This finding reflects the rural nature of the study population and persistent socioeconomic factors contributing to early marriage and childbearing in the region.

The demographic profile of our study population revealed several important characteristics. The majority of teenage mothers (88%) belonged to the 18-19 years age group, consistent with findings by Bhalerao AR who reported 93% of teenage pregnancies in the 17-19 years age range. All participants in our study were married at the time of enrollment, similar to observations by Sharma AK (100%) and Ashok Kumar (100%), reflecting the sociocultural context in India where teenage pregnancies predominantly occur within wedlock, unlike developed countries where unmarried teenage pregnancies are more common.

The high proportion of participants from lower socioeconomic status (88%) aligns with established literature linking poverty, limited educational opportunities, and early marriage. Imamura et al. in their meta-analysis emphasized that socioeconomic disadvantage, disrupted family structure, and low educational attainment consistently associate with teenage pregnancy. Educational status analysis in our study showed that while only 1% were illiterate, nearly half had not progressed beyond middle school, supporting the correlation between limited education and teenage pregnancy. Research by the Allen Guttmacher Institute demonstrated that seven years of education reduced pregnancy rates by 34% in urban areas and 54% in rural areas among 15-19 year-olds in India.

The finding that 27% of marriages were "love marriages" represents an emerging trend in rural India and may contribute to teenage pregnancy when young couples marry without adequate family planning knowledge or financial stability. The relatively high rate of consanguineous marriages (27%) in our population, while lower than some other Indian states, may have implications for congenital anomalies, though our sample size was insufficient to draw definitive conclusions.

Antenatal Care and Complications

A notable strength observed in our study was the 100% antenatal booking rate, significantly higher than previous studies such as Sharma AK (20.7%) and Ashok Kumar (52.7%). This improvement likely reflects successful implementation of government initiatives including early pregnancy registration through PICME (Pregnancy Infant Cohort Monitoring and Evaluation) tracking systems, which facilitate comprehensive follow-up and reduce lost cases. However, timing of first antenatal visit remained suboptimal, with only 27% registering in the first trimester and 8% presenting only in the third trimester, indicating continued need for awareness about early antenatal care benefits.

Anemia emerged as a major complication, affecting 53% of teenage mothers in our study, closely matching the Tamil Nadu prevalence of 54.8% and the national average of 53% among reproductive-age women according to NFHS-4. This finding is consistent with studies by Verma V and Shravage JC, who reported higher anemia rates in teenage mothers compared to adults, attributed to poor nutritional status, increased iron requirements during adolescent growth, and competition between maternal growth needs and fetal demands. The persistent high anemia prevalence despite supplementation programs underscores the need for more intensive interventions, such as FOGSI's "12 by 12" initiative aiming to achieve 12 g/dL hemoglobin by age 12.

Hypertensive disorders affected 18% of our study population, with pregnancy-induced hypertension being most common (12%), followed by severe pre-

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eclampsia (3%), imminent eclampsia (2%), and antepartum eclampsia (1%). These rates are comparable to studies by Shobana Patted and Chahande MS (approximately 20%), and consistent with findings by Verma V, Shravage JC, and Bhaduria, all demonstrating higher pre-eclampsia rates in teenage mothers. The increased risk of hypertensive disorders in adolescents is attributed to biological immaturity, nulliparity, inadequate antenatal care, and nutritional deficiencies. Our rates were higher than the general population prevalence of 8-10% reported in Mudaliar and 5-10% in Williams Obstetrics, confirming that teenage pregnancy represents a high-risk category for this complication.

The preterm delivery rate of 11% in our study falls within the range reported by previous investigators: Shobana Patted (12.83%), Bhalerao AR (16%), and lower than Asha Swaroop (32%). This relatively favorable outcome may reflect improved antenatal care and hospital-based management protocols. However, it remains higher than the general population rate of 5-18%, consistent with observations by Bhaduria, Bhattacharya, and Shravage JC, who attributed increased preterm births in teenagers to higher rates of pre-eclampsia, anemia, and socioeconomic stress.

The cesarean section rate of 48% in our teenage population is concerning, exceeding the normal vaginal delivery rate of 42%. This finding is higher than previous Indian studies reporting cesarean rates of 22.1% (Bhattacharya), 31% (Shravage JC), and 27.3% (Chahande MS), though comparable to Shobana Patted's findings. The elevated cesarean rate likely reflects multiple factors including biological immaturity, underdeveloped bony pelvis, cephalopelvic disproportion, and increased fetal distress. Our rate also exceeds the Tamil Nadu state average of 34% for all age groups according to NFHS-4, confirming that teenage pregnancy is an independent risk factor for operative delivery.

Fetal distress (29%) and cephalopelvic disproportion (27%) were the leading indications for cesarean section in our study, differing slightly from Shravage's study where CPD predominated followed by fetal distress. This pattern reflects the anatomical challenges faced by young mothers whose pelvic development may be incomplete. Other significant indications included oligohydramnios, failed induction, and malpresentations, collectively accounting for the remaining cases.

