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Original Research Article

Retrospective Evaluation of Fetomaternal Outcomes Among Teenage Mothers

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Abstract:

Background: Teenage pregnancy is a major public health concern associated with increased maternal and neonatal morbidity, particularly in developing countries. Biological immaturity, anemia, hypertensive disorders, and inadequate antenatal care contribute to adverse fetomaternal outcomes.

Aim: To assess the fetomaternal outcomes among teenage pregnancies and evaluate associated risk factors.

Methodology: This hospital-based retrospective observational study was conducted over one year in the Department of Obstetrics and Gynaecology, Nalanda Medical College and Hospital, Patna. A total of 80 primigravida teenage mothers (13–19 years) with singleton pregnancies ≥28 weeks were included. Maternal and fetal outcomes were recorded and analyzed using SPSS version 27.0.

Results: Most participants were aged 18–19 years (50%) and 57.5% were unbooked. Anemia (22.5%) was the most common maternal complication, followed by preterm delivery (17.5%) and preeclampsia (15%). Vaginal delivery occurred in 60% of cases, while 32.5% underwent cesarean section. Low birth weight (20%), preterm birth (17.5%), low Apgar score (11.25%), and stillbirth (6.25%) were notable fetal outcomes. Unbooked status was significantly associated with preterm delivery (p=0.041).

Conclusion: Teenage pregnancy is associated with considerable maternal and neonatal risks, emphasizing the importance of early antenatal care and adolescent-focused healthcare interventions.

Keywords: Teenage pregnancy, Fetomaternal outcome, Anemia, Preterm birth, Low birth weight, Antenatal care.

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Introduction

Teenage pregnancy continues to pose a major challenge in the global public health because of its far-reaching medical, social and economic consequences to mother and child [1]. The World Health Organization describes the term adolescence as a period of youthful life between the ages of 10 and 19, which is the period of accelerated physical development, psychological maturation, and socialization. Conceptualization of pregnancy at this delicate stage creates biological and obstetric problems that are not common among adults due to the fact that most teenagers are not mature enough biologically and psychologically to cater to the stresses of pregnancy and delivery. The number of adolescent pregnancies is the percentage of patients giving birth in the world because in low- and middle-income countries, early marriage, lack of access to birth control, insufficient educational levels, and sociocultural beliefs have all contributed to the rise of birth rates in adolescent pregnancies [2]. Teenage pregnancy still poses a serious reproductive health problem in other countries like India, particularly when it comes to the rural and socially disadvantaged.

Adolescent mothers face higher chances of negative maternal health results because their bodies have not yet achieved complete pelvic development and they experience nutritional deficiencies and they do not receive proper prenatal care [3]. Nutrient competition occurs between the developing fetus and the growing mother which results in teenage mothers developing anemia and hypertensive disorders during pregnancy and experiencing insufficient weight gain throughout their pregnancy. Adolescent female patients show higher rates of hypertensive disorders that include preeclampsia and eclampsia which require immediate treatment to prevent serious maternal health complications [4]. Teenage pregnancies show higher rates of preterm labor and premature rupture of membranes and cephalopelvic

disproportion and obstructed labor. The medical interventions required for these complications include both instrumental delivery and cesarean section which create additional demands on healthcare facilities while increasing risks for mothers.

On the part of the fetus, teen pregnancy has been strongly linked to negative perinatal outcomes [5]. Babies born of adolescent mothers have better outcomes due to increased low birth weight, preterm birth, intrauterine growth restriction, and perinatal death. The concern of low birth weight and preterm birth is significant because the two factors cause considerable morbidity among the neonates and developmental issues throughout their lives. Preterm development of the uterus and cervix, opportunistic maternal intake and fetal surveillance during pregnancy can hamper the placental functionality and fetal developments [6]. Moreover, the infant of teen mothers has a higher chance of being admitted by the neonatal intensive care because of conditions like respiratory distress syndrome, neonatal sepsis, and birth asphyxia. The intergenerational effects of adolescent childbearing are emphasized by the fact that these infants are more susceptible.

