







## ***What Are the Maternal and Neonatal Outcomes of Adolescent Pregnancy in Women Referring to Ayatollah Mousavi Hospital in Zanjan? A Comparative Cross-sectional Study***

Youseflu S<sup>1</sup>, Keshavarz Afshar M<sup>1</sup>, Mousavi M<sup>2</sup>, Moradi Z<sup>2</sup>, Banaei M<sup>3</sup>, Bayat F<sup>4\*</sup>

<sup>1</sup>Instructor, Department of Midwifery, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran

<sup>2</sup>Student research committee, Zanjan University of Medical Sciences, Zanjan, Iran

<sup>3</sup>Ph.D student of reproductive health, Mother and child welfare research Center, Hormozgan University of medical Sciences, Bandar Abbas, Iran

<sup>4</sup>Ph.D student of reproductive health, Student Research Committee, Midwifery and Reproductive Health Research Center, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

**\*Corresponding Author:** Department of midwifery, school of nursing and midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

**Tel:** 0098- 9913906962

**Email:** f.bayat680@gmail.com

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### **Abstract**

**Background:** Adolescent pregnancy is considered a high-risk pregnancy and is considered as a common phenomenon in Iran.

**Objectives:** This study aimed to compare neonatal and maternal outcomes in adolescent mothers with those of adult pregnancy.

**Methods:** This cross-sectional comparative study was conducted between September 2018 and March 2019 in the Referral Hospital of Ayatollah Mosavi of Zanjan, Iran. Data were collected using the convenience sampling method. Overall, 133 and 696 out of 1340 participated women were teenage and adult women within the age range of 20-30 years, respectively. The Chi-squared and logistic regression tests were used to compare the neonatal and obstetric consequences of the pregnancy of the two age groups. Finally, SPSS25 was used for data analysis, and a  $P < 0.05$  was considered statistically significant.

**Results:** Prevalence of adolescent pregnancy was found to be 9.92%. Adolescents had an increased risk of induced vaginal delivery (IVD) (OR=1.43, (OR: Odds ratio) 95% CI 1.07-4.23(CI: Confidence interval)), ( $P=0.01$ ), dystocia (OR=3.23, 95% CI (2.27-17.22), ( $P=0.004$ )), and episiotomy ((OR=3.63), 95% CI (2.44-7.31), ( $P=0.001$ )). None of the neonatal consequences showed any significant difference between the two groups ( $P > 0.05$ ).

**Conclusion:** In our society, adolescent pregnancy is accompanied by dire consequences for the mother, but not for the neonate. Thus, it is recommended that health workers discourage adolescent pregnancy through appropriate services and education, and in cases where pregnancy has already occurred, support the woman through offering health services in order to prevent or minimize the risks or complications of pregnancy at such early age.

**Keywords:** *adolescent pregnancy, neonatal outcome, prevalence, pregnancy outcome*

### **Introduction**

The World Health Organization (WHO) defines adolescence as the ages between 10 and 19 years [1]. In addition, it is a formative transitional period between childhood and adulthood during which drastic physiological and psychological changes occur in the individual. Childbirth during

this period causes far-reaching physical, psychological, and social changes regarding the individual [2]. According to the WHO report, 16 million adolescent pregnancies and 5.2 million pregnancies annually occur within the age of 15-19 and under the age of 16, respectively [3]. Approximately 7 million of these pregnancies

occur in developing countries annually. Adolescent pregnancies can lead to dramatic changes in the lives of the individuals, not least due to their compulsory school dropouts, leading to their undesirable job opportunities later in life. Accordingly, this makes them more vulnerable to further physical harm due to poverty and deprivation [4].

Adolescent pregnancy has dire consequences for the welfare of the mother and the newborn [5]. According to some studies, it can also lead to more complications such as pre-eclampsia, gestational diabetes [6,7], preterm birth, and low birth weight [7,8] as compared with pregnancy later in life. Contrarily, some other studies suggested other conclusions in this regard [9,10]. Some other conflicting accounts exist regarding several other complications that may arise, including the need for a caesarian section [11,12] and episiotomy [13,14], the low Apgar of the newborn at childbirth [15,16], and the requirement for the newborn's delivery to the neonatal intensive care unit (NICU) [17,18]. Some studies have referred to the crucial role of prenatal care in the maternal and neonatal outcomes of teenage pregnancy [19,20]. Considering the teen marriage culture and the prevalence of subsequent teen pregnancies in Iran, namely, 3 in 1000 pregnancies [5], this study sought to compare neonatal and obstetric outcomes in adolescents with those of adult pregnancy.

