



FETOMATERNAL OUTCOME IN ADOLESCENT AND YOUNG ADULT PRIMIGRAVIDAS: A HOSPITAL-BASED CASE-CONTROL STUDY

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ABSTRACT

Adolescent pregnancies are considered high-risk, and create an enormous negative socioeconomic impact at an individual level, as well as on the society. According to WHO, 'adolescent pregnancy' refers to pregnancy between 10 and 19 years of age. The purpose of this study was to compare the fetomaternal outcome in adolescent and young adult primigravidas.

The study was conducted at a tertiary care centre in India over a period of two years. Adolescent and young adult (20-25 years) primigravidas who delivered at our institution during that period were randomly selected for the study and compared using the chi-square test.

Aim- To study and compare fetomaternal outcomes in adolescent (10-19 years of age) and young adult (20-25 years of age) primigravidas in a tertiary care centre in North-India over a period of two years

Objectives-

- To assess and compare antepartum, intrapartum and postpartum complications, in adolescent and young adult primigravidas.
- To assess and compare fetal outcomes in adolescent and young adult primigravidas

KEYWORDS

Adolescent, Adult, Antepartum, Fetomaternal, Intrapartum, Postpartum, Primigravida

INTRODUCTION:

Adolescence is a period when structural, functional and psychological developments occur in a child to prepare her for assuming the responsibility of motherhood.¹ Adolescent pregnancy is considered high-risk, imposing enormous negative socioeconomic impact at an individual level and on the society. According to the World Health Organization (WHO), the term 'adolescent pregnancy' refers to any pregnancy between 10 and 19 years of age. However, statistics from existing literature comparing the incidence of adolescent pregnancies between countries often give rates per 1,000 adolescents aged 15-19 years.² According to the WHO, 16 million adolescent mothers give birth annually and nine of every ten adolescent births belong to low and middle-income countries (LMICs).³ The adolescent birth rates are among the lowest in Japan and Denmark whereas higher rates are found in Nigeria and the Republic of Congo. According to World Bank data of 2013, there were 32 adolescent births for every 1,000 girls aged 15-19 in India.⁴ Deeply entrenched practices of child marriage, poor access to quality healthcare, poverty, and low literacy are factors mainly held responsible for the high rate of adolescent pregnancy in India.

Although, the proportion of obstetrical and perinatal complications that can be attributed to age as opposed to other factors (like availability, utilization and quality of health services, educational level, marital status, race and other socio-demographic factors) continues to remain a matter of debate. Studies from developing countries report that pre-eclampsia, eclampsia, anemia, premature labour, operative delivery, postpartum haemorrhage, low-birth weight, still birth, and early neonatal death were found to be associated with all adolescent pregnancies.⁶⁻⁹ A study conducted by the WHO in LMICs reported that eclampsia, puerperal infection, preterm birth, low-birth weight, stillbirth and early neonatal death were significantly higher among adolescent mothers.^{9,10} Whereas a study in Finland, where high-quality care is available to all pregnant mothers, reported a higher risk of anemia, urinary tract infection, pyelonephritis, eclampsia, preterm delivery and adverse neonatal outcomes predominantly among adolescent mothers with inadequate antenatal care. It can be argued that this difference in adverse outcomes could also be due to different methodologies used by different authors.

Regardless, the socioeconomic challenges and the public cost of adolescent childbearing is enormous for adolescent mothers. To a report by United Nations in 2013, the productivity of India would have been \$7.7 billion higher if adolescent pregnancies could be prevented.¹¹ In India, 26.8% of girls (17.5% in urban and 31.5% in rural

areas) were married before 18 years of age in 2015-16.¹² According to the government of India launched a flagship health programme called the National Rural Health Mission (NRHM) in 2005 (renamed to National Health Mission (NHM) in 2015) with the aim of reducing maternal mortality rate and infant mortality rate by providing free healthcare services to all pregnant women and children up to 1 year of age, and making improvements in the healthcare delivery system. The program also has provisions for incentives to mothers as well as the field level trained health workers accompanying them for institutional delivery. As a result of such initiatives, coupled with an increase in literacy leading to a rise in the overall number of institutional deliveries in India, the maternal mortality rate has reduced from 254 in 2005 to 178 in 2013; and the infant mortality rate has reduced from 58 in 2005 to 40 in 2013 as the hospital delivery has significantly increased.