Socioeconomic determinants function as essential elements which determine fetomaternal outcomes in teenage pregnancy [7]. Adolescents typically belong to lower socioeconomic strata while they face educational limitations and their access to complete reproductive health services remains restricted. Early marriage and early conception may lead to educational interruptions which result in continuous poverty cycles. The lack of antenatal care knowledge together with inadequate understanding of birth preparedness and nutritional needs creates a situation which increases the likelihood of unfavorable results [8]. Psychological stress together with social stigma and absence of familial or spousal support create negative effects on maternal health practices and healthcare-seeking behavior. The various factors which influence teenage pregnancy demonstrate that it exists as a medical condition which connects to both biological aspects and social factors.

Though the quality of obstetric care and the availability of institutional delivery have improved, there are still maternal and neonatal disparities among adolescent mothers. Some studies indicate that risks can be avoided with proper antenatal supervision and institutional birth, whereas other studies point to the fact that biological immaturity on its own is a predictor of negative outcomes [9]. Thus, the evidence-based planning and the application of specific interventions rely on the spectrum of fetomaternal complications of teenage pregnancy. Thorough evaluation of complication of the maternal conditions like anemia, hypertensive disorders, operative births, and fetal conditions like birth weight, gestational age birth, Apgar scores, and neonatal intensive care hospitalization offer valuable information in respect of the extent of the problem.

In the context of public health, reducing teenage pregnancy aligns with global goals aimed at improving maternal and child health outcomes. Preventive strategies, including sexuality education, empowerment of adolescent girls, access to contraception, and delayed age at marriage, are critical components in addressing this issue. Simultaneously, strengthening adolescent-friendly health services and ensuring timely antenatal care can significantly improve outcomes among pregnant teenagers. Thus, an in-depth evaluation of fetomaternal outcomes in teenage pregnancy is crucial not only to quantify associated risks but also to inform policy formulation, optimize clinical management, and contribute toward achieving sustainable improvements in reproductive and neonatal health.

Methodology

Study Design: This study was conducted as a hospital-based retrospective observational study to assess the fetomaternal outcomes in teenage pregnancy. The design was chosen to systematically evaluate maternal and fetal complications among teenage mothers delivering at a tertiary care center and to analyze their frequency and distribution.

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

Study Duration: The duration of the study was one year from March 2024 to February 2025.

Study Participants: A total of 80 teenage pregnant women fulfilling the eligibility criteria were included in the study.

Inclusion Criteria

- Primigravida women aged 13 to 19 years.
- Singleton pregnancy.
- Gestational age ≥ 28 weeks confirmed by ultrasonography.
- Willingness to participate in the study with written informed consent.

Exclusion Criteria

- Pregnant women aged below 13 years or above 19 years.
- Multigravida women.
- Multiple pregnancies (e.g., twins or higher order gestation).
- Pregnant women with a history of smoking or alcohol intake.
- Women with pre-existing major medical illnesses (e.g., chronic hypertension, diabetes mellitus, renal disease).
- Women with a family history of hypertension.

Sample Size: The sample size of the study was 80 teenage pregnant women.

Procedure: Eligible participants were recruited from the antenatal clinics and labour ward of the Department of Obstetrics and Gynaecology. Written informed consent was obtained from all participants prior to enrollment. A predesigned and pretested proforma was used to collect relevant data, including demographic details, age, booking status, socioeconomic background, and gestational age as determined by ultrasonography.

Operational definitions were standardized for uniform data collection. Teenage pregnancy was defined as pregnancy occurring in women aged 13–19 years. Maternal outcomes were assessed in terms of pregnancy-induced hypertension (blood pressure ≥140/90 mmHg on two occasions at least four hours apart), preeclampsia (pregnancy-induced hypertension with proteinuria >300 mg/24 hours), anemia (hemoglobin <10.5 g/dl), and preterm delivery (delivery before 37 completed weeks of gestation). Mode of delivery (vaginal, instrumental, or cesarean section) and indications for cesarean section were recorded.

Fetal outcomes were evaluated in terms of stillbirth (delivery of a baby after 28 weeks of gestation with no signs of life), low birth weight (birth weight <2.5 kg irrespective of gestational age), and Apgar score at birth and at 10 minutes. All participants were followed up until delivery, and relevant intrapartum and immediate postpartum events were documented. Data collection forms were reviewed daily for completeness and accuracy to ensure data quality.

