

**Effect of Adolescent Pregnancy on Maternal And Fetal Outcome – A Study Conducted in a Tertiary Care Centre**Simran Arya<sup>1</sup>, Madhu Jain<sup>2</sup>, Ankita Mani<sup>3</sup>, Shuchi Jain<sup>4</sup><sup>1</sup>Assistant Professor, Department of Obstetrics and Gynecology, NSMCH, Bihta, Patna, India<sup>2</sup>Professor and HOD, Department of Obstetrics and Gynecology, Heritage Institute of Medical Sciences, Varanasi, India<sup>3</sup>Consultant, Department of Obstetrics and Gynecology, Tender Palm Hospital, Lucknow, India<sup>4</sup>Associate Professor, Department of Obstetrics and Gynecology, Institute Of Medical Sciences, Banaras Hindu University, Varanasi, India

Received: 27-12-2024 / Revised: 25-01-2025 / Accepted: 27-02-2025

Corresponding Author: Shuchi Jain

Conflict of interest: Nil

**Abstract:****Objectives:** To find out the determinants of adolescent pregnancy and the effect of adolescent pregnancies on maternal and neonatal outcome**Material and Methods:** This is a clinical prospective study carried out in the Adolescent Clinic Banaras Hindu University, Varanasi, India. All adolescent pregnant women attending the adolescent clinic, during the study period were included in the study. Cases were divided into 2 groups;  $\leq 17$  years (Group A) and 18-19 years (Group B). Data were analyzed by SPSS version 22.0. Chi-square test was used to find out significant correlation.**Results:** The incidence of anemia (84% Vs 63%,  $p=0.045$ ) and Cephalo-pelvic disproportion (16% Vs 3%,  $p=0.029$ ) were found to be significantly higher in young teenagers (Group A). Neonatal morbidities and mortality like still birth (16% Vs 8%,  $p=0.008$ ), neonatal intensive care unit (NICU) admission (43% Vs 22%,  $p=0.007$ ), low birth weight (68% Vs 38%,  $p=0.007$ ), intrauterine growth retardation (32% Vs 6%,  $p=0.001$ ), birth asphyxia (20% Vs 3%,  $p=0.002$ ) were significantly more in babies born to early teenage mothers. We also found that the incidence of still birth (12.8%Vs 4.3%,  $p=0.014$ ), NICU admission (32.1%Vs 14.9%,  $p=0.014$ ), eclampsia (22.8%Vs 44.7%,  $p=0.007$ ), anemia (80.8%Vs 44.7%,  $p=0.001$ ) and low birth weight baby (51.3%Vs 31.92%,  $p=0.02$ ) were higher for the mothers had unsatisfactory antenatal care.**Conclusion:** Adverse maternal and fetal outcome associated with adolescent pregnancies were more common in younger teenager group. Increasing the age of marriage and quality antenatal care can reduce the complications associated with adolescent pregnancies.**Keywords:** Adolescent Pregnancy, Maternal Outcome, Neonatal Outcome.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

World Health Organization defines Adolescent Pregnancy as “any pregnancy from a girl who is 10-19 years of age”, the age being defined as her age at the time the baby is born.[1]

adolescent pregnancy is a common public health problem worldwide, as it is a ‘high risk’ or ‘at risk’ pregnancy due to its association with various adverse maternal and fetal outcomes which results in increased mortality and morbidity of both mother and the child. Approximately 90% of the adolescent pregnancy occurs in developing countries.[2] There is also a significant variation in adolescent pregnancy and birth rates between developed countries, although the adolescent pregnancy and birth rate of developed countries are significantly lower than that of developing countries.[3]

Worldwide, according to the World Health Organization (WHO) 11% of all births occur during adolescent age group, of which 95% takes place in low- and middle-income countries. This includes about 16 million girls aged 15 to 19 and some 2 million girls under 15.[4] Complications due to pregnancy and childbirth are the second cause of death for 15-19 year-old girls globally.[5]

According to UNFPA, every year some 4 million adolescent girls in India have babies. adolescent pregnancy in India is high with 62 pregnant teens out of every 1000 women.[6]