The objective of our study was to compare the fetomaternal outcomes of adolescent primigravidas and young adult primigravidas in a tertiary care centre in North-India over a period of two years, and derive conclusions to aid decision-making processes concerning this issue.

MATERIAL AND METHODS:

Data Source:

A prospective case-control study was carried out at a tertiary centre in North India over a period of 2 years between 2020 to 2021 amongst antenatal mothers attending outpatient and emergency departments. Approval from the ethical committee of the hospital was obtained. Informed written consent was obtained from all patients in the language they understood.

Study Population:

Inclusion Criteria:

The study group composed of adolescent primigravidas between 15 – 19 years of age and the control group included young adult primigravidas aged between 20-25 years who delivered at this centre over the period of this study. *The age of the subject was taken as the age at time of delivery.*

Exclusion Criteria:

H/o medical or surgical disorders, Rh-negative status, multiple pregnancies and fetal congenital anomalies. Mothers more than 26 years were not included in the study as controls due to higher pregnancy complications common in this age group.

For the purpose of this study antenatal, intrapartum and postpartum

complications were defined as the abnormal outcomes observed from 12 weeks of pregnancy to the onset of labour, from the onset of labour to delivery of fetus and placenta, from immediately after delivery of placenta upto 6 weeks of delivery of baby respectively.

Details Collected:

A semi-structured open-ended questionnaire was provided to each case and control in the language they understood. Demographic details such as name, age, address were recorded in all included cases along with obstetric details such as duration of pregnancy, date of last menstrual period, expected date of delivery, booked or unbooked status (booked cases had 3 or more ANC visits whereas unbooked cases were those who had less than 3 ANC visits). General, physical & obstetrical examination was performed and routine investigations including Hemoglobin estimation, urine for albumin & sugar, ABORh grouping, blood sugar, bleeding & clotting time were done. Liver & renal function tests, tests for HIV, Hepatitis B antigen, VDRL, complete blood counts & ultrasonography were also performed. All known antepartum abnormalities were noted. The course of labour, mode of delivery and outcome of labour including fetal outcomes were recorded. The mother and newborn were followed till discharge.

Statistical Analysis:

The data were compiled and analyzed using the excel software. For comparison, chi-square test were used. Odds ratio (OR) and 95% confidence interval (CI) were used to identify the strength of association. For significant cut off values are as follows- $p > 0.05$ = not significant, $p < 0.05$ = significant, $p = 0.05$ = just significant, $p < 0.01$ = highly significant.

MODE OF DELIVER	STUDY GROUP		Control		P-value
	NUMBER OF SUBJECT	% OF TOTAL (n=110)	NUMBER OF SUBJECT	% OF TOTAL (n=290)	
Spontaneous normal delivery	75	68.18%	220	75.86%	>0.05
LSCS	34	30.90%	46	15.86%	<0.001
Assisted breech	1	0.9%	6	2.06%	>0.05
Forceps	0	0%	10	3.44%	<0.05
Ventouse	0	0%	8	2.75%	>0.05
Total	110		290		

TYPE OF COMPLICATI ON	STUDYGROU		CONTROLGR		P value
	NUMBER OF SUBJECS	% OF TOTAL (n=110)	NUMBE R OF SUBJECS	% OF TOTAL (n=290)	
ANEMIA	39	35.4%	26	8.9%	<0.001
HYPERTENSI VE DISORDER	37	33.6%	21	7.2%	<0.001
ECLAMPSIA	2	1.8%	6	2.06%	>0.05
ABRUPTIO PLACENTAE	1	0.9%	2	0.6%	>0.05
PLACENTA PRAEVIA	0	0%	2	0.6%	>0.05
INTRAUTERI NE DEATH	1	0.9%	2	0.6%	>0.05
MALPRESEN TATION	3	2.7%	18	6.2%	>0.05
TOTAL		75.3%		26.16%	

	NUMBER OF SUBJECT	% OF TOTAL (n=110)	NUMBE R OF SUBJECS	% OF TOTAL (n=290)	
Premature labour	18	16.36%	40	13.79%	>0.05
Premature rupture of embranes	21	19.09%	68	23.44%	>0.05
Non-progress of labour	11	10%	9	3.10%	<0.05
Cephalopelvic disproportion	4	3.6%	28	9.6%	<0.05
Obstructed labour	2	1.8%	1	0.3%	>0.05
Dystocia	2	1.8%	0	0%	<0.05
Prolonged second stage	5	4.5%	3	1.03%	<0.05
Total		57.15%		51.26%	