Statistical Analysis: Data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Prior to analysis, data cleaning and validation were performed. Quantitative variables such as age and gestational age were expressed as mean and standard deviation. Qualitative variables such as maternal complications (pregnancy-induced hypertension, preeclampsia, anemia, preterm delivery), mode of delivery, and fetal outcomes (low birth weight, stillbirth) were presented as frequencies and percentages. Stratification was performed with respect to age groups, booking status, and gestational age to assess their association with maternal and fetal outcomes. The Chi-square test was applied for comparison of categorical variables. A p-value of ≤0.05 was considered statistically significant.

Result

Table 1 presents the socio-demographic characteristics of the 80 teenage mothers included in the study. The majority of participants were aged 18–19 years (50%), followed by those aged 16–17 years (35%), while only 15% were in the younger age group of 13–15 years, indicating that late adolescence constituted the largest proportion of teenage pregnancies. Regarding antenatal care utilization, more than half of the mothers (57.5%) were unbooked, whereas 42.5% had received regular antenatal booking, suggesting suboptimal access to or utilization of prenatal services among a considerable proportion of participants. In terms of residence, a predominant number of teenage mothers belonged to rural areas (65%), compared to 35% from urban settings, highlighting a higher prevalence of teenage pregnancies in rural populations. Overall, the data suggest that teenage motherhood in this study was more common among older adolescents, unbooked mothers, and those residing in rural areas.

Table 1: Socio-Demographic Characteristics of Teenage Mothers (n = 80)

Variable	Frequency (n)	Percentage (%)
Age (years)		
13–15	12	15
16–17	28	35
18–19	40	50
Booking Status		
Booked	34	42.5
Unbooked	46	57.5
Residence		
Rural	52	65
Urban	28	35

Table 2 illustrates the distribution of maternal complications among 80 teenage pregnancies. The most common complication observed was anemia, affecting 18 participants (22.5%), indicating that nearly one-fourth of the teenage mothers experienced reduced hemoglobin levels during pregnancy. This was followed by preterm delivery in 14 cases (17.5%) and preeclampsia in 12 cases (15%), highlighting a considerable burden of hypertensive and obstetric complications in this age group. Pregnancy-induced hypertension (PIH) was reported in 10 mothers (12.5%), further emphasizing the vulnerability of teenage pregnancies to blood pressure-related disorders. Notably, 26 participants (32.5%) did not experience any complications, suggesting that while a substantial proportion had adverse

outcomes, nearly one-third had an uncomplicated course. Overall, the findings reflect a significant prevalence of maternal complications among teenage pregnancies, with anemia and hypertensive disorders being particularly prominent.

Table 2: Maternal Complications Among Teenage Pregnancies (n = 80)		
Maternal Outcome	**Frequency (n)**	**Percentage (%)**
Pregnancy Induced Hypertension (PIH)	10	12.5
Preeclampsia	12	15
Anemia	18	22.5
Preterm Delivery	14	17.5
No Complication	26	32.5

Table 3 shows the distribution of mode of delivery among 80 teenage mothers. The majority of participants, 48 (60%), delivered through normal vaginal delivery, indicating that most teenage pregnancies in the study resulted in spontaneous vaginal births. Cesarean section was the second most common mode of delivery, accounting for 26 cases (32.5%), suggesting a considerable proportion required surgical intervention, possibly due to obstetric complications or fetal indications. Instrumental delivery was the least common, observed in only 6 cases (7.5%), reflecting limited use of assisted vaginal techniques such as forceps or vacuum. Overall, while normal vaginal delivery predominated, nearly one-third of teenage mothers underwent cesarean section, highlighting a significant surgical delivery rate in this population.

Table 3: Mode of Delivery Among Teenage Mothers (n = 80)		
Mode of Delivery	**Frequency (n)**	**Percentage (%)**
Normal Vaginal Delivery	48	60
Instrumental Delivery	6	7.5
Cesarean Section	26	32.5

Table 4 presents the distribution of fetal outcomes among 80 teenage pregnancies. The majority of neonates (62.5%) had a normal outcome, indicating that more than half of the pregnancies resulted in satisfactory fetal health. However, a considerable proportion experienced adverse outcomes. Low birth weight (<2.5 kg) was observed in 20% of cases, suggesting that one in five infants born to teenage mothers had suboptimal birth weight. Preterm birth was reported in 17.5% of cases, highlighting a significant risk of early delivery in this population. Additionally, 11.25% of newborns had an Apgar score of less than 7 at 5 minutes, reflecting compromised neonatal condition requiring immediate medical attention. Stillbirth occurred in 6.25% of cases, representing a serious but comparatively less frequent adverse outcome. Overall, while normal outcomes predominated, the notable rates of low birth weight, preterm birth, low Apgar score, and stillbirth underscore the increased fetal risks associated with teenage pregnancy.