At the time of survey (NFHS-4) it was observed that one in 4 Indian women (26.8%) are married before 18 and 7.8% of women aged 15-19 are pregnant or mother.[7]

It is estimated that every year, 3 million girls aged 15 to 19 undergo unsafe abortions. Babies born to teen age mothers face a substantially higher risk of dying than those born to women aged 20 to 24.[8] In spite of the Child Marriage Restraint Act 1978, a substantial proportion of rural marriages in India continue to take place when the girl is around 15 years. Early marriage coupled with an ingrained Indian tradition to bear a child within 1-2 years of marriage puts undue pressure on the married teenage girl to bear a child.

The findings of studies conducted worldwide on the cause of adverse outcomes in adolescent pregnancy are contradictory. Some studies report that the adverse outcomes are due to anatomical and physiological factors associated with young maternal age, while others reported that they are due to external factors such as socioeconomic status, social support, inadequate antenatal care and other behavioral determinants associated with adolescence.

The adverse outcomes and complications linked to adolescent pregnancy includes anemia, the need for instrumental delivery or emergency Caesarean section, hypertensive disorders of pregnancy, prematurity, low birth weight, IUGR (intra uterine growth retardation) low Apgar score, neonatal intensive care unit (NICU) admission and perinatal mortality.[9-12]

Hence, the present study aimed to find out the determinants of adolescent pregnancy and to evaluate the effect of adolescent pregnancy on maternal and fetal outcome.

#### Material and Methods:

This is a clinical prospective study carried out, at a tertiary care centre of Varanasi, Sir Sunderlal Hospital, BHU. Institutional ethical committee approval was taken. Informed consent was taken from all participants. All adolescent pregnant women attending the labour room during the study period were included in the study. Detailed Socio-demographic, Obstetric, Medical and Neonatal information were collected by history taking and following the patients from labour room visit till delivery. For statistical analysis the cases were divided into 2 subgroups;  $\leq 17$  yrs (Group A) and 18-19 yrs (Group B). All pregnant females equal to or more than 20 years and with major illnesses existing from pre-pregnant state, viz., heart or kidney disease, bronchial asthma, diabetes, hypothyroidism or hypertension which could have adversely affect the outcome of pregnancy were excluded. Socio-demographic status was measured by modified

Kuppuswami scale. Literacy was defined as attending primary school education and ability to read and write in local language. Antenatal care (ANC) was considered as inadequate for a pregnant woman who booked a visit after 16 weeks into the pregnancy (i.e. the window period for antenatal screening and potential interventions would have been missed). Antenatal care was also considered unsatisfactory if the number of follow-up visits was less than four, based on the WHO's recommendation of a minimum of four antenatal visits. Several dummy variables have been constructed for analyzing the data.

- Contraceptive prevalence rate (CPR) for any method (yes or no).
- Type of delivery (normal, caesarean, or by an instrument or assisted).
- Pregnancy outcome is categorized as three parts, healthy, neonatal intensive care unit (NICU) admission and stillbirth.
- Pregnancy related complications (anemia, hypertensive disorders of pregnancy, premature rupture of the membrane, obstetric cholestasis, malpresentation);
- Problems with fetus (premature labour, low birth weight, Intra-uterine growth restriction, birth asphyxia, neonatal jaundice, Sepsis)

Data were analyzed by commercial statistical software package SPSS version 22.0. Chi-square test was used to find out whether there was any significant correlation between variables and the reproductive outcomes. A p-value  $< 0.05$  was considered statistically significant.

#### Results and Observation:

The total number of teen-age mothers visited during the study period was 125. Majority of the respondents were 19 years old. Mean age of study subjects was 18.34 (SD=0.89) and mean age of marriage was 17.09 (SD= 0.87). Around 79 (63.2%) of study subjects were from rural area and 46 (36.8%) from urban area. About 48 (38.4%) teenage mothers had received primary education, 28(25.6%) received education till 10<sup>th</sup> standards and 40 (32%) were illiterate. Majority of the study population belonged to lower middle socioeconomic status 55.5% (N=61) followed by upper lower 32 (25.6%). Most of the teenagers 107(85.6%) were primigravida and rest were carrying their second pregnancy. Only 47 (37.6%) has received satisfactory antenatal care. About 77.6% of the study population had never used any form of contraceptives, of which 52.58% were not aware of any form of contraceptives.

