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Original Research Article

Maternal and Neonatal Outcomes in Teenage Pregnancy: A Retrospective Study from Tertiary Care Centre in Eastern India

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Abstract:

Background: Teenage pregnancy remains a significant public health concern, particularly in low- and middle-income countries, due to increased maternal and neonatal complications stemming from biological immaturity, socioeconomic challenges, and limited healthcare access.

Aim: To analyze maternal and neonatal complications associated with teenage pregnancy compared to adult pregnancies.

Methodology: A retrospective observational study was conducted at the Department of Obstetrics and Gynaecology, Nalanda Medical College and Hospital, Patna, Bihar, India, from March 2024 to February 2025. Medical records of 90 teenage mothers (13–19 years) and 90 adult mothers (20–35 years) were reviewed. Maternal demographics, obstetric history, antenatal care, pregnancy complications, delivery outcomes, and neonatal outcomes were extracted and analyzed using SPSS 27.0, with statistical significance set at $p < 0.05$.

Results: Teenage mothers had higher rates of anemia (46.7% vs. 27.8%, p=0.004) and obstructed labor (11.1% vs. 3.3%, p=0.04). Neonatal complications included significantly higher low birth weight (28.9% vs. 14.4%, p=0.01) and trends toward preterm delivery and low Apgar scores. Teenage mothers were predominantly primigravida, resided in rural areas, and had lower educational attainment with reduced antenatal care utilization.

Conclusion: Teenage pregnancy is associated with elevated maternal and neonatal risks, emphasizing the need for reproductive education, enhanced antenatal care, nutritional support, and careful labor management.

Keywords: Teenage Pregnancy, Maternal Complications, Neonatal Outcomes, Anemia, Low Birth Weight, Antenatal Care.

Introduction

Teenage pregnancy is a serious human health issue that keeps alarming the world especially the low and middle-income nations [1] because it is a pregnancy that takes place in girls between the age of 13 to 19 years. Although there have been improvements in access to reproductive health education and methods of birth control, teenage pregnancies remain unusually high in a number of areas, which has led to a grossly disproportionate data on maternal morbidity and mortality. Due to the challenges of pregnancy, adolescents are vulnerable to maternal complications because of their peculiar physiology, psychological, and social issues [2] in this situation. Adolescent body is usually in its active growth and developmental stage, whereby the pelvic structure, as well as the hormonal milieu has not yet grown to full strength, and this may be a predisposing factor to obstetric complications in teen pregnancies, like obstructed labor, preterm birth and hypertensive pregnancy related issues. Furthermore, immature cardiovascular and renal systems in adolescents might not be able to cope with the high hemodynamic and metabolic burden of gestation which creates a further risk of poor maternal outcomes.

The health complications encountered by the mother due to teen pregnancy are multi-factorial as they are caused by biological immaturity, socioeconomic factors as well as lack of access to quality healthcare [3]. Teenagers' mothers biologically experience greater incidences of anemia as their nutritional requirements rise during adolescence and pregnancy which can cause postpartum blood loss and extra transfusion needs. They also face increased risk of preeclampsia and eclampsia which can be closely related to maternal and fetal morbidity and mortality

[4]. Research studies have also demonstrated that pregnancy induced hypertension is much more common in teenagers than in women in the twenties and this underscores the relationship between physiological susceptibility based on age and obstetric delivery. Moreover, adolescents are also prone to hindered labor and need cesarean section as the pelvis is still relatively immature and can further expose the patients to surgical complications, infections and an extended hospital stay.

The social economic status and psychological factors, which exist from that time until present, create dangerous conditions that lead to increased health problems of teenage mothers [5]. Adolescents who belong to marginalized groups, which have low educational attainment and income levels, face difficulties accessing antenatal care services. These factors create obstacles that prevent timely pregnancy detection, limit available antenatal visits, and hinder patients from following recommended treatments which include iron supplements and vaccinations and developmental problem assessments during pregnancy [6]. The fact that teenage mothers face high levels of stress and depression together with social stigma, results in negative effects on their maternal health practices which then lead to dangerous outcomes that include poor nutrition and inadequate weight gain and heightened risk of infections. Teenage pregnancy requires special healthcare solutions because its combination of social vulnerability and biological immaturity creates extreme danger.