Table 4: Fetal Outcomes in Teenage Pregnancy (n = 80)		
Fetal Outcome	**Frequency (n)**	**Percentage (%)**
Low Birth Weight (<2.5 kg)	16	20
Stillbirth	5	6.25
Apgar Score <7 at 5 min	9	11.25
Preterm Birth	14	17.5
Normal Outcome	50	62.5

Table 5 shows a statistically significant association between booking status and preterm delivery among the 80 study participants ($p = 0.041$). Out of 34 booked women, only 3 (8.8%) experienced preterm delivery, while the majority, 31 (91.2%), delivered at term. In contrast, among the 46 unbooked women, 11 (23.9%) had preterm deliveries and 35 (76.1%) delivered at term. Although term delivery was more common in both groups overall (66 out of 80 cases), the proportion of preterm births was notably higher in unbooked women compared to booked women. This finding suggests that lack of antenatal booking is associated with an increased risk of preterm delivery, highlighting the importance of regular antenatal care in improving pregnancy outcomes.

Table 5: Association Between Booking Status and Preterm Delivery (n = 80)				
Booking Status	**Preterm (n)**	**Term (n)**	**Total**	**p-value**
Booked (n=34)	3	31	34	0.041
Unbooked (n=46)	11	35	46	
Total	14	66	80	

Discussion

Teenage pregnancy remains a significant public health concern in developing countries, where early marriage, limited contraceptive awareness, and restricted access to healthcare services contribute to high adolescent fertility rates. In the present study on fetomaternal outcome in teenage pregnancy, the majority of mothers belonged to late adolescence (18–19 years), with an overall mean age comparable to findings reported by Mukhopadhyay et al. (2010) [10], where the mean age of adolescent mothers was 17.3 ± 1.5 years. Similar observations were made by Jamali et al. (2017) [11], who reported a mean age of 17.8 years among teenage mothers. These comparable age distributions suggest that late adolescence constitutes the most vulnerable period for teenage pregnancies across different regional settings.

A significant finding in our study was the high proportion of unbooked cases (57.5%), reflecting inadequate antenatal care utilization. This aligns with findings by Iklaki et al. (2012) [12], who reported poorer perinatal outcomes among unbooked teenage mothers, with significantly higher rates of complications compared to booked counterparts. Similarly, Kurth et al. (2010) [13] observed that adolescent mothers with limited prenatal care had increased risks of adverse neonatal outcomes, particularly preterm birth and low birth weight. Our study demonstrated a statistically significant association between unbooked status and preterm delivery (17.5%), reinforcing the protective role of antenatal supervision.

Maternal anemia was the most common complication in our study, affecting 22.5% of teenage mothers. This prevalence is comparable to the 24% anemia rate reported by Tanveer et al. (2016) [14] among adolescent primigravida, but lower than the 46% reported by Naz U (2014) [15] and substantially lower than the 67% anemia prevalence documented by Jusoh et al. (2015) [16] among Malaysian teenage mothers. The variation in anemia prevalence across studies may reflect differences in nutritional status, socioeconomic conditions, and healthcare accessibility. Nonetheless, the consistent observation of anemia across studies highlights the increased nutritional vulnerability of adolescents, who must meet the demands of both growth and pregnancy simultaneously.

Hypertensive disorders were another important maternal complication in our study. Pregnancy-induced hypertension (PIH) and preeclampsia collectively accounted for a notable proportion of cases. Sarwar and Iftikhar (2016) [17] reported PIH in 10% of teenage pregnancies, which is lower than the prevalence observed in our study. Conversely, Zahiruddin et al. (2017) [18] documented preeclampsia in 19.5% of teenage mothers, closely approximating our findings. In contrast, Jamali et al. (2017) reported a much lower PIH rate of 1.2% among adolescents, indicating regional variability. These discrepancies may be attributed to differences in sample size, study design, genetic predisposition, and quality of antenatal care. However, collectively, these studies confirm that hypertensive disorders remain a significant obstetric risk among teenage mothers.

