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Assessment of Maternal and Fetal Outcomes in Adolescent and Non-Adolescent Pregnant Women

Elçin Balcı[1], Zehra İncedal Sonkaya[2], Şemsinnur Göçer[3*]

[1]Public Health Department of Erciyes University, Medicine School, Kayseri, Turkey
[2]Elderly Care Department of Amasya University, Amasya, Turkey
[3]Physical Therapy and Rehabilitation Department of Bozok University, Yozgat, Turkey

ABSTRACT

The teenage pregnancy can result in unfavorable maternal and fetal outcomes. Here, we aimed to assess maternal and fetal outcomes in adolescent and non-adolescent pregnant women.
The study is a retrospective, comparative study. The study included all of 272 adolescent pregnant women (aged 13-19 years) who presented for delivery between 2010 and 2015 and 269 non-adolescent pregnant women (aged 20-49 years) selected from those presented for delivery during same period.
The gestational age at birth was significantly higher in patients aged≤19 years than those aged≥20 years.
The rate of infants with birth weight>4000 g, height and head circumference, and Apgar scores at minute 1 and 5 were significantly lower in patients aged≤19 years than those aged≥20 years.
Adolescent pregnancy is a major risk factor for many health and social outcomes.

Key Words: Adolescent, Perinatal outcomes, Pregnancy

Introduction

Adolescence includes period between 10 and 19 years of age, which comprises more than 20% of the world population. Annually, about 16 millions adolescent women give birth, accounting 11.0% of all births worldwide (1).

Sexual experience before marriage; thus, resultant pregnancies and induced abortion are more commonly encountered in developed countries while early marriage and resultant teenage pregnancies are more common due to cultural and traditional issues in developing countries such as Turkey. According to 2013 Turkey Demographic and Health Survey (TDHS-2013), 26.0% of population was at adolescent age group in Turkey while 16.0% of adolescents aged 15-19 years were married with increased rate of begin childbearing by advancing age (2).

Teenage pregnancy limits many social rights of adolescent girls, mainly education, and should be considered as a violation of human rights and children's right in the first place (3). It confers heavy responsibilities to adolescents and prevents formal marriage (9). From social perspective, it is well-known that early marriage leads decreased self-confidence in adolescent individuals, making it difficult to create an original identity. Besides, problems more commonly seen in teenage pregnancy include interrupted education, isolation from social activities, divorce, separation, poverty, stress and depression (4). The teenage pregnancy can result in unfavorable maternal and fetal outcomes (5, 6). In adolescents, anemia, pregnancy-induced hypertension, lower weight gain during pregnancy, low birth weight infant and increased perinatal mortality can be seen during pregnancy (7, 8). Again, malnutrition, emotional stress and insufficient prenatal care are also more frequently observed in adolescents (5). These maternal disadvantages and immaturity can lead many problems in both fetuses at intrauterine period and newborns at postnatal period.

In this study, it was aimed to assess maternal and fetal outcomes in adolescent and non-adolescent pregnant women.

Material and Method

The study was conducted at Sabuncuoğlu Şerefeddin Teaching and Research Hospital of Amasya University. It is a retrospective, case-control study including 2 groups (adolescent and non-adolescent pregnant women). The study included all of 272 adolescent pregnant women (aged 13-19 years) who presented for delivery

***Corresponding Author:** Şemsinnur Göçer, Physical Therapy and Rehabilitation Department of Bozok University/Yozgat/Turkey
E-mail: semsinnurgocer@gmail.com, Phone: +90 (354) 242 10 34/+90 (505) 839 46 19
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Table 1. Relationship between sociodemographic characteristics and age groups