Teenage pregnancies create hazardous health effects because they increase rates of maternal morbidity and mortality which establishes a crucial need for public health interventions according to research evidence [7]. Teenage mothers experience higher rates of various obstetric complications which include preterm labor and obstetric hemorrhage and hypertensive disorders and anemia and puerperal infections that lead to increased intensive care unit admissions and maternal fatalities in developing countries. The burden of these complications extends beyond the first perinatal period because adolescent mothers experience long-term health effects that include chronic hypertension and reproductive tract injuries and psychological distress which degrade their overall well-being. The economic burden of teenage pregnancy affects both families and healthcare systems because maternal complications require extensive hospital treatment which includes both surgical procedures and specialized medical attention.

The analysis of maternal complications in teenage pregnancy is necessary because it helps researchers to discover main risk factors which they can use to develop effective programs and create policies that will enhance maternal and child health results. Healthcare providers can establish age-appropriate medical procedures through their research on the epidemiology, patterns, and determinants of these complications which includes implementing early antenatal registration and nutritional counseling and psychosocial support and prompt treatment of obstetric emergencies. The research in this field will establish guidelines for creating educational programs which communities can use to decrease teenage pregnancy rates while enhancing reproductive health service access for adolescents. Health systems can decrease morbidity and mortality rates for teenage mothers by addressing both biological and social factors which cause maternal complications, which will help them reach their maternal and child health objectives [8].

Teenage pregnancy occurs because of three primary factors which include biological risks and social economic challenges and restricted healthcare services. The systematic analysis of these complications shows how adolescent mothers face specific challenges which require comprehensive solutions that include medical treatments and educational support and social services. The health of young mothers depend on understanding maternal complications from teenage pregnancy because this knowledge protects their well-being while creating healthier future generations and reducing healthcare expenses and helping achieve international public health goals.

Methodology

Study Design: This study was designed as a retrospective observational study aimed at analyzing maternal complications associated with teenage pregnancy. The study focused on reviewing medical records and patient data to identify the prevalence and pattern of maternal complications among teenage mothers compared to adult mothers.

Study Area: The study was conducted in the Department of Obstetrics and Gynaecology, Nalanda Medical College and Hospital, Patna, Bihar, India.

Study Duration: The study covered a period of one year from March 2024 to February 2025.

Study Participants

Inclusion Criteria:

- Pregnant women aged 13–19 years at the time of delivery.
- Singleton pregnancies.
- Delivered at Nalanda Medical College and Hospital during the study period.
- Availability of complete medical records, including antenatal, intranatal, and postnatal details.

Control Group:

- Adult mothers aged 20–35 years delivering during the same period.

- Selected using simple random sampling from the hospital delivery register to ensure comparability with the teenage group.

Exclusion Criteria

- Multiple gestations (twins, triplets, etc.).
- Incomplete or missing medical records.
- Known pre-existing chronic medical disorders unrelated to pregnancy complications (e.g., chronic hypertension, pre-gestational diabetes, renal disease, or cardiac disease).

Sample Size: All teenage deliveries during the study period were included, and an equal number of adult controls were selected, resulting in 90 teenage mothers meeting the inclusion criteria. An equal number of adult controls were selected using simple random sampling from the delivery register making the final sample size 180 participants. This approach ensured balanced comparison between the two groups.

Procedure: Medical records of eligible participants were retrieved from the hospital obstetric database and labor room registers. Data were collected using a structured data extraction sheet. Recorded variables included maternal demographic characteristics (age, residence, education), obstetric history (gravidity, antenatal care visits), and maternal complications such as gestational hypertension, preeclampsia, eclampsia, antepartum and postpartum hemorrhage, anemia (defined as hemoglobin <11 g/dL per WHO criteria), obstructed labor, cesarean section, maternal blood transfusion, and ICU admission.

Neonatal outcomes recorded included preterm birth, birth weight, Apgar score, and NICU admission. Each variable was appropriately categorized for statistical analysis. All data were anonymized to maintain patient confidentiality, and ethical approval was obtained from the Institutional Ethics Committee of Nalanda Medical College and Hospital prior to data collection.

Statistical Analysis: Data were entered and analyzed using SPSS version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics summarized demographic and clinical characteristics, with continuous variables presented as mean ± standard deviation (SD) and categorical variables expressed as frequencies and percentages. Comparisons between teenage and adult mothers were conducted using Chi-square tests or Fisher's exact tests, as appropriate. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to determine the strength of association between maternal age group and complications. A p-value of <0.05 was considered statistically significant.