Regarding mode of delivery, 60% of teenage mothers in our study delivered vaginally, while 32.5% underwent cesarean section. This is consistent with Mukhopadhyay et al. (2010), who reported approximately 71% vaginal deliveries and 25% cesarean sections among adolescent mothers. Similarly, Jamali et al. (2017) found that 82.5% of adolescent mothers delivered vaginally, with 17.5% requiring cesarean section. However, Kayika and Utama (2017) [19] reported a higher cesarean rate of 40.3% among teenage mothers in Indonesia. The relatively high cesarean rate in our study may be attributable to obstetric indications such as fetal distress and cephalopelvic disproportion (CPD), which are commonly cited indications in adolescent pregnancies. The biological immaturity of the pelvis and higher incidence of hypertensive disorders may contribute to operative interventions.

Preterm birth in our study was observed in 17.5% of cases. This finding is comparable to Khashan et al. (2010) [20], who demonstrated an increased risk of preterm birth among teenage mothers, particularly in first pregnancies. Edessy et al. (2014) [21] reported preterm labor in 13.1% of teenage pregnancies, slightly lower than our findings but still indicative of elevated risk. The consistent association between adolescent pregnancy and preterm birth across studies underscores the combined influence of biological immaturity, anemia, hypertensive disorders, and inadequate antenatal care.

Low birth weight (LBW) was noted in 20% of neonates in our study. This closely parallels the 20.04% LBW rate reported by Tanveer et al. (2016) among adolescent mothers. Mukhopadhyay et al. (2010) also documented higher rates of LBW in teenage pregnancies compared to adult mothers. However, Jusoh et al. (2015) reported a higher LBW prevalence of 24% in teenage pregnancies complicated by anemia. These similarities indicate that low birth

weight remains one of the most consistent adverse fetal outcomes in adolescent pregnancies, often interlinked with maternal anemia and preterm delivery.

Although the majority of neonates in our study had favorable outcomes, the presence of stillbirths and low Apgar scores reflects ongoing neonatal vulnerability. Kurth et al. (2010) similarly identified adolescence as an independent risk factor for adverse neonatal outcomes in Central Africa. The convergence of findings across multiple studies suggests that teenage pregnancy is associated with heightened fetomaternal risk, particularly in resource-limited settings.

Overall, our findings are demonstrating increased risks of anemia, hypertensive disorders, preterm birth, low birth weight, and operative delivery among teenage mothers. Variations in prevalence rates across studies may be attributed to differences in healthcare infrastructure, sociocultural practices, nutritional status, and antenatal care utilization. Nevertheless, the overall pattern confirms that teenage pregnancy remains a high-risk obstetric condition requiring targeted public health interventions, improved antenatal care coverage, nutritional supplementation, and enhanced adolescent reproductive health education to mitigate adverse fetomaternal outcomes.

Conclusion

The present study highlights that teenage pregnancy remains a high-risk obstetric condition associated with significant maternal and fetal complications. A considerable proportion of mothers were unbooked and belonged to rural areas, reflecting gaps in antenatal care utilization. Maternal anemia and hypertensive disorders were common, while preterm delivery and low birth weight constituted major fetal concerns. Although the majority of deliveries were vaginal and over half of the neonates had normal outcomes, the notable rates of cesarean section, preterm birth, low Apgar scores, and stillbirth emphasize persistent vulnerabilities. The significant association between unbooked status and preterm delivery underscores the critical role of regular antenatal care. Strengthening adolescent-friendly health services, improving nutritional support, and promoting early and adequate prenatal supervision are essential to enhance fetomaternal outcomes in teenage pregnancies.