Variables	Frequency (N=125)	Percentage (%)
<b>Age (years)</b>		
≤17	25	20
18 – 19	100	80
<b>Residency</b>		
Rural	79	63.2
Urban	46	36.8
<b>Literacy status</b>		
Illiterate	37	29.6
Primary education	48	38.4
Secondary education	40	32
<b>Socioeconomic status</b>		
Upper middle	25	20
Lower middle	68	54.4
Upper lower	32	25.6
<b>Gravida</b>		
Primi	107	85.6
Second gravida	18	14.4
<b>Adequate antenatal care taken</b>		
Yes	47	37.6
No	78	62.4
<b>Contraception use</b>		
Yes	28	32.4
No	97	77.6
<b>Reason of not using contraception (n=97)</b>		
Do not have access	7	7.22
Do not have knowledge	51	52.58
Family influence	32	32.98
Wants to be pregnant	7	7.22

Most common complication associated with adolescent pregnancy in our study was Anemia (67.2%). About 49.6% had mild, 14.4% had moderate and 3.2% had severe grade of anemia. The frequency of hypertensive disorder of pregnancy

(HDP) is also very high in our study (22.4%). Around (57.6%) had normal vaginal delivery while 42.4% had delivered by cesarean section. Around 25.6% had pre term delivery (table-2).

Variables	Frequency (n)	Percentage (%)
<b>Anemia</b>		
No anemia	41	32.8
Mild anemia	62	49.6
Moderate anemia	18	14.4
Severe anemia	4	3.2
<b>Gestational age at delivery</b>		
<37 weeks	32	25.6
>37 weeks	93	74.4
<b>Hypertensive disorders of pregnancy</b>		
Gestational HTN	2	1.6
Pre-eclampsia	6	4.8
Eclampsia	20	16.3
<b>Mode of delivery</b>		
Vaginal	72	57.6
Cesarean	53	42.4
<b>Others</b>		
PROM	8	6.4
Obstetric cholestasis	8	6.4
Malpresentation	7	5.6

**Neonatal outcome of adolescent pregnancy:**

Majority of the babies (64.8%) born out of such pregnancies were healthy, but the complication rate was also very high. The Most common adverse fetal outcome noted in fetus of adolescent mothers were low birth weight babies (44%). Neonatal mortality

and morbidity were also very high in babies born to adolescent mothers. Around 25% needed NICU admission and 9.6% were still born babies. Other neonatal morbidities noted in our study were IUGR (Intra-uterine growth restriction (10.4%), respiratory distress (6.4%), neonatal jaundice (3.6%) and sepsis (0.8%).

Variables	Frequency (n)	Percentage (%)
Healthy	81	64.8
Still born	12	9.6
NICU admission	32	25.6
Low birth weight	55	44.0
Intra-uterine growth restriction	13	10.4
Birth asphyxia	8	6.4
Neonatal jaundice	4	3.6
Sepsis	1	0.8

Table 4 compares obstetric outcome between early and late adolescent pregnancies. The incidence of anemia (84% Vs 63%, p value=0.045) and cephalo-pelvic disproportion (16% Vs 3%, p value=0.029) were found to be significantly higher in young

teenagers (Group A). However, the incidence of premature labour (40% Vs 22%), pre-eclampsia (8% Vs 4%), eclampsia (28% Vs 13%), cesarean delivery rate (56% Vs 39%) was also higher in group A study subjects but significant association was not found.