Instrumental delivery was required in 9% of cases, with outlet forceps (57%) preferred over vacuum extraction (43%). Higher rates of instrumental delivery in teenage populations have been consistently reported, including studies by Pal Amitha et al. and Shravage et al., reflecting difficulties in the second stage of labor due to pelvic immaturity and inadequate maternal effort.

Intrapartum complications occurred in 25% of deliveries, with premature rupture of membranes being most common (33% of complications), followed by postpartum hemorrhage (17%) and cephalopelvic disproportion (14%). These findings align with a Texas State Health Department study analyzing over 1.3 million deliveries, which found teenage mothers (15-18 years) had significantly higher rates of premature rupture of membranes, placenta previa, prolonged labor, dysfunctional delivery, breech presentation, and cephalopelvic disproportion compared to mothers aged 25-29 years.

Postpartum complications affected 21% of mothers, with mastitis (28%), urinary tract infections (24%), post-operative fever (22%), and local sepsis (21%) being most frequent. Blood transfusion was required in 9% of cases, comparable to findings by Indranil Dutta (5%). These complications reflect not only the physiological stress of teenage pregnancy and delivery but also potential gaps in postpartum care and hygiene education.

Knowledge gaps regarding breastfeeding and contraception were substantial, with only 41% possessing adequate breastfeeding knowledge and 35% understanding contraceptive methods. This finding parallels Indranil Dutta's study (43.75% with breastfeeding knowledge) and highlights the critical need for comprehensive health education during pregnancy and the postpartum period. Despite these knowledge deficits, counseling and demonstration resulted in successful breastfeeding establishment in 95% of mothers, demonstrating the effectiveness of targeted interventions.

Contraceptive adoption rates were encouraging, with 31% accepting postpartum IUCD insertion, though 65% did not adopt any method immediately postpartum. Compared to the Tamil Nadu average of 53% contraceptive use among reproductive-age women (NFHS-4), there is considerable room for improvement. Enhanced contraceptive counseling during antenatal care and immediate postpartum period may help prevent closely spaced repeat pregnancies, which carry additional risks for young mothers.

Neonatal outcomes revealed significant challenges, with 42% of babies being low birth weight (<2.5 kg), including 10% very low birth weight (<2 kg). This rate substantially exceeds the 20-30% low birth weight prevalence in adult mothers in the Indian population and is consistent with studies by Shravage JC and Kushwaha. The high proportion of low birth weight babies reflects the combined effects of maternal anemia, hypertensive disorders, inadequate nutrition, and biological competition between maternal and fetal growth needs.

APGAR scores indicated significant birth asphyxia, with 47% of babies scoring <7 at one minute and 45% scoring <9 at five minutes. Consequently, 51% of newborns required NICU admission, substantially higher than typical rates in adult pregnancies. The primary neonatal complications were low birth weight (35%), respiratory distress (26%), and prematurity (11%), consistent with Kumar Ashok's findings of increased perinatal asphyxia (11.7%),

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jaundice (5.77%), and respiratory distress syndrome (1.9%).

The perinatal mortality rate of 3% in our study, while concerning, compares favorably with previous reports by Pratinidhi (6.72%), Bhalerao (6.52%), and Kumar Ashok (6.7%). This improvement may reflect enhanced neonatal care capabilities and effective management protocols in our tertiary care setting. Our rate approximates the national infant mortality rate of 2.83% (2019 government data), suggesting that with appropriate institutional care, outcomes

CONCLUSION

This prospective study of 300 teenage pregnancies in a rural tertiary care hospital revealed an incidence of 6.74%, with significant maternal and neonatal morbidity. Key findings include high rates of anemia (53%), hypertensive disorders (18%), and operative deliveries (48% cesarean section, 9% instrumental), substantially exceeding rates in adult pregnancies. Neonatal outcomes were compromised, with 42% low birth weight babies, 51% NICU admissions, and 3% perinatal mortality.

Contributing factors identified include predominantly lower socioeconomic status (88%), limited education (only 8% graduates), poor knowledge about pregnancy and childbirth (66%), and delayed first antenatal visits (65% in second trimester or later). While universal antenatal booking through government programs represents a significant achievement, timing and quality of care require improvement.

The biological immaturity of teenage mothers, evidenced by high cephalopelvic disproportion rates and nutritional competition between maternal growth and fetal development, cannot be fully mitigated by medical care alone. Prevention through delayed marriage and childbearing remains the optimal strategy. Comprehensive interventions are urgently needed, including:

The success of government initiatives in achieving universal antenatal booking demonstrates that system-level interventions can produce measurable improvements. However, addressing teenage pregnancy comprehensively requires sustained commitment to social determinants of health, particularly female education and empowerment. As demonstrated by states like Kerala with higher female literacy, education represents the most effective long-term strategy for reducing teenage pregnancy rates and improving maternal-child health outcomes.

While medical management can mitigate some risks, biological and developmental constraints inherent to teenage pregnancy cannot be fully overcome. Prevention through delayed childbearing, coupled with optimal care for those who do become pregnant, offers the best approach to reducing the substantial morbidity and mortality associated with teenage pregnancy in India.

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