Result

Table 1 presents the demographic characteristics of the study participants, comparing teenage mothers with adult mothers. The mean age of teenage mothers was 17.8 ± 1.5 years, while adult mothers had a significantly higher mean age of 27.2 ± 4.1 years ($p < 0.001$). A larger proportion of teenage mothers resided in rural areas (75.6%) compared to adult mothers (60%), whereas urban residence was more common among adult mothers (40%) than teenage mothers (24.4%), with both differences reaching statistical significance ($p = 0.03$). Regarding education, the majority of teenage mothers had not completed the 10th grade (65.6%), whereas most adult mothers had attained at least a 10th-grade education (73.3%), and these differences were highly significant ($p < 0.001$), highlighting notable disparities in age, residence, and educational attainment between the two groups.

Table 1: Demographic Characteristics of Study Participants

Characteristic	Teenage Mothers (n=90)	Adult Mothers (n=90)	p-value
Mean Age (years)	17.8 ± 1.5	27.2 ± 4.1	<0.001
Rural Residence	68 (75.6%)	54 (60%)	0.03
Urban Residence	22 (24.4%)	36 (40%)	0.03
Education <10th Grade	59 (65.6%)	24 (26.7%)	<0.001
Education ≥10th Grade	31 (34.4%)	66 (73.3%)	<0.001

Table 2 presents the obstetric history of teenage and adult mothers. Among teenage mothers, a significantly higher proportion were primigravida (91.1%) compared to adult mothers (53.3%), while multigravida status was more common in adult mothers (46.7%) than in teenagers (8.9%), with both differences being statistically significant ($p<0.001$). Regarding antenatal care, fewer teenage mothers completed four or more visits (60% vs. 80% in adults), and a higher proportion had less than four visits (40% vs. 20%), indicating a significant disparity in antenatal care utilization between the two groups ($p=0.005$). These findings suggest that teenage mothers are more likely to be first-time mothers and are less likely to receive adequate antenatal care compared to adult mothers.

Table 2: Obstetric History			
Obstetric Parameter	**Teenage Mothers (n=90)**	**Adult Mothers (n=90)**	**p-value**
Primigravida	82 (91.1%)	48 (53.3%)	<0.001
Multigravida	8 (8.9%)	42 (46.7%)	<0.001
Antenatal Care <4 visits	36 (40%)	18 (20%)	0.005
Antenatal Care ≥4 visits	54 (60%)	72 (80%)	0.005

Table 3 shows the distribution of maternal complications during pregnancy among teenage and adult mothers with hemoglobin levels below 11 g/dL. Teenage mothers exhibited higher rates of most complications compared to adult mothers, including gestational hypertension (20% vs. 13.3%), preeclampsia (15.6% vs. 8.9%), eclampsia (4.4% vs. 1.1%), anemia (46.7% vs. 27.8%), and antepartum hemorrhage (6.7% vs. 3.3%). The odds ratios indicate that teenage mothers were more likely to develop these complications, with anemia showing a statistically significant association (OR 2.36, 95% CI 1.32–4.21, p=0.004), while other complications did not reach statistical significance (p>0.05). These findings suggest that teenage pregnancy is associated with an increased risk of anemia and a trend toward higher rates of other maternal complications compared to adult pregnancies.

Table 3: Maternal Complications During Pregnancy (Hb <11 g/dL)				
Complication	**Teenage Mothers (n=90)**	**Adult Mothers (n=90)**	**OR (95% CI)**	**p-value**
Gestational Hypertension	18 (20%)	12 (13.3%)	1.61 (0.74–3.49)	0.22
Preeclampsia	14 (15.6%)	8 (8.9%)	1.86 (0.74–4.63)	0.17
Eclampsia	4 (4.4%)	1 (1.1%)	4.11 (0.46–36.3)	0.20
Anemia (Hb <11 g/dL)	42 (46.7%)	25 (27.8%)	2.36 (1.32–4.21)	0.004*
Antepartum Hemorrhage	6 (6.7%)	3 (3.3%)	2.06 (0.50–8.53)	0.31

