



Neonatal Prognosis and Outcomes in Adolescent Pregnancies

Adölesan Gebeliklerin Neonatal Prognoz ve Sonuçları

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Abstract

Aim: The study aims to determine features, morbidities and mortality of adolescent pregnant and their hospitalized newborns in the neonatal period.

Methods: Six hundred forty-one adolescent pregnant were enrolled and compared to 309 non-adolescent pregnant. Demographic characteristics of mothers and complications of delivery, demographic characteristics of newborns, morbidities, and mortality of infants admitted to hospital during neonatal period were recorded.

Results: The mean age of adolescent and non-adolescent pregnant were 17.2±0.8 and 27.0±4.3 years, respectively. Education levels, being housewife, extramarital birth-giving, cesarean section rate, and twin pregnancy were higher in adolescent pregnant. The mean height, head circumference, and weight of newborns in adolescent pregnant were significantly lower. Even though neonatal mortality was similar in both pregnant, early neonatal morbidities were more common in adolescent pregnant. Duration and rate of hospitalization, and morbidities causing hospitalization during the neonatal period were similar in the babies of both pregnant. Among babies admitted to the neonatal intensive care unit, mortality rates were higher in babies born to non-adolescent mothers.

Conclusion: Worse neonatal outcome of babies born to adolescent pregnant, and higher mortality in the neonatal period in non-adolescent pregnant were found. But characteristics and morbidities of babies hospitalized in the neonatal period were similar in both groups.

Keywords: Adolescent pregnancy, hospitalization, neonatal morbidity, neonatal mortality, newborn

Öz

Amaç: Çalışmamızın amacı, adölesan gebelerin ve yenidoğan döneminde hastaneye yatırılan bebeklerinin özelliklerini, morbidite ve mortalitelerini araştırmaktır.

Yöntemler: Çalışmaya 641 adölesan ve 309 adölesan olmayan gebe dahil edildi. Anne ve bebeklerin demografik özellikleri, doğum komplikasyonları, yenidoğan döneminde hastaneye yatırılan bebeklerinin morbidite ve mortaliteleri kaydedildi.

Bulgular: Adölesan olan ve olmayan gebelerin ortalama yaşı sırasıyla 17,2±0,8 ve 27,0±4,3 yıldır. Adölesan gebelerde eğitim düzeyleri, ev hanımı olma oranı, evlilik dışı doğum oranı, sezaryen doğum oranı ve ikiz gebelik oranı daha yüksekti. Adölesan anne bebeklerinde ortalama boy, baş çevresi ve ağırlık anlamlı düzeyde daha düşüktü. Neonatal mortalite her iki grupta benzer saptanmışken, erken neonatal morbiditeler adölesan gebe bebeklerinde daha sık saptanmıştı. Hastane yatış oranı, süresi ve yatışa neden olan yenidoğan dönemi morbiditeleri her iki grup bebeklerinde benzerdi. Yenidoğan yoğun bakıma yatan bebekler arasında, mortalite kontrol grubunda daha yüksekti.

Sonuç: Çalışmamızda adölesan anne bebeklerinde doğum özellikleri daha düşük saptanmışken, hastaneye yatan adölesan olmayan anne bebeklerinde ise neonatal mortalite yüksek bulunmuştur. Yenidoğan döneminde yatırılan bebeklerin özellikleri ve morbiditeleri her iki grupta benzer saptanmıştır.

Anahtar Sözcükler: Adölesan gebelik, hastane yatışı, neonatal morbidite, neonatal mortalite, yenidoğan

Introduction

Adolescent period involves a frame of time when the individual goes through biological, psychological and social changes. As the definition of World Health Organization states, it is a nine years period between ages of 10-19. Because of the biological immaturity, being an adolescent pregnant is an important factor which poses a risk for both the mother and the newborn (1). Becoming pregnant during adolescence can greatly alter young women's life prospects and those of their children. Complications of pregnancy and childbirth are the second leading cause of death among 15-19-year-old women (2). Malnutrition, smoking and alcohol use, emotional stress and suboptimal prenatal care are observed more in adolescents (3,4). Stillbirth, death within the first week and month are higher in newborns born to adolescent mothers compared to mothers between ages of 20-29 years and the risk increases as the age of the mother decreases. Although preterm birth, low birth weight and asphyxia rates are higher in adolescent mothers, all of which increase risks for the infants, morbidities and mortality of the babies born to adolescent pregnant mothers who need to be hospitalized during neonatal period have not been clearly identified in our population.

The aim of our study was to determine the features and problems related to adolescent pregnancies for the mothers and the newborns during delivery and their newborns having problems during neonatal period in our country.

Methods

Study Population

The single center, retrospective, observational, cohort study protocol was approved by the local Ethics Committee. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors. Ethical clearance was obtained from the Ethics Committee of the Bakirkoy Maternity and Children Hospital. 950 pregnant women having no missing data of patient files and whose babies were followed up in neonatal period were enrolled to our study during two years in our hospital. Pregnant women below 15 years and above 35 years, patients with missing data, pregnant women with in utero ex fetus and babies who could not be followed up in our hospital during neonatal period were excluded from the study. The adolescent mothers consisted of pregnant women aged between 15 and 19 years and the non-adolescent pregnant women consisted of mothers

aged between 20 and 35 years. Six hundred and forty-one adolescent pregnant women and three hundred and nine non-adolescent pregnant women were enrolled to the study. Patient files and hospital database records were provided via newborn database by the researcher.