## Methods

This cross-sectional comparative study was conducted on 1340 women who gave birth to a child in Ayatollah Mousavi Hospital in Zanjan, Iran from September to February 2019. Of the studied women, 133 and 696 cases were in the age range of 13-19 and 20-30 years, respectively. The present research project (coded: A-12-1203-1) was approved by Zanjan University of Medical Sciences and the Ethics Committee (coded: IRZUMS.REC.1397.166). Using the convenience sampling method, the sampling was started from among pregnant women who gave birth to a child within the seven months of the study after 20 weeks of pregnancy in the Referral Hospital of Ayatollah Mousavi in Zanjan. The study aimed at comparing the obstetric and the neonate's

outcomes between adolescent and adult mothers within the age range of 20-30 years. This age range was considered as low-risk individuals [21]. The inclusion criteria included obtaining written informed consent from the participants, being married, having Iranian nationality, passing more than 20 weeks of pregnancy, and experiencing a single fetus pregnancy. The data were collected by gynecology residents through conducting interviews and research checklists. The research checklist included the demographic information of the mother, the age of a pregnancy (determined by sonographic examination during the first trimester or reliable last menstrual period), the mother's disorders such as pre-eclampsia (based on the special unit set in 2013 by the American College of Gynecology and Obstetrics), and gestational diabetes (based on patients' history and medical records). Other included data were induced vaginal delivery (IVD), episiotomy, preterm birth (before 37 weeks of pregnancy), the preterm rupture of membranes, shoulder dystocia, the height, weight, and head circumference of the neonate, the Apgar score of the first and fifth minutes, and consignment to NICU among the disorders of the neonate. SPSS software, version 25 was used to analyze the data. Eventually, the Chi-squared, ANOVA, and logistic regression tests were used for data analysis, and a  $P < 0.05$  was considered to be statistically significant.

## Results

Of a total of 1324 women, 133 and 696 cases were in their teens and within the age range of 20-30 years, respectively. The prevalence of adolescent pregnancy in this population was 9.92% and all participants were married. Further, adolescent pregnancy was more prevalent among village-dwelling women ( $P=0.001$ ) so that 66.92% of adolescent mothers were village-dwellers including 55.17% of the 20-30 age group. The history of abortion ( $P=0.009$ ) and high parity ( $P=0.001$ ) was higher in the adult group compared to the adolescent group. Nonetheless, the preterm birth rate was not significantly different between the two groups. The relative number of vaginal births was significantly higher (77.69%) among the adolescent group compared to those in the +20 age group ( $P=0.002$ ), the details of which are presented in (Table1).

*Table 1: The Socio-demographic Characteristics of the Participants*

		Adolescents N=130 N (%)	Adult women N=696 N (%)	p-value
<b>Residency</b>	Urban	43(33.08)	312(44.83)	0.01
	rural	87(66.92)	384(55.17)	
<b>Parity</b>	1	111(85.38)	226(32.48)	0.001
	2	18(13.47)	309(44.40)	
	3>	1(0.77)	161(23.13)	
<b>History of abortion</b>	yes	10(7.69)	120(17.24)	0.009
	no	116(85.38)	580(83.33)	
<b>Gestational age</b>	Less than 34 week	7 (5.38)	56(8.04)	0.43
<b>Gestational age</b>	Between 34-37 week	17(13.08)	106(15.23)	
	Between 37-42 week	106(81.54)	534(76.72)	
<b>Type of delivery</b>	NVD	101(77.69)	444(63.79)	0.002
	CS	29(22.31)	252(36.21)	

Note. NVD: Normal vaginal delivery; CS: Cesarean section

Based on the data in (Table2) none of the neonatal consequences showed any significant difference

between the two groups ( $P>0.05$ ).