		Age groups						Test	
		≤19 years		≥20 years		Total			
		n	%	n	%	n	%	X^2	p
Education level	Illiterate	7	2.6	0	0.0	7	1.3	343.111	0.0001
	Literate	2	.7	0	0.0	2	.4		
	Primary school	80	29.4	5	1.9	85	15.7		
	Secondary school	153	56.3	48	17.8	201	37.2		
	High school	30	11.0	115	42.8	145	26.8		
	College	0	0.0	101	37.5	101	18.7		
	Total	272	100.0	269	100.0	541	100.0		
Formal marriage	Present	218	80.1	266	98.9	484	89.5	50.377	0.0001
	Absent	54	19.9	3	1.1	57	10.5		
	Total	272	100.0	269	100.0	541	100.0		
Smoking	Yes	22	8.1	67	24.9	89	16.5	27.834	0.0001
	No	250	91.9	202	75.1	452	83.5		
	Total	272	100.0	269	100.0	541	100.0		
Mode of delivery	Normal delivery	164	60.3	132	49.1	296	54.7	18.467	0.0001
	Operative delivery	13	4.8	2	.7	15	2.8		
	Cesarean section	95	34.9	135	50.2	230	42.5		
	Total	272	100.0	269	100.0	541	100.0		
Birth before 36 weeks of gestation	Present	23	8.5	18	6.7	41	7.6	0.601	0.438
	Absent	249	91.5	251	93.3	500	92.4		
	Total	272	100.0	269	100.0	541	100.0		

between 2010 and 2015 and 269 non-adolescent pregnant women (aged 20-49 years) selected from those presented for delivery during same period.

In all pregnant women included, age, demographic data such as gestational age at birth, number of pregnancies, deliveries and abortions, educational level, presence of formal marriage, smoking habits; obstetric data such as mode of delivery, postpartum hematocrit levels, presence or absence of placental anomaly, premature rupture of membranes, intrauterine growth retardation (IUGR), oligohydramnios, preeclampsia and stillbirth; and neonatal characteristics such as birth weight, Apgar score at minute 1 and 5 were recorded by using a datasheet.

The normality of data was assessed by Shapiro Wilk's test. Independent t test was used for inter-group comparisons. Chi-square test was used to determine relationship between categorical variables categorical variables between groups. Fisher's exact test was used in case of failure in 2x2 matrix. Pearson's chi square analysis was performed in RxC matrix via Monte Carlo simulation. A p value <0.05 was considered as statistically significant.

A significant relation was found between educational level and age groups ($p<0.05$). It was seen that 56.3% of patients aged≤19 years had secondary school degree while 42.8% of patients aged≥20 years had high school degree.

There was a significant relation between formal marriage status and age groups ($p<0.05$). It was seen that 80.1% of the patients aged ≤19 years and 98.9% of those aged≥20 years had formal marriage.

There was a significant relation between smoking and age groups ($p<0.05$). It was found that 91.9% of patients aged≤19 years were non-smokers while this rate was 75.1% among those aged≥20 years.

A significant relation was found between mode of delivery and age groups. It was observed that 60.3% of patients aged≤19 years underwent normal delivery while 50.2% of those age≥20years underwent cesarean section.

Although there was no significant difference between age groups, rate of birth before gestational week 36 was 8.5% in patients aged ≤19 years and 6.7% in those aged ≥20 years ($p>0.05$).

Table 2. Relationship between obstetric parameters and age groups

Obstetric parameters		t test						
		n	Mean	Median	Minimum	Maximum	t	p
Gestational week	≤19 years	272	39.13	40.00	33.00	42.00	8.287	0.0001
	≥20 years	269	37.98	38.00	34.00	40.00		
	Total	541	38.56	39.00	33.00	42.00		
Maternal hemoglobin value	≤19 years	272	11.21	11.20	7.50	17.00	2.935	0.003
	≥20 years	269	10.88	11.00	8.40	12.60		
	Total	541	11.04	11.20	7.50	17.00		
Birth weight	≤19 years	272	3193.57	3215.00	1740.00	4610.00	-2.505	0.013
	≥20 years	269	3292.97	3260.00	2160.00	5300.00		
	Total	541	3242.99	3240.00	1740.00	5300.00		
Birth weight	≤19 years	272	49.80	50.00	40.00	52.00	-2.549	0.011
	≥20 years	269	50.05	50.00	40.00	54.00		
	Total	541	49.92	50.00	40.00	54.00		
Head circumference	≤19 years	272	33.92	34.00	29.00	39.00	-8.178	0.0001
	≥20 years	269	35.30	35.00	3.00	38.00		
	Total	541	34.60	35.00	3.00	39.00		
Apgar score at minute 1	≤19 years	272	9.46	10.00	3.00	10.00	-2.714	0.007
	≥20 years	269	9.73	10.00	2.00	10.00		
	Total	541	9.59	10.00	2.00	10.00		
Apgar score at minute 5	≤19 years	272	9.82	10.00	5.00	10.00	-0.624	0.533
	≥20 years	269	9.85	10.00	3.00	10.00		
	Total	541	9.83	10.00	3.00	10.00		