Variables	Group A ≤17 yrs (n=25)	Group B 18-19 yrs (n=100)	p-value
<b>Anemia</b>			
Present	21 (84%)	63 (63%)	<b>0.045</b>
Absent	4 (16%)	37 (37%)	
<b>Premature labour</b>			
<37 weeks	10 (40%)	22 (22%)	<b>0.065</b>
≥37 weeks	15 (60%)	78 (78%)	
<b>PROM</b>	1(4%)	7 (7%)	<b>0.498</b>
<b>Pre-eclampsia</b>	2 (8%)	4 (4%)	<b>0.739</b>
<b>Eclampsia</b>	7 (28%)	13 (13%)	<b>0.067</b>
<b>Mode of delivery</b>			
Vaginal	11 (44%)	61 (61%)	<b>0.124</b>
Cesarean	14 (56%)	39 (39%)	
<b>Cephalo-pelvic disproportion</b>	4 (16%)	3 (3%)	<b>0.029</b>

Table 5 compares neonatal mortality and morbidity between early and late adolescent mothers. The incidence of still birth (16% Vs 8%, p value =0.008), NICU admission (43% Vs 22%, p value=0.007),

Low birth weight (68% Vs 38%, p value=0.007), IUGR (32% Vs 6%, p value=0.001), birth asphyxia (20% Vs 3%, p value=0.002) were significantly more in babies born to early adolescent mothers.

Variables	Group A ≤17 yrs (n=25)	Group B 18-19 yrs (n=100)	P-value
<b>Neonatal outcome</b>			
Alive & well	11 (41%)	70(70%)	<b>0.008</b>
Still birth	4 (16%)	8 (8%)	
Admission to NICU	10 (43%)	22 (22%)	
<b>Low birth weight</b>	17 (68%)	38 (38%)	<b>0.007</b>
<b>Intra-uterine growth retardation</b>	8(32%)	6(6%)	<b>0.001</b>
<b>Birth asphyxia</b>	5 (20%)	3 (3%)	<b>0.002</b>

Table 6 compares data on the adolescent mothers and their infants according to antenatal care received by teenage mothers. We found that the incidence of still birth (12.8%Vs 4.3%, p value=0.014), NICU admission (32.1%Vs 14.9%, p value=0.014), eclampsia (22.8%Vs 44.7%, p value=0.007), anemia

(80.8%Vs 44.7%, p value=0.001) and low birth weight baby (51.3%Vs 31.92%, p value=0.02) were higher for the mothers had unsatisfactory antenatal care. However, incidence of prematurity was not significantly associated with antenatal care.

Variable	Satisfactory ANC (n=47)	Unsatisfactory ANC (n=78)	p-value
<b>Neonatal outcome</b>			
Alive & well	38 (80.9%)	43 (55.1%)	<b>0.014</b>
Still birth	2 (4.3%)	10 (12.8%)	
NICU Admission	7 (14.9%)	25 (32.1%)	
<b>Eclampsia</b>	2 (4.3%)	18 (22.8%)	<b>0.007</b>
<b>Anemia</b>	21 (44.7%)	63 (80.8%)	<b>0.001</b>
<b>Low birth weight</b>	15 (31.92%)	40 (51.3%)	<b>0.02</b>
<b>Prematurity</b>	9 (19.1%)	23 (29.5%)	<b>0.142</b>

### Discussion:

Adolescent pregnancy in developed countries usually occurs outside marriage. In other countries and cultures particularly in developing world 90% adolescent pregnancies are often within marriage and does not involve social stigma.[13] In the present study all mothers attending the hospital for deliveries were married. It is a common practice for unmarried mothers to undergo either for termination of pregnancy or to quacks for delivery due to social stigma preventing them to attend large hospital. This could be a reason for less number of adolescent pregnancy in the present study. As expected, majority of teenage mothers in our study were primigravida (85.6%) but surprisingly 14.4% carrying their second pregnancy. This could be due to early onset of puberty, early sexual activity and lack of education on contraception.