*Table 2: Comparison neonatal outcome among adolescent and adult mothers*

	Adolescents	Adult Women	Unadjusted OR	Adjusted ORs\$	P-Value
<b>Neonatal weight*</b>	3.06 (0.51)	3.05 (0.61)	1.03(1.00-1.04)	1.00(1.00-1.01)	0.38
<b>Neonatal height*</b>	50.17(2.86)	50.33(3.38)	0.98(0.95-1.02)	0.95(0.88-1.03)	0.22
<b>head circumference*</b>	34.06(1.95)	35.16(16.62)	0.98(0.93-1.04)	0.99(0.95-1.02)	0.55
<b>The 1 min Apgar score*</b>	8.65(1.25)	8.58(1.37)	1.04(0.89-1.21)	0.99(0.81-1.36)	0.95
<b>The 5 min Apgar score*</b>	9.6(1.40)	9.7(1.23)	1.05(0.89-1.18)	0.95(0.79-1.14)	0.61
<b>Neonatal resuscitation**</b>	8(6.15)	78(11.20)	0.83(0.61-1.13)	0.91(0.67-1.25)	0.58
<b>Malformation **</b>	3(2.31)	10(1.23)	1.62(0.44-5.97)	1.16(0.69-2.86)	0.56
<b>neonatal intensive care unit admission**</b>	12(9.23)	87(12.5)	0.71(0.41-1.22)	0.80(0.40-1.59)	0.51
<b>PROM**</b>	8(6.15)	27(3.88)	1.62(0.71-3.66)	1.27(0.66-1.29)	0.24
<b>Preterm birth (&lt;37 weeks)**</b>	8(6.15)	27(3.88)	0.45 (0.11-1.96)	1.01(0.93-1.10)	0.80

\*Values are given as mean  $\pm$  SD, \*\*Values are given as number (%), PROM: preterm rupture of membrane, OR: odds ratio. \$Adjusted for mother education, residency, type of delivery, gestational age, neonatal gender, and mother's parity.

The relative number of adolescent mothers undergoing IVD was significantly higher (45.38%) than that of the 20+ age group (OR=1.43, 95% CI=1.07-4.23,  $P=0.01$ ). Furthermore, the number of dystocia cases in the adolescent group was 3.23 times that of the 20-30 age group (OR=3.23, 95% CI=2.27-17.22,

$P=0.004$ ). Moreover, the number of episiotomy cases in the adolescent group was 3.63 times that of the adult group to the extent that as many as 68.4% of adolescent mothers underwent episiotomy (OR=3.63, 95% CI=2.44-7.31,  $P=0.001$ ), the related data are shown in (Table 3).

*Table 3: Comparison maternal outcome among adolescent and adult pregnancy*

	Adolescents*	Adult Women*	Unadjusted OR	Adjusted ORs\$	P-value
<b>Preeclampsia</b>	2(1.53)	31(4.45)	0.33(0.08-1.42)	0.42(0.10-1.83)	0.25
<b>Gestational Diabete</b>	3(2.31)	33(4.74)	0.47(0.14-1.57)	0.58(0.17-2.01)	0.37
<b>IVD</b>	59(45.38)	237(34.05)	1.60(1.10-2.35)	1.43(1.07-4.23)	0.01
<b>Episiotomy</b>	89(68.46)	263(37.79)	4.00(2.54-6.30)	3.63(2.44-7.31)	<0.001
<b>Dystocia</b>	6(4.61)	7(1.00)	4.76(1.57-14.41)	3.23(2.27-17.22)	0.004

\*Values are given as number (%), \$ Adjusted for education, residency, neonatal weight, and parity. IVD: Induced Vaginal Delivery

## Discussion

The findings of the current study showed that adolescent pregnancy leads to added rates of dystocia and induced vaginal delivery (IVD), as well as added requirements for the episiotomy. It

was also found that the age of the mother has no detrimental effects on the neonate. In our study, vaginal birth demonstrated significantly more prevalence rate in adolescent mothers compared to older mothers. Pre-eclampsia and gestational

diabetes were more or less the same in the two age groups. Based on the findings, the prevalence of adolescent pregnancy was 9.92%, indicating a 3.8% increase in the incidence reported by the UNFPA (The United Nations Population Fund) in Iran in 2017. In line with our study, Kadour et al. and Soysal et al. reported that pre-eclampsia and gestational diabetes did not significantly differ between the two pregnancy age groups [10,22]. The findings of a cohort study on three groups of adolescents and teens aged 11-14 (2007 members), 15-17 (8028 members), and 18-19 (8028 members) also showed no significant difference between the age groups in terms of blood pressure, pre-eclampsia, eclampsia, and gestational diabetes compared to the 20-24-year-old group (8028 members) [19]. In another study in Brazil, the prevalence of pre-eclampsia in teen mothers represented no significant difference among older mothers [6]. In a meta-analysis conducted in Africa, the risk of pre-eclampsia in teen mothers was found to be more compared to older mothers [7]. In another study, pre-eclampsia was higher while gestational diabetes was lower in teen mothers [8]. The lower incidence of gestational diabetes [8,23,24] and pre-eclampsia [25,26] were reported as well.