There was a significant difference in gestational age between groups ($p<0.05$). The gestational age was significantly higher in patients aged ≤19 years.

There was a significant difference in hemoglobin values during gestation between groups. The hemoglobin value was significantly higher in patients aged ≤19 years.

There was a significant difference in birth weight among age groups ($p<0.05$). Birth weight was significantly lower among infants from patients aged≤19 years. Also, a significant difference was observed in birth height between age groups ($p<0.05$). The birth height was significantly shorter in infants of patients aged ≤19 years. There was significant difference in head circumference between groups as being significantly lower in infants from patients aged ≤19 years.

There were significant differences in Apgar scores at minutes 1 and 5 between age groups ($p<0.05$). Both Apgar scores at minute 1 and 5 were significantly lower in infants of patients aged≤19 years.

There was no significant correlation between birth weight<2500 g and age groups.

Again, there was a significant relation between preeclampsia status and age groups. It was seen that 99.3% of patients aged≤19 years had no preeclampsia while this rate was 92.9% in those aged≥20 years.

No significant relation was observed between intrauterine growth retardation and age groups.

There was a significant correlation between presence of oligohydramnios and age group. No oligohydramnios was present in 99.6% of patients aged≤19 years and 93.7% of those ≥aged 20 years.

No significant relation was found between presence of diabetes mellitus and age groups. There was no patient with diabetes mellitus among those aged≤19 years while 5.9% of patients aged≥10 years had diabetes mellitus.

There was a significant relation between birth weight>4000 g and age groups. The rate of infants with birth weight≥4000 g was 1.8% in patients aged≤19 years and 6.7% in those aged≥20 years.

A significant relation was detected between placental anomaly and age groups ($p<0.05$). There was placental anomaly in 0.7% of patients aged≤19 years and in 14.5% of patients aged≥20 years.

There was no significant correlation between presence of congenital anomaly and age groups.

Discussion

In our study, it was found that 56.3% of patients aged≤19 years had secondary school degree while 42.8% of patients aged≥20 years had high school degree and that educational level was significantly lower in patients aged≤19 years when compared to those aged≥20 years (Table 1). Again, rate of formal marriage was significantly lower in patients aged≤19 years than those in patients aged≥20 years (Table 1). In a study by Melekoğlu et al., it was found that 52.5% of adolescent women had no formal marriage (1). According to TDHS-2013, 17.0% of women with no formal education or no primary school degree had started childbearing at adolescent period while this rate was 8.0% among women having at least primary degree (2). Teenage pregnancies are more commonly seen in those with low educational level and pregnancy hinders education and participation to work in young mothers and makes them dependent in economic manner (9).

In our study, it was observed that 60.3% of patients aged≤19 years underwent normal delivery while 50.2% of those age≥20years underwent cesarean section (Table 1). It is known that cesarean rate is lower in pregnancies at adolescent period when compared to other pregnancies (10-13). In the study by İnalöz et al., it was found that normal delivery rate was higher in adolescents (14). Our results are in agreement with literature. It may be thought that economic status and presence of social insurance are also effective for provision of cesarean section.