Maternal Characteristics

Maternal characteristics included age, marital status, duration of marriage, consanguineous marriages, smoking history, occupation, educational status, mode of delivery, cesarean indication, and obstetric complication.

Neonatal Features

Last menstruation date or new Ballard score with ultrasound were used to determine the gestational age and preterm delivery (gestation <37 weeks). Neonatal characteristics included gender, APGAR score (1st and 5th minutes), low 1st and 5th minutes APGAR score (less <7), birth weight (gram), low birth weight (less than 2.500 g), very low birth weight (less than 1.500 g), birth height (cm), head circumference (cm), congenital abnormalities, intrauterine growth retardation (IUGR), the presence of neonatal respiratory problems respiratory distress syndrome (RDS) and/or transient tachypnea of newborn (TTN), meconium aspiration syndrome, hypoglycemia, Rh incompatibility, polycythemia, hyperbilirubinemia, and presence of resuscitation.

Features of Newborns Admitted to Hospital

Rate of prematurity, presence of accompanying congenital malformation, duration of hospitalization, level of hospitalization, ventilatory support, duration of total parenteral nutrition, the reasons for hospitalization, mortality rates during hospitalization of babies in neonatal period were recorded.

Data analysis

The analyses were performed by using the SPSS software (Statistical Package for the Social Sciences, version 20.0, SPSS Inc, Chicago Illinois, USA). Data are expressed as mean \pm standard deviation. Parametric variables were compared with student's t-test between dependent variables and with Mann-Whitney U test between independent variables. Categorical variables were compared by using Pearson's chi-square test and Fisher's exact test was used for parameters that were not normally distributed. The results were evaluated with a confidence interval of 95% and a significance level of $p < 0.05$.

Results

Maternal Outcomes

Demographic characteristics of adolescent and non-adolescent pregnant women were given in Table 1. The cesarean rate was significantly higher in the adolescent pregnant women

compared to non-adolescent pregnant (52.9% and 42.7%; $p=0.003$). The most common cesarean indications were fetal distress, cephalopelvic disproportion and breech presentation in adolescent pregnant, however the most common indication was a previous cesarean section in the non-adolescent pregnant. 529 (82.5%) of the adolescent pregnant did not have any obstetric complications and the most common reason was bleeding among 112 (17.5%) of adolescent pregnant having complication. Whereas in non-adolescent pregnant; 235 pregnancies (76%) did not develop obstetric complications and 74 (24%) of the pregnant had bleeding as the most common complication. Preeclampsia rates were also similar (2.2% vs 3.9%, $p=0.133$, respectively). While 96 (15%) of the adolescents had premature birth, 53 (17.2%) of the non-adolescent pregnant had premature birth ($p=0.388$). Pregnant women in the adolescent age group stayed 1.9 ± 1.2 days in the hospital, while the hospitalization duration of the pregnant women in the non-adolescent group was 1.8 ± 1.2 days ($p=0.19$).

Neonatal Outcomes

Six hundred and sixty-six babies were delivered from 641 adolescent women, 313 babies were delivered from 309 non-adolescent women. One hundred and six (16.1%) of the babies born to adolescent mothers had a birth weight below 2500 g, while 31 (9.9%) of the infants born to non-adolescent mothers had a birth weight below 2500 g ($p=0.01$). 18 (2.7%) of the babies born to adolescent mothers had a birth weight below 1500 g, while 5 (9.9%) of the infants born to non-adolescent mothers had a birth weight below 1500 g ($p=0.281$).

There were no congenital anomalies of any system among 614 (92.2%) of the infants born to adolescent mothers, and 270 (86.3%) of the infants born to non-adolescent mothers, however the genitourinary and central nervous system anomalies were significantly higher in the babies of the non-adolescent group ($p=0.01$ and $p=0.03$, respectively). Demographic characteristics of newborns born to adolescent and non-adolescent mothers are given in Table 2.

Four hundred and twenty one (63.2%) of babies born to adolescent mother had no any problem while 242 (77.3%) of the babies born to non-adolescent pregnant were all well during neonatal period. Early neonatal morbidities are summarized in Table 3. Among the morbidities resulted with hospitalization; meconium aspiration syndrome (MAS), respiratory distress syndrome, and hypoglycemia were significantly higher in the adolescent group compared to the non-adolescent group. The rate of resuscitation was 12.5% ($n=83$) in babies born to adolescent mother whereas 9.3% ($n=29$) in babies born to non-adolescent mothers ($p=0.143$).