TYPE OF COMPLICA TION	STUDY GROUP		CONTROL GROUP		P-value
	NUMBER OF SUBJECTS	% OF TOTAL (n=110)	NUMBER OF SUBJECT	% OF TOTAL (n=290)	
Primary PPH	8	7.27	2	0.6	<0.001
Retained placenta	1	0.9	0	0	>0.05
Perineal tear	13	11.81	11	3.7	<0.05
Puerperal sepsis	2	1.8	1	0.3	>0.05
Puerperal psychoses	1	0.9	3	1.03	>0.05
CHF	0	0	3	1.03	>0.05
Others	0	0	7	2.41	>0.05
Total		22.68%		9.07	

Birth weight of neonates (in kg)	STUDY GROUP		CONTROL GROUP		P value
	NUMBER OF SUBJECTS	% OF TOTAL (n=110)	NUMBER OF SUBJECTS	% OF TOTAL (n=290)	
<2	21	19.09%	23	7.93	<0.05
2- 2.499	16	14.54%	48	16.55	>0.05
2.5- 2.999	39	35.45%	101	34.82	>0.05
3- 3.499	27	24.54%	80	2.75	>0.05
>3.5	7	6.36%	38	13.10	>0.05
TOTAL	110		290		

PERINATAL MORTALITY	STUDY GROUP		CONTROL GROUP		P-value
	NUMBER OF SUBJECTS	% OF TOTAL (n=110)	NUMBER OF SUBJECTS	% OF TOTAL (n=290)	
Stillbirth	1	0.9	0	0%	>0.05
Early neonatal mortality	2	1.8%	0	0%	<0.05
Total	3		0		

RESULTS

There were a total of 3700 confinements in Mahatma Gandhi Hospital during the 2-year long study period, amongst which 110 adolescent mothers fulfilled our selection criteria.

Most of the subjects in the adolescent group (study group) were of 20 years of age. A maximum number of subjects in the control group were 25 years of age. The mean age of participants in the adolescent (study) group was 20 years and that of the young adult (control) group was 25 years.

Most subjects in the adolescent group were unbooked while the young adult group subjects were predominantly booked.

Table 1 shows the overall incidence of antepartum complications in study and control groups. 75.45% cases in the adolescent group had antepartum complications whereas 26.5% cases suffered antenatal complications among the young adult group. The difference is significant.

The incidence of all intrapartum complications was 5.89% higher in the adolescent group (57.15%) compared to the young adult group (51.26%) as recorded in Table 2.

From table 3, it is evident that the overall incidence of deliveries through LSCS was twice in the adolescent group (30.90%) as compared to the young adult group (15.86%).

As seen in Table 4, the incidence of postpartum complications was almost 2.5 higher in the adolescent group rounding up to 22.68%, as opposed to 9.07% in the young adult group.

The mean birth weight of neonates born to adolescent mothers was 2.6 kgs while that of neonates born to young adult mothers was 2.7 kgs. The difference of 0.1 kgs in birth weight among both groups was not statistically significant. The results are demonstrated in Table 5.

Whereas, the perinatal mortality was significantly higher among neonates born to adolescent mothers (2.7%) as compared to the control group (0%).

DISCUSSION

The prevalence of adolescent pregnancies in India was reported

varyingly but estimated to be 8.3-24 per 100, while in our study, the incidence of adolescent pregnancies was 2.9%; which could be due to geographical, social and educational factors; it could also be due to taboos and underreporting due to marriage laws in India, or due to the general inclination of women and families towards child birth at home. A study conducted in Rajasthan through focus group discussions revealed that the community norm is to opt for home delivery because of a perception that the TBA or dai is competent, and because fewer problems occur at home than at hospital⁽¹³⁾. A study conducted in Rajasthan through focus group discussions revealed that the community norm is to opt for home delivery because of a perception that the TBA or dai is competent, and because fewer problems occur at home than at hospital⁽¹³⁾.