There was a significant difference in gestational age at birth and age groups with higher gestational age at birth in patients aged≤19 years than those aged≥20 years (Table 2). On contrary, İnalöz et al. reported that gestational age at birth was approximately one week younger in teenage pregnancies than other pregnancies (14). It is known that adolescent pregnancy is an independent risk factor for preterm delivery (15, 16). In the logistic regression analysis of 54,447 deliveries, it was shown that preterm delivery risk was 3- or 4-times higher among adolescent pregnant women when compared to those aged 20-30 years (15). This outcome is inconsistent with literature. This may be due to fact that there are multiple factors involved in preterm delivery and that adolescent pregnancy is only one of these factors.

In our study, there was significant difference in maternal hemoglobin values and age groups with higher maternal hemoglobin values in pregnant women aged≤19 years (Table 2). In the literature, it is suggested that anemia is a condition that may complicated pregnancy in adolescents. The maternal anemia incidence has been reported to reach up to 76% in adolescent pregnant women in several studies (17). As adolescent individuals does not complete their own development and require iron and other vitamin and minerals for development, additional demand caused by pregnancy makes the condition more severe. In addition to iron, folic acid, calcium, magnesium, vitamin E and B12 intake is also lower in adolescents, resulting in deficiencies of these vitamins and minerals in adolescents (18, 19). In the study on 945 adolescent pregnant women, Keskinoğlu et al. found that anemia incidence was higher among adolescent pregnant women (38.5%) than adult population (11). In our study, hemoglobin value was found to be higher in

Table 3. Results of Chi-square test differences between age groups regarding variables evaluated

		Age groups						Test	
		≤19 years		≥20 years		Total			
		n	%	n	%	n	%	X^2	p
Birth weight<2500 g	Yes	18	6.6	12	4.5	30	5.5	1.201	0.273
	No	254	93.4	257	95.5	511	94.5		
	Total	272	100.0	269	100.0	541	100.0		
Preeclampsia	No	270	99.3	250	92.9	520	96.1	21.924	0.0001
	Mild	1	0.4	19	7.1	20	3.7		
	Severe	1	0.4	0	0.0	1	0.2		
	Total	272	100.0	269	100.0	541	100.0		
Intrauterine growth retardation	Yes	6	2.2	12	4.5	18	3.3	2.138	0.144
	No	266	97.8	257	95.5	523	96.7		
	Total	272	100.0	269	100.0	541	100.0		
Oligohydramnios	Yes	1	0.4	17	6.3	18	3.3	14.896	0.0001
	No	271	99.6	252	93.7	523	96.7		
	Total	272	100.0	269	100.0	541	100.0		
Diabetes mellitus	Yes	0	0.0	16	5.9	16	3.0	16.671	0.0001
	No	272	100.0	253	94.1	525	97.0		
	Total	272	100.0	269	100.0	541	100.0		
Birth weight>4000 g	Yes	5	1.8	18	6.7	23	4.3	7.826	0.005
	No	267	98.2	251	93.3	518	95.7		
	Total	272	100.0	269	100.0	541	100.0		
Placental anomaly	Yes	2	0.7	39	14.5	41	7.6	36.575	0.0001
	No	270	99.3	230	85.5	500	92.4		
	Total	272	100.0	269	100.0	541	100.0		
Congenital anomaly	Yes	0	0.0	1	0.4	1	0.2	f	0.497
	No	272	100.0	268	99.6	540	99.8		
	Total	272	100.0	269	100.0	541	100.0		

adolescents on contrary to literature.

In our study, rate of infants with birth weight>4000 g was 1.8% in patients aged≤19 years whereas 6.7% in those aged≥20 years, indicating a significant difference (Table 3). In many studies, it was found that there is a relationship between pregnancy at adolescence period and low birth weight (12-20). Inalöz et al. reported similar results (14). In a study on 775 adolescent pregnant women from Central Africa, Florian et al. found that rate of low birth weight was higher when compared to controls (21). It is also known that teenage pregnancy is an independent risk factor for preterm birth (15, 16). It was shown that preterm delivery risk was 3- or 4-folds higher among adolescent pregnant women when compared to those aged 20-30 years (15). Also, it is known that rate of low birth weight infant is increased due to prematurity in teenage pregnancies (17, 22). In a retrospective study including 16,857 pregnancies, it was reported relative risk for low birth weight was increased by 1.7 folds in adolescent pregnant women (23). Again, Meydanlı et al. reported that preterm birth and low birth weight rates were higher in adolescence age group than normal population (24).