Table 4 presents the comparison of intrapartum and delivery complications between teenage mothers and adult mothers. The data showed that obstructed labor occurred significantly more frequently in teenage mothers (11.1%) compared to adult mothers (3.3%), with an odds ratio of 3.60 (95% CI: 1.0–12.9, p = 0.04), indicating a statistically significant higher risk among teenagers. Cesarean section rates were slightly higher in teenage mothers (33.3%) than in adult mothers (27.8%), but this difference was not statistically significant (OR 1.30, 95% CI: 0.73–2.32, p = 0.37). Postpartum hemorrhage was observed in 13.3% of teenage mothers versus 6.7% of adult mothers, showing a trend toward increased risk, though not statistically significant (OR 2.11, 95% CI: 0.79–5.61, p = 0.13). Similarly, maternal blood transfusions and ICU admissions were more frequent among teenagers (5.6% and 3.3%, respectively) compared to adults (2.2% and 1.1%), but these differences did not reach statistical significance (OR 2.59, 95% CI: 0.50–13.5, p = 0.25; OR 3.00, 95% CI: 0.32–28.3, p = 0.31). Overall, teenage mothers demonstrated a higher tendency for most complications, with obstructed labor being the only complication showing a significant association.

Table 4: Intrapartum and Delivery Complications				
Complication	**Teenage Mothers (n=90)**	**Adult Mothers (n=90)**	**OR (95% CI)**	**p-value**
Obstructed Labor	10 (11.1%)	3 (3.3%)	3.60 (1.0–12.9)	0.04*
Cesarean Section	30 (33.3%)	25 (27.8%)	1.30 (0.73–2.32)	0.37
Postpartum Hemorrhage	12 (13.3%)	6 (6.7%)	2.11 (0.79–5.61)	0.13
Maternal Blood Transfusion	5 (5.6%)	2 (2.2%)	2.59 (0.50–13.5)	0.25
ICU Admission	3 (3.3%)	1 (1.1%)	3.00 (0.32–28.3)	0.31

Table 5 presents the neonatal outcomes comparing teenage mothers (n=90) with adult mothers (n=90). Preterm delivery occurred in 20% of neonates born to teenage mothers versus 11.1% in adults, showing a non-significant increased risk (OR 2.0; 95% CI 0.90–4.44; p=0.08). Low birth weight was significantly higher among teenage mothers at 28.9% compared to 14.4% in adults (OR 2.43; 95% CI 1.19–4.94; p=0.01), indicating a strong association with maternal age. Macrosomia rates were slightly lower in teenagers (4.4%) than adults (6.7%), but this difference was not significant (OR 0.65; p=0.53). NICU admissions were more frequent in neonates of teenage mothers (13.3% vs 7.8%; OR 1.78; p=0.23), while low 5-minute Apgar scores (<7) occurred in 11.1% of teenage births versus 4.4% in adults, showing a trend but not statistical significance (OR 2.70; p=0.07). Overall, teenage pregnancy was associated with higher risks of adverse neonatal outcomes, particularly low birth weight.

Table 5: Neonatal Outcomes				
Outcome	**Teenage Mothers (n=90)**	**Adult Mothers (n=90)**	**OR (95% CI)**	**p-value**
Preterm Delivery (<37 wks)	18 (20%)	10 (11.1%)	2.0 (0.90–4.44)	0.08
Low Birth Weight (<2500 g)	26 (28.9%)	13 (14.4%)	2.43 (1.19–4.94)	0.01*
Macrosomia (>4000 g)	4 (4.4%)	6 (6.7%)	0.65 (0.17–2.45)	0.53
NICU Admission	12 (13.3%)	7 (7.8%)	1.78 (0.70–4.52)	0.23
Low 5-min Apgar (<7)	10 (11.1%)	4 (4.4%)	2.70 (0.88–8.27)	0.07

Discussion

The present study demonstrates that teenage pregnancies are associated with significant maternal and neonatal complications when compared with adult pregnancies. The mean age of teenage mothers in our study was 17.8 years, reflecting early childbearing patterns consistent with other reports, where adolescent mothers were mostly younger than 19 years (Abbas et al., 2017) [9]. Similar to our findings, Omole-Ohonsi and Attah (2010) [10] reported that teenage mothers were predominantly primigravida, resided in rural areas, and had lower educational attainment, highlighting the impact of socioeconomic determinants on the occurrence and outcomes of adolescent pregnancies. These social factors may influence health-seeking behaviors, antenatal care uptake, and ultimately maternal and neonatal outcomes (Penman-Aguilar et al., 2013) [11].