The prevalence of adolescent pregnancy varies widely in the world from 14.3 per 100 for Nigeria to extremely low ones like 0.3 per 10 for South Korea. The highest prevalence of adolescent pregnancy amongst developed countries is in the US about 3.3 per 100.

All mothers attending the hospital for deliveries were married. We did not come across any unmarried teenage mothers in the study. Pregnancy and child birth outside of a wedlock is frowned upon in India and it is a common practice for unmarried mothers to go either for termination of pregnancy or quacks for delivery because of strong social taboos preventing them from attending a large public hospital. Furthermore, marriage below the age of 18 years for females and 21 years for males is illegal in India; and fear of facing legal trouble could be a potential deterrent for women and families from visiting a hospital- especially for early adolescent mothers. This could explain why most adolescent cases were found to be unbooked in our study, while those in the young adult group were predominantly booked. Other authors have reported an early registration of pregnancy ranging from 40% to 90% in teenage pregnancies; however, the frequency of antenatal check-ups by them was consistently lower than adult gravidas.^{14,15,16,17,18} As expected, majority of adolescents were primigravida. But it was surprising and concerning to find that nearly 22% of adolescents were carrying their second or third pregnancy. This finding suggests that adolescents have limited knowledge and/or control over their fertility in our country and are exposed to repeated pregnancies at short intervals with all its inherent dangers. Poor weight gain during pregnancy in both cases and control reflects overall female undernutrition in the country.

Incidences of antepartum complications in the adolescent group were found to be significantly higher than the adults in the present study. This may be because they are less likely to seek consistent antenatal care. This could be due to lack of awareness regarding the importance of antenatal care, independent decision making, barriers in accessing healthcare information and services, and the general unpreparedness for childbirth. This further indicates the need to evaluate the barriers adolescent mothers facing in accessing regular antenatal care.

Anaemia and hypertensive disorders were found to be significantly higher in adolescents as compared to adult primigravidas ($p < 0.001$). Anaemia was seen in both groups, pointing towards iron deficiency in women at large, while it may be higher in adolescents because the developing body has to compete for nourishment with the fetus, causing rapidly depleting iron and nutrient reserves. A difference in hypertensive disorders could be due to the lack of adequate menstrual preconditioning among adolescents further interfering with the process of decidualization and trophoblastic invasion.¹⁹ Other medical disorders are not increased in the adolescent primigravidas of our study.

With regards to complications of labour and delivery, this study reveals a higher rate of non-progress of labour, dystocia, cephalo-pelvic disproportion and a prolonged second stage in adolescents as compared to adults. Various literatures cited that there is biological immaturity of the adolescent pelvis which causes cephalo-pelvic disproportion leading to an increase in cesarean section rate.^{20,21,22} This holds true for our study, with deliveries through LSCS being twice as common in the adolescent group as compared to the young adult group. Although, the mode of delivery in adolescent pregnancies is has inconsistent findings across different studies. Contrary to our study, some other studies report not finding any increase in the rate of cesarean section among adolescent mothers^{23,24,25,26}.

We found that the perinatal mortality was significantly higher among

neonates born to adolescent mothers as compared to the control group, although the number of perinatal mortalities was overall low compared to other studies; the quality of obstetric facilities could be a potential confounding factor.

Contrary to most studies there was a statistically insignificant difference of 0.1 kgs in the mean birth weight of neonates born to adolescent mothers and young adult mothers. This could be due to lack of education, knowledge, financial constraints, poor nutrition etc.

The present study was conducted at a tertiary centre where high-quality maternal and neonatal care facilities were available, which is a limitation, as these findings may not be truly reflective of the situation of the whole population in the country. Furthermore, a detailed analysis of factors such as income, family background and contraceptive practices could help in a clearer situational analysis, which could not be obtained in the present study.

CONCLUSION

Teenage/adolescent pregnancies are riskier than adult pregnancies, and multiple factors need to be taken into consideration in designing interventions to tackle the problem. A situational analysis of adolescent pregnancies out of wedlock and their outcomes needs to be conducted. More efforts need to be made for prevention of adolescent pregnancies; and in-depth studies to understand barriers in seeking regular, quality antenatal care and barriers to early registration of pregnancies among adolescents are concomitantly required. Appropriate counseling to discourage pregnancies in short intervals and sexual education needs to be done thoroughly in adolescents to prevent the burden of repeated pregnancies and exposure to risk of complications.

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