Many studies done all over the world have suggested that adolescent pregnancies are on the increase.[14] Reasons for the increased teenage and adolescent pregnancy rate in developing countries are multifactorial including behavioral, traditional, social, educational or religious bases. The most important factors are poverty and low socioeconomic status.[15] In the present study, about 63.2% belonged to rural area, 37% were illiterate and 32% were belonged to upper lower class, these girls did not had power to take right decisions about their sexual and reproductive health and wellbeing themselves. Many prior studies also suggested that the adverse reproductive outcome in adolescent pregnancy is due to the social, economic and behavioural factors rather than the biological effect of young age.[16-17]

Regarding contraception awareness 77.6% of the study population had never used any method of contraception. As shown in table 1, reason of not using contraception in majority of study population

(52.58%) were lack of awareness and in rest of the cases it was due to lack of access to appropriate health services, lack of sex education and family pressure on girls to produce child early to prove fertility.

For statistical analysis the cases were further divided into 2 subgroups;  $\leq 17$  yrs (group A) and 18-19 yrs (group B). The incidence of complications of pregnancy in early teenagers compared with late teenagers was higher. Anemia, hypertensive disorders of pregnancy, preterm birth, low birth weight, IUGR were significantly higher in early teenage group.

In our study most common maternal complication associated with adolescent pregnancy was anemia. Around 67.2% teenage mothers were suffered from anemia, of which 49.6% had mild grade of anemia, 14.4% had moderate anemia and 3.2% had severe grade of anemia. In several other studies conducted in different regions anemia was found to be more common in teenage mother.[18-20] In the present study the incidence of anemia was more common among early teenage mothers (84% Vs 63%, p value=0.045), compared with late teenage mothers. Anemia was thought to be more common in early adolescent pregnancy because an adolescent's growing body has to compete with the fetus for nourishment which causes rapid depletion of iron and nutritional stores, this is added by the fact that pregnant teenagers often receive inadequate antenatal care. Our study also shows that adolescent mothers having unsatisfactory antenatal care had a significantly higher risk of anemia (80.8% Vs 44.7%, p value=0.001).

Incidence of eclampsia is 10% in our country.[21] Incidence of hypertensive disorders of pregnancy increased by 2 folds in pregnant teens as compared to older women.[22] This finding is also supported by study conducted by Pal et al.[23] and MS

Chahande et al.[24] In the current study incidence of pre-eclampsia (4.8%) and eclampsia (16.3%) were very high among the adolescent mothers. This might be explained by the fact that most of the adolescent pregnant women were from the rural area with low socioeconomic status and with lack of antenatal visits. Most of them presented with late complications of hypertensive disorder of pregnancy like eclampsia. Hypertensive disorders of pregnancy were found more frequently in younger teenagers (Group A) (Table 5). This indicates lack of awareness and maturity of younger teenage mothers. As shown in table 6, satisfactory antenatal care reduced significantly the frequency of eclampsia from 22.8% - 4.3% (p value=0.007). However other investigators have observed no difference in various age groups.[25-26]

The mode of delivery in our study reflected a remarkable increase in emergency CS (42.4%) among teenage mothers. The younger teenagers (Group A) tended to have higher rate of cesarean section but the difference in mode of delivery was not significant (56% Vs 39%, p value=0.124). We observed in our study that most common indication of cesarean was acute fetal distress, cephalo-pelvic disproportion and hypertensive disorders of pregnancy. Ezegwui et al, Bacci A et al and Nwobodo et al also confirmed the same finding.[27-29] Cephalopelvic disproportion rate was higher in early teenagers (16% Vs 3%, p value=0.029), because the bony pelvis has not reached its full size in this age group.

A higher proportion of adolescent mothers gave birth to LBW babies (44%), IUGR babies(10.4%) and premature birth (25.6%) and maximum affection was seen with group A study subjects (table 4,5), which is in accordance with earlier studies conducted by , Saxena et al, Bradford et al and Zlathnik et al.[30-34] Adverse birth outcomes in adolescent pregnancy may be due to the effect of a girl becoming pregnant before her own growth has ceased thus competing for nourishment with the fetus. In the present study along with poor nutritional status, hypertensive disorders of pregnancy were added reason for increased number of LBW, IUGR and premature deliveries to adolescent mothers. Our study also shows that, adolescent mothers with unsatisfactory antenatal care had a significantly higher risk of having infants with LBW (51.3%Vs 31.92%, p value=0.02), NICU admission (32.1%Vs 14.9%, p value=0.014) and still born babies (12.8%Vs 4.3%, p value=0.014), supported by study conducted by Kurth et al.[35] Incidence of birth asphyxia, neonatal jaundice and sepsis were also high in our study which were most probably due to higher number of LBW and premature deliveries. It has been seen that good antenatal care and early detection and treatment of complications improve both maternal and fetal

outcome but does not completely eliminate the adverse effects.