In our study, both height and head circumference at birth were significantly lower in patients aged≤19 years when compared to those aged≥20 years (Table 3). It has been reported that adolescent pregnant women do not use prenatal care effectively; that pregnancy is more commonly completed without antenatal care; thus, maternal and fetal problems can occur (25). On the other hand, in some studies, it was reported that younger maternal age is not the only factor accounting for unfavorable effects on infant and mother and other social and biological

disadvantages associated to adolescents are also involved (25, 26).

In our study, Apgar scores at minute 1 and 5 were significantly lower in infants from mothers aged ≤19 years (Table 3). In the study by Taner et al., no significant difference was reported while results similar to our study were reported by Ayyıldız et al. (28). Prolonged labor, also known as failure to progression, is very commonly seen in first delivery in adolescents as pelvic development is incomplete in these patients. This may be due to small pelvis or inappropriate fetal presentation (25). However, interventions to facilitate labor include forceps and vacuum during vaginal delivery. Labor requires more intervention in adolescent pregnant women (29).

In our study, preeclampsia was lacking in 99.3% of patients aged ≤19 years, which was significantly higher than those aged≥20 years (Table 3). In the literature, it has been reported that preeclampsia incidence was 7.5% of all pregnancies (30); that eclampsia incidence varies according to maternal age distribution and proportion of primipar pregnancies in the study population (31); that it often involves young, nullipar pregnant women and risk for eclampsia is higher due to underlying hypertension in pregnancies at older age; and that preeclampsia and eclampsia are more commonly seen among adolescent pregnant women when compared to those aged≥20 years (12). Again, in the study by İnalöz et al., it was suggested that eclampsia incidence was higher among adolescents. Our results are inconsistent with literature.

In case of disrupted fetoplacental perfusion such as intrauterine growth retardation, fetal urine production is decreased, resulting in insufficient amniotic fluid and oligohydramnios (33). The oligohydramnios rate was 0.4% in patients aged≤19 years whereas 6.3% in those aged≥20 years in our study (Table 3). It was significantly higher in patients aged≥20 years. In a previous study, it was reported that oligohydramnios was seen in 12.0% of adolescent pregnant women whereas 5.0% of normal pregnancies, indicating no significant difference between adolescent and non-adolescent pregnant women (28). Our result may be due to fact that there are many factors causing oligohydramnios and mechanisms related to amniotic fluid in addition to age.

The rate of diabetes was 5.9% in patients aged≥20 years while there was no case with diabetes mellitus among those aged≤19 years, indicating significantly higher DM rate in patients aged ≥20 years (Table 3).

Gestational diabetes mellitus is rarer among young women. Pancreatic ß cell function and insulin sensitivity is decreased by advancing age. In older women, predisposition to diabetes mellitus can be linked to insufficient ß cell response and increased insulin resistance (34). This finding may be explained by predisposition to diabetes mellitus via increased insulin resistance in older age.

In our study, placental anomaly was seen in 0.7% of patients aged≤19 years whereas it was found in 14.5% of patients aged≥20 years, indicating a significant difference (Table 3). In a previous study, it was reported that placental anomaly was detected in 2.0% of adolescent pregnant women and in 4.2% of non-adolescent pregnant women but there was no significant difference between groups (35). Our results are inconsistent with literature. In a study by Taner et al., it was found that placental anomaly incidence was comparable among adolescents and adults without no significant difference (27). This may be due to fact that several risk factors are involved in development of placental anomalies in addition to pregnancy at adolescence period.

The incidences of preeclampsia, diabetes mellitus, placental anomaly and oligohydramnios were higher in non-adolescent pregnant women. The infants delivered by adolescent pregnant women had shorter height and smaller head circumference, lower birth weight, and lower Apgar scores at minute 1 and 5. These are among risk factors that may affect on infant health and increase mortality in infants. Thus, pregnancy at adolescence period should be prevented and it must be followed closely for maternal and fetal adverse outcomes.

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