Similarly, some other studies demonstrated the lower incidence of the caesarian section (C-section) and the higher incidence of vaginal birth in teen mothers [12,13,15,22-25], which corroborates with the findings of the present study. In a study on around a million pregnant women, the risk of C-section in teen mothers was shown to be less (43%) in comparison with the older ones thanks to the teen mothers having ideal weights before pregnancy and more moderate weight gains during pregnancy [27]. It seems that the better functioning of the endometrium and the greater elasticity of the connective tissue of the vagina are related to the higher incidence of vaginal birth in teen mothers compared to older mothers [26]. The shorter duration of labor in this age group can also be effective in the greater incidence of vaginal birth among them [9]. On the other hand, considering the young age of these mothers and the baby boom reproductive policies of some governments, especially in developing countries, gynecologists and obstetricians are hesitant or less inclined to perform C-section on these young mothers, which could partly account

for the greater number of vaginal births among these mothers. Contrarily, some studies reported a greater number of C-section births in teenage mothers probably due to the prevalence of cephalopelvic disproportion among them [8,11,28]. In our study, the need for IVD was significantly greater in the adolescent group while the preterm or prelabour rupture of membranes showed no significant difference between the two groups. Korenčan also found a greater incidence of spontaneous birth among teenage mothers, with oxytocin administration not making any significant difference in inducing labor in the two groups. However, the manual rupturing of the membranes and the administration of prostaglandin had significantly greater incidence in the adolescent group when compared with the adult group [15]. Although most participants were referred with intact membranes in our study, oxytocin was used to induce labor and significantly fewer adult mothers required the administration of oxytocin to induce labor in comparison with teenage mothers.

Some other studies reported a greater incidence of necessary episiotomy in the adolescent group compared with the adult group [13,24,28-31], which is conformity with the findings of the current study. Conversely, in a study by Yadav, a greater incidence of episiotomy was reported among adolescent mothers.

In our study, a greater incidence of shoulder dystocia was observed among adolescent mothers when compared to adult mothers. However, Torvi et al. evaluated 26091 pregnant women and found no connection or correlation between the age of the women and the degree of the occurrence of shoulder dystocia [19]. Given that this study was conducted in the US, a number of factors need to be taken into consideration, including social, economic, cultural, health, ethnic, and nutritional factors, and even differing lifestyles in the US and the developing world since they can drastically influence the findings. The differences between the two studies could at least be partially due to these intervening factors. In line with the findings of the current study, some studies reported no connection between the mother's age and the neonate's disorders [32,33]. In this study, neonatal disorders [15,19], as well as the height, weight, and head circumference of the neonate and preterm birth demonstrated no significant

difference between the two age groups. Likewise, other studies showed no significant difference in preterm births and the low birth weight (LBW) of the neonate between teenage and older mothers [10,13,22,25], which matches the findings of the present study. On the other hand, the findings of some other studies showed significant differences between the two groups [7,8,18,24,28,34]. A study by Soyasal also demonstrated that preterm births were significantly higher in adolescent mothers compared to older mothers. However, following the equalization of the samples with regard to prenatal care, inadequate prenatal care was found to entail a greater risk of preterm birth in comparison with the mother's young age per se. More precisely, adequate prenatal care in teenage mothers can reduce preterm birth in this age group. In addition, gaining weight during pregnancy could be related to the LBW of the neonate and the nutrition of the mother could also have a great influence on the birth weight of the neonate [35]. In a study by Ogawa et al., preterm birth and the LBW was also found to be associated with the mother's height [36]. Further, Kassa et al. conducted a study in Ethiopia and concluded that preterm birth and the LBW of the neonate could be due to the low standard of living and malnutrition in addition to poor prenatal care [18]. Similarly, the findings of another study revealed that the low body mass index, inadequate weight gain during pregnancy, and poor prenatal care were the most important indicators of preterm pregnancies. Further, smoking, the fetus's female gender, and insufficient weight gain during pregnancy were found to be related to the birth weight of the neonate [37]. As in our study, some other studies found there not be any significant difference in Apgar score (1<sup>st</sup>/5<sup>th</sup> minute) and neonatal intensive care unit (NICU) confinement of the neonate between the adolescent and the older mothers [15,18]. Contrary to our study, some other studies showed the neonates of teenage mothers to be more likely to have to be confined to NICU [17,38] and have lower Apgar scores than the neonates of older mothers [8,16,23,26,36,30,38,39]. In yet another study, the Apgar score of the neonates whose birth weight and the mother's stage of pregnancy was higher was found to be higher [40]. On analyzing the findings, it was found that in all of these studies the neonates were preterm births and