Our results indicated that teenage mothers had lower utilization of antenatal care, with fewer completing the recommended four or more visits. This underutilization of antenatal services has been widely reported. For instance, Fraser et al. (1995) [12] observed that adolescents were 1.8 times more likely to have inadequate antenatal care compared to adult mothers, increasing the risk of undiagnosed complications during pregnancy. Similarly, Azevedo et al. (2015) [13] highlighted that insufficient antenatal visit among adolescent mothers were directly correlated with higher rates of anemia and nutritional deficiencies. In our study, anemia affected 40% of teenage mothers compared to 22.2% of adult mothers, aligning with prior evidence that adolescents are more vulnerable to iron-deficiency anemia due to physiological immaturity and increased nutritional demands (Goonewardene & Waduge, 2005) [14].

Regarding hypertensive disorders, our study found a non-significant but higher prevalence of gestational hypertension, preeclampsia, and eclampsia in teenage mothers. These findings are partially supported by Ganchimeg et al. (2014) [15], who reported a higher incidence of eclampsia among adolescents in a multicountry WHO study, though preeclampsia was slightly less frequent. Conversely, Kawakita et al. (2016) [16] observed that preeclampsia risk was significantly increased only in teens younger than 16 years (aOR 1.44), with no notable rise in older adolescents. The variation in findings may be attributed to differences in study populations, geographic settings, and healthcare quality. Nevertheless, our results suggest that younger maternal age may predispose to hypertensive complications, emphasizing the need for close monitoring during pregnancy.

In terms of intrapartum outcomes, the current study demonstrated a significantly higher incidence of obstructed labor among teenage mothers. This is consistent with the findings of Gupta et al. (2008) [17], who reported a 1.5-fold higher risk of labor dystocia in adolescent pregnancies, likely due to the physiological immaturity of the pelvis. Although cesarean section and postpartum hemorrhage rates were higher in teenagers, the differences were not statistically significant. Loto et al. (2004) [18] similarly reported that while obstetric complications were more frequent among adolescents, high-quality obstetric care could mitigate adverse outcomes, suggesting that healthcare access and quality play a critical role in determining maternal morbidity.

Neonatal outcomes in our study further confirmed the vulnerability of infants born to teenage mothers. Low birth weight was significantly higher in this group, corroborating findings by Chen et al. (2007) [19], who observed a relative risk of 1.14 for low birth weight among adolescent mothers in a large US cohort. Trends toward increased preterm delivery, low 5-minute Apgar scores, and NICU admissions were also observed, consistent with Stewart et al. (2007) [20], who identified a strong association between young maternal age and preterm birth in rural Nepal. These results suggest that biological immaturity, combined with socioeconomic and healthcare factors, contributes to adverse neonatal outcomes.

Interestingly, while certain neonatal complications were elevated, some outcomes such as NICU admissions, did not show statistically significant association. This suggests that proper antenatal and intrapartum management can partially offset the inherent risks associated with adolescent pregnancies.

Overall, the findings of our study indicate that teenage pregnancies are influenced by a combination of biological, social, and healthcare-related factors that increase the likelihood of maternal and neonatal complications. These results emphasize the importance of targeted interventions, including improving antenatal care utilization, providing nutritional support, and ensuring careful labor

monitoring. Furthermore, strategies aimed at delaying first pregnancies through education, reproductive health awareness, and improved access to contraception are crucial for reducing the incidence of teenage pregnancies and mitigating the associated adverse outcomes.

Conclusion:

This study demonstrated that teenage pregnancy is associated with a higher risk of maternal and neonatal complications compared to adult pregnancies. Teenage mothers were predominantly primigravida, resided in rural areas, and had lower educational attainment, which contributed to reduced utilization of antenatal care. Biologically, adolescents exhibited increased susceptibility to anemia and obstructed labor due to physiological immaturity, while hypertensive disorders showed a trend toward higher prevalence. Neonatal outcomes, particularly low birth weight, were significantly worse among infants born to teenage mothers, with trends toward increased preterm delivery, low Apgar scores, and NICU admissions. These findings underscore the multifactorial nature of risks in adolescent pregnancies, highlighting the need for comprehensive strategies combining early reproductive education, improved antenatal care, nutritional support, and careful labor management to reduce both maternal and neonatal morbidity and improve overall health outcomes.