References

1. Lawlor DA, Shaw M. Too much too young? Teenage pregnancy is not a public health problem. International journal of Epidemiology. 2002 Jun 1;31(3):552-3.
2. 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.
3. 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.
4. Macedo TC, Montagna E, Trevisan CM, Zaia V, de Oliveira R, Barbosa CP, Laganà AS, Bianco B. Prevalence of preeclampsia and eclampsia in adolescent pregnancy: A systematic review and meta-analysis of 291,247 adolescents worldwide since 1969. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2020 May 1; 248:177-86.
5. Smith GC, Pell JP. Teenage pregnancy and risk of adverse perinatal outcomes associated with first and second births: population based retrospective cohort study. Bmj. 2001 Sep 1;323(7311):476.
6. Wu G, Imhoff-Kunsch B, Girard AW. Biological mechanisms for nutritional regulation of maternal health and fetal development. Paediatric and perinatal epidemiology. 2012 Jul; 26:4-26.
7. Amjad S, MacDonald I, Chambers T, Osornio-Vargas A, Chandra S, Voaklander D, Ospina MB. Social determinants of health and adverse maternal and birth outcomes in adolescent pregnancies: a systematic review and meta-analysis. Paediatric and perinatal epidemiology. 2019 Jan;33(1):88-99.
8. Sumankuuro J, Crockett J, Wang S. Factors influencing knowledge and practice of birth preparedness and complication readiness in sub-saharan Africa: a narrative review of cross-sectional studies. International Journal of Community Medicine and Public Health. 2016 Dec;3(12):3297-307.
9. Tandu-Umba B, Mbangama MA, Kamongola KM, Kamgang Tchawou AG, Kivuidi MP, Kasonga Munene S, Kambashi Meke I, Kapuku Kabasele O, Kondoli BJ, Kikuni KR, Kasikila Kuzungu S. Pre-pregnancy high-risk factors at first antenatal visit: how predictive are these of pregnancy outcomes? International Journal of Women's Health. 2014 Dec 5:1011-8.
10. Mukhopadhyay P, Chaudhuri RN, Paul B. Hospital-based perinatal outcomes and complications in teenage pregnancy in India. Journal of health, population, and nutrition. 2010 Oct;28(5):494.
11. Jamali S, Javadpour S, Rakesh Jahromi A. Teenage versus adult pregnancy: maternal and neonatal outcomes. Journal of Fundamental and Applied Sciences. 2017; 9:1170-82.
12. Iklaki CU, Inaku JU, Ekabua JE, Ekanem EI, Udo AE. Perinatal outcome in unbooked teenage pregnancies in the University of Calabar Teaching Hospital, Calabar, Nigeria.

International Scholarly Research Notices. 2012;2012(1):246983.
13. Kurth F, Belard S, Mombo-Ngoma G, Schuster K, Adegnika AA, Bouyou-Akotet MK, Kremsner PG, Ramharter M. Adolescence as risk factor for adverse pregnancy outcome in Central Africa–a cross-sectional study. PloS one. 2010 Dec 20;5(12):e14367.
14. Tanveer Q, Fatima A. Adolescent pregnancy: a comparative study from the teaching hospital of Lahore, Pakistan. The Professional Medical Journal. 2016 Jun 10;23(06):727-30.
15. Naz U. Comparison of obstetric outcome in terms of the risk of low birth weight, preterm delivery, cesarean section rate and anemia in primigravid adolescents and older primigravida. J Coll Physicians Surg Pak. 2014 Feb 1;24(2):131-4.
16. Jusoh N, Ismail TA, Daud A. Anemia among teenage pregnancy in northwestern Malaysia: what are the factors? International Journal of Collaborative Research on Internal Medicine & Public Health. 2015 Dec 1;7(12):196.
17. Sarwar A, Iftikhar T. Comparative study of obstetrical outcomes of teenager and older primigravida. Annals of PIMS. 2016; 1815:2287.
18. Zahiruddin S, Chetandas P, Ahmed SI, Baloch R. Obstetrical and perinatal outcomes of teenage pregnant women attending a secondary hospital in Hyderabad. Open J Obstet Gynecol. 2017 May 16;7(5):503-10.
19. Kayika IP, Utama TK. Increased rate of cesarean section among teenage mothers attending a tertiary teaching hospital in Indonesia. Indonesian Journal of Obstetrics and Gynecology. 2017 Nov 1:131-4.
20. Khashan AS, Baker PN, Kenny LC. Preterm birth and reduced birthweight in first and second teenage pregnancies: a register-based cohort study. BMC pregnancy and childbirth. 2010 Jul 9;10(1):36.
21. Edessy M, Gaber M, Maher A. Teenage pregnancy and fetal outcome. Am J Res Commun. 2014;2(10):169-75.