had LBW. In the current study, socio-demographic factors such as education, parity, and dwelling differed significantly between teenage and adult mothers. Most teenage mothers were village-dwellers with less education. These findings are in line with those of a study conducted in Ethiopia, demonstrating less education, being nulligravida, and living in the village were related to teen pregnancy [18]. Another study showed more smoking, lower education, and less prenatal care in teenage mothers [15].

In this study, only the consequences of adolescent pregnancy on the mother and the neonate were compared and contrasted with those of later pregnancies in life. Nevertheless, many other variables have not been taken into account, including nutrition, lifestyle, psychological factors, social acceptance, and domestic violence in addition to the mother's age. Thus, it is suggested that further studies be conducted to determine the possible effects of these factors on the consequences of adolescent pregnancy on the mother and the neonate. Therefore, the lack of these considerations is one of the limits of this study, jeopardizing its rigour and making it not empirical. It is also suggested that futuristic longitudinal studies be conducted to determine the long-term effects of such pregnancies. The small number of the subjects of this study is also another limitation of this quantitative study.

In developing countries like Iran, adolescent pregnancy does not seem to have any significant detrimental effects on the well-being of the neonate [8,9]. On the other hand, these mothers seem to have greater needs for IVD and episiotomy and present with more cases of shoulder dystocia. Accordingly, although adolescent pregnancy does not pose any significant threat to the well-being of the neonate, it can entail risks to the well-being of the mother. On the other hand, given that adolescent pregnancy interferes with the mother's continuing education, it can seriously jeopardize her socio-economic status, which can thus interfere with her caring for herself and her neonate. In the long run, it is bound to have adverse effects on the child's health and upbringing. Therefore, more rigorous studies are required to investigate the effects of these crucial factors on the consequences of adolescent pregnancy [41].

Given the prevalent culture of teen marriage, especially in rural areas of Iran, studying its consequences for the mother and the neonate is considered critical. The lack of appropriate education with regard to pregnancy prevention (contraception) and the resulting unwanted pregnancies leads to increased pregnancies and childbirths among this vulnerable group of mothers [42,43]. Thus legislations should be passed to ban underage marriages (below the age of 18) [44]. Although in our country free education regarding pregnancy prevention is available to adolescent mothers, the incidence of adolescent pregnancies is still extremely high. Therefore, the policymakers of health issues need to educate underage women and their parents regarding the consequences of this type of pregnancy. Where pregnancy has already occurred, adequate prenatal care and appropriate childbirth support need to be provided with greater intensity and rigour for adolescent mothers compared to older mothers.

Finally, only women who referred to Ayatollah Mousavi Hospital (A referral hospital) were included, which is the main limitation of our study. There are three centers for childbirth in Zanjan. Thus, it is recommended that future studies include data from three hospitals with long durations and large sample sizes.

### Conclusion

In this study, the 9.9% incidence of adolescent pregnancy was found significantly high for this age group in our society. Adolescent pregnancy was found to entail the added adverse consequences of childbirth, including the need for induced vaginal delivery and episiotomy, as well as the added occurrence of shoulder dystocia. On the other hand, it posed no added adverse consequences for the neonate, which could be the result of better prenatal care. Accordingly, it is recommended that health officials offer appropriate services and education to discourage adolescent pregnancy or, if pregnancy has occurred, provide appropriate assistance and support to prevent any adverse consequences it may have for the mother and the neonate.

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### Conflict of interest

There is no conflict of interest to be declared.

### Authors' contributions

All authors contributed to this project and article equally. All authors read and approved the final manuscript.

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