### Conclusion:

It was concluded from our study that there is increased incidence of adverse maternal and fetal outcome in adolescent pregnancy. Younger teenager group (<17 years) was most vulnerable to maternal and neonatal morbidity. It is likely that these outcomes are due to the physiological and anatomical traits of adolescent mothers, and a mix of several contributory factors, including behavioural and lifestyle choices, antenatal care and socioeconomic factors.

By increasing the age of marriage, providing better prenatal, obstetric care and family planning to pregnant teenagers, maternal and perinatal morbidity can be reduced. Greater importance should be given to sex education and contraception to avoid unwanted adolescent pregnancies.

**Acknowledgement:** We express our gratitude to Mamta – Health Institute for Mother and Child, Delhi for funding this study. We also acknowledge the support of the staff of the adolescent clinic, BHU. We are thankful to the Institute of Medical Sciences, BHU ethical committee for clearance to conduct the study.

**Funding:** This study was funded and monitored by Mamta - Health Institute for Mother and Child, Delhi.

**Ethical Clearance:** Institute of Medical Sciences, Banaras Hindu University, ethical committee

### References:

1. Adolescent pregnancy- Issues in adolescent health and development, WHO discussion papers on adolescence. WHO, 2004 Pg 86.
2. Alan Guttmacher Institute. Risks and realities of early childbearing. Alan Guttmacher Institute 2000
3. UNICEF. A league table of teenage births in rich nations. Innocenti Research Centre Florence, Italy. 2001
4. [http://www.who.int/maternal\\_child\\_adolescent/topics/maternal/adolescent\\_pregnancy](http://www.who.int/maternal_child_adolescent/topics/maternal/adolescent_pregnancy)
5. WHO Fact sheet No.364 May 2012.
6. <http://www.unfpa.org/adolescent-pregnancy>
7. NFHS-4, 2015-2016
8. Hollingsworth DR, Felice M. Teenage Pregnancy: A multiracial sociologic problem. Am J Obstet Gynecol.1986;155:741-6
9. Yadav S, Choudhary D, Narayan KC, et al. Adverse reproductive outcomes associated with teenage pregnancy. McGill J Med 2008; 11:141-4.
10. Ezegwui HU, Ikeako LC, Ogbuefi F. Obstetric outcome of teenage pregnancies at a tertiary