References

1. Pradhan R, Wynter K, Fisher J. Factors associated with pregnancy among adolescents in low-income and lower middle-income countries: a systematic review. J Epidemiol Community Health. 2015 Sep 1;69(9):918-24.
2. Wainaina CW, Sidze EM, Maina BW, Badillo-Amberg I, Anyango HO, Kathoka F, Khasowa D, Okoror CE. Psychosocial challenges and individual strategies for coping with mental stress among pregnant and postpartum adolescents in Nairobi informal settlements: a qualitative investigation. BMC pregnancy and childbirth. 2021 Sep 28;21(1):661.
3. 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).
4. Sawhney H, Aggarwal N, Biswas R, Vasishta K, Gopalan S. Maternal mortality associated with eclampsia and severe preeclampsia of pregnancy. Journal of Obstetrics and Gynaecology Research. 2000 Oct;26(5):351-6.
5. Bruno SK, Rocha HA, Rocha SG, Araújo DA, Campos JS, Silva AC, Correia LL. Prevalence, socioeconomic factors and obstetric outcomes associated with adolescent motherhood in Ceará, Brazil: a population-based study. BMC pregnancy and childbirth. 2021 Sep 8;21(1):616.
6. Begum K, Ouédraogo CT, Wessells KR, Young RR, Faye MT, Wuehler SE, Hess SY. Prevalence of and factors associated with antenatal care seeking and adherence to recommended iron-folic acid supplementation among pregnant women in Zinder, Niger. Maternal & child nutrition. 2018 Feb;14:e12466.
7. Christiansen CS, Gibbs S, Chandra-Mouli V. Preventing early pregnancy and pregnancy-related mortality and morbidity in adolescents in developing countries: the place of interventions in the prepregnancy period. Journal of pregnancy. 2013;2013(1):257546.
8. Chung HW, Kim EM, Lee JE. Comprehensive understanding of risk and protective factors related to adolescent pregnancy in low-and middle-income countries: A systematic review. Journal of adolescence. 2018 Dec 1;69:180-8.
9. Abbas AM, Ali SS, Ali MK, Fouly H, Altraigey A. The maternal and neonatal outcomes of teenage pregnancy in a tertiary university hospital in Egypt. Proceedings in Obstetrics and Gynecology. 2017 Oct 1;7(3).
10. Omole-Ohonsi A, Attah RA. Obstetric outcome of teenage pregnancy in Kano, North-Western Nigeria. West African journal of medicine. 2010;29(5).
11. Penman-Aguilar A, Carter M, Snead MC, Kourtis AP. Socioeconomic disadvantage as a social determinant of teen childbearing in the US. Public Health Reports. 2013 Mar;128(2_suppl1):5-22.
12. Fraser AM, Brockert JE, Ward RH. Association of young maternal age with adverse reproductive outcomes. New England journal of medicine. 1995 Apr 27;332(17):1113-8.
13. Azevedo WF, Diniz MB, Fonseca ES, Azevedo LM, Evangelista CB. Complications in adolescent pregnancy: systematic review of the literature. Einstein (Sao Paulo). 2015 Jun 9;13(4):618-26.
14. Goonewardene IM, Waduge RD. Adverse effects of teenage pregnancy. Ceylon Medical Journal. 2009 Dec 9;50(3).
15. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J, Yamdamsuren B, Temmerman M, Say L, Tunçalp Ö, Vogel JP. Pregnancy and childbirth outcomes among adolescent mothers: a W orld H ealth O rganization multicountry study. BJOG: An International Journal of Obstetrics & Gynaecology. 2014 Mar;121:40-8.
16. Kawakita T, Wilson K, Grantz KL, Landy HJ, Huang CC, Gomez-Lobo V. Adverse maternal and neonatal outcomes in adolescent pregnancy. Journal of pediatric and adolescent gynecology. 2016 Apr 1;29(2):130-6.

17. Gupta N, Kiran U, Bhal K. Teenage pregnancies: Obstetric characteristics and outcome. Eur J Obstet Gynecol Reprod Biol 2008;137:165e71.
18. Loto OM, Ezechi OC, Kalu BK, Loto AB, Ezechi LO, Ogunniyi SO. Poor obstetric performance of teenagers: is it age-or quality of care-related?. Journal of obstetrics and Gynaecology. 2004 Jun 1;24(4):395-8.
19. Chen XK, Wen SW, Fleming N, Demissie K, Rhoads GG, Walker M. Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. International journal of epidemiology. 2007 Apr 1;36(2):368-73.
20. Stewart CP, Katz J, Khatry SK, LeClerq SC, Shrestha SR, West Jr KP, Christian P. Preterm delivery but not intrauterine growth retardation is associated with young maternal age among primiparae in rural Nepal. Maternal & child nutrition. 2007 Jul;3(3):174-85.