- hospital in Enugu, Nigeria. *Niger J Clin Pract* 2012; 15:147-50.
11. Sharma V, Katz J, Mullany LC, et al. Young maternal age and the risk of neonatal mortality in rural Nepal. *Arch Pediatr Adolesc Med* 2008; 162:828-35.
  12. Chen XK, Wen SW, Fleming N, et al. teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. *Int J Epidemiol* 2007; 36:368-73.
  13. Population Council Unexplored Elements of Adolescent in the developing world. *Population Brief's* 2006;12 (1) 1
  14. Dutta I, Joshi P. Maternal and perinatal outcome in teenage vs. Vicenarian primigravidae - a clinical study. *J Clin Diagn Res.* 2013 Dec;7(12):2881-4
  15. Moisan C, Baril C, Muckle G, Belanger RE. Teen pregnancy in Inuit communities - gaps still needed to be filled. *Int J Circumpolar Health.* 2016 Dec 9; 75:31790. <https://doi.org/10.3402/ijch.v75.31790> PubMed PMID: 27938638; PubMed Central PMCID: PMC5149662.
  16. Hollingsworth DR, Felice M. Teenage Pregnancy: A multiracial sociologic problem. *Am J Obstet Gynecol.*1986; 155:741-6
  17. McAnarney ER. Young Maternal age and adverse neonatal outcome. *Am J Dis Child.* 1987; 141:1053-9
  18. Brabin L, Verhoeff FH, Kazembe P, Brabin BJ, Chimsuku L, Broadhead R. Improving antenatal care for pregnant adolescents in southern Malawi. *Acta Obstet Gynecol Scand* 1998; 77: 402-409
  19. Bhalerao AR, Desai SV, Dastur NA, Daftary SN. Outcome of teenage pregnancy. *J Postgrad Med.*1990; 36:136-9.
  20. Rahman MM, Hasan M, Akhter S, Sultan P. Adolescent pregnancy complication and wastage in Bangladesh. *J. Nepal Paediatr.* 2010; 30(3):147-153.
  21. Aznar R, Bennet AE. Pregnancy in adolescent girl. *Am J Obstet Gynecol.*1961; 81:934
  22. Scholl TO, Hediger ML, Belsky DH. Perinatal care and maternal health during adolescent pregnancy: a review and meta-analysis. *J Adolesc Health.* 1944;15(6):444-56
  23. Pal, K.B. Gupta, & Randhawa, I. (1997). Adolescent pregnancy: A high-risk group. *J Indian Med Assoc,* 95, 5, 127-128
  24. Chahande, M.S., Jadhao, A.R., & Wadhva, S.K. (2002). Study of some epidemiological factors in teenage pregnancy– Hospital-based case comparison study. *Indian Journal of Community Medicine,* XXVII, 3, July-Sept
  25. Ziadeh S. Obstetric outcome of teenage pregnancies in North Jordan. *Arch Gynecol Obstet* 2001; 265: 26-29.
  26. Berenson AB, Wiemann CM, McCombs SL. Adverse perinatal outcomes in young adolescents. *J Reprod Med* 1997; 42: 559-564.
  27. Ezegwui HU, Ikeako LC, Ogbuefi F. Obstetric outcome of teenage pregnancies at a tertiary hospital in Enugu, Nigeria. *Niger J Clin Pract.* 2012 Apr-Jun;15(2):147-50. <https://doi.org/10.4103/1119-3077.97289> PubMed PMID: 22718161
  28. Bacci A, Manhica GM, Machungo F and et al. Outcome of teenage pregnancy in Maputo. *Int J Gynaecol. Obstet* 1993; 40:19-23
  29. Nwobodo EI, Adoke KU. Obstetric outcome of teenage pregnancies at a tertiary care hospital in Sokoto, Nigeria. *Trop J Obstet Gynaecol.* 2005;22(2):168-70.
  30. Gortzak-Uzan L, Hallak M, Press F, Katz M, Shoham-Vardi I. Teenage pregnancy: risk factors for adverse perinatal outcome. *J Matern Fetal Med* 2001; 10: 393-397
  31. Scholl TO, Hediger ML, Belsky DH. Prenatal care and maternal health during adolescent pregnancy: a review and meta-analysis. *J Adolesc Health* 1994; 15: 444-456.
  32. Saxena P, Salhan S, Chatopadhyay B, Kohli MPS, Nandan D and AdhishSV. Obstetrics and perinatal outcome of teenage and older primigravidas –A retrospective analysis. *Health and Population: Perspectives and Issues.* 2001; 33(1):16-22
  33. Bradford, J.A., & Giles, W.B. (1989). Teenage pregnancy in western Sydney. *Aust. & N Z J Obstet Gynaecol.,* Feb., 29, 1, 1-4.
  34. Zlatnik, F.J., & Burmeister, L.F. (1977). Low gynaecologic age: An obstetric risk factor. *Am J Obstetric Gynecol.,* 128, 183-186.
  35. Kurth F, Bélard S, Mombo-Ngoma G, et al. Adolescence as risk factor for adverse pregnancy outcome in Central Africa--a cross-sectional study. *PLoS One* 2010; 5:e14367