Table 1. Demographic characteristics of adolescent and non-adolescent pregnant

	Adolescent pregnant (n=641)	Non-adolescent pregnant (n=309)	p
Age (year) (mean \pm SD)	17.2 \pm 0.8	27.0 \pm 4.3	<0.001
Married (%)	93.3%	99.7%	<0.001
Duration of marriage (years) (mean \pm SD)	1.6 \pm 0.9	6.1 \pm 4.1	<0.001
Consanguineous marriage (%)	9.7%	13.3%	0.09
Smoker (%)	0.9%	0.6%	0.488
Unemployment rate (%)	99.5%	93.3%	<0.001
Education level (%)	16.7% Illiterate 42.3% PSG 34.2% SSG 6.7% HSG	20.6% Illiterate 44% PSG 17.2% SSG 14.6% HSG 3.9% Bachelor	<0.001

PSG: Primary school graduate, SSG: Secondary school graduate, HSG: High school graduate

Table 2. Neonatal characteristics of newborns born to the adolescent and non-adolescent mothers

	Adolescent mothers' babies (n=666)	Non-adolescent mothers' babies (n=313)	p
Gestational week (week)	37.8 \pm 2.3	37.7 \pm 2.1	0.526
Gender (male)	50.2%	49.2%	0.782
1 st min. Low APGAR (<7)	19.7%	5.1%	<0.001
5 th min. Low APGAR (<7)	1.1%	0.3%	0.216
Birth weight (gr)	3033 \pm 660	3202 \pm 587	<0.001
Birth height (cm)	49.2 \pm 3.5	49.9 \pm 2.7	0.002
Birth head circumference (cm)	34 \pm 2.1	34.7 \pm 2.1	<0.001

Outcomes of Newborns Admitted to Hospital

In adolescent group, one hundred and twelve of six hundred and sixty six (17%) babies were hospitalized in the neonatal period however only forty of three hundred and thirteen (13%) babies were hospitalized in the non-adolescent mothers ($p=0.104$). The reasons of hospitalization of babies admitted to neonatal intensive care unit are given in Table 4. Hospitalization due to MAS was significantly higher in the babies born to adolescent mothers. Among the hospitalized babies; twenty-nine (25.9%) of 112 babies born to adolescent mothers were premature while 9 (22.5%) babies were premature in non-adolescent mothers ($p=0.671$). And 13 (11%) babies in the adolescent group and 3 (7%) babies in the control group had no any congenital malformation ($p=0.962$). While the hospitalized infants born to adolescent mother had an

Table 3. Neonatal morbidities in newborns born to adolescent and non-adolescent pregnant

	Adolescent pregnant babies (n=666)	Non-adolescent pregnant babies (n=313)	OR (95% CI)	p
Respiratory problems	74 (11.1%)	14 (4.5%)	0.375 (0.208-0.674)	0.001
MAS	52 (7.8%)	9 (2.9%)	0.350 (0.170-0.719)	0.003
Hypoglycemia	44 (6.6%)	10 (3.2%)	0.467 (0.232-0.940)	0.029
Rh incompatibility	34 (5.1%)	23 (7.3%)	1.474 (0.853-2.548)	0.162
IUGR	17 (2.6%)	8 (2.6%)	1.001 (0.427-2.346)	0.998
Polycythemia	8 (1.2%)	3 (1%)	0.796 (0.210-3.021)	0.737
Hyperbilirubinemia	8 (1.2%)	2 (0.6%)	0.529 (0.112-2.505)	0.415

MAS: Meconium aspiration syndrome, IUGR: Intrauterine growth retardation

Table 4. Reasons of hospitalization and morbidities of babies admitted to the neonatal intensive care unit

	Adolescent pregnant babies (n=112)	Non-adolescent pregnant babies (n=40)	p
Hypoglycemia	12 (10.7%)	2 (5%)	0.232
TTN	20 (17.9%)	6 (15%)	0.680
MAS	10 (8.9%)	0	0.042
Hyperbilirubinemia	44 (39.3%)	14 (35%)	0.632
Septicemia	27 (24.1%)	15 (37.5%)	0.104
Respiratory Distress Syndrome	12 (10.7%)	4 (10%)	0.583
Bronchopulmonary Dysplasia	3 (2.7%)	1 (2.5%)	0.717
Retinopathy of Prematurity	5 (4.5%)	2 (5%)	0.592
Necrotizing Enterocolitis	2 (1.8%)	1 (2.5)	0.603
Intraventricular hemorrhage	5 (4.5%)	2 (5%)	0.592

TTN: Transient tachypnea of newborn, MAS: Meconium aspiration syndrome

average of 9.1 days, the mean hospitalization period of the infants was 8.2 days in the non-adolescent mothers. ($p=0.707$). When the level of hospitalization was evaluated; 80 (71.4%) of the babies born to adolescent mothers were in the first level, 18 (16.1%) were in the second level and 14 (12.5%) were in the third level intensive care unit whereas 28 (70%) of the babies born to non-adolescent mothers were in the first level, 6 (15%) were in the second level and 6 (15%) were in the third level intensive care unit. There was no significant difference between the groups in

terms of hospitalization level ($p=0.919$). Twelve (10.7%) of the hospitalized babies born to adolescent mothers needed mechanical ventilation support while 4 (10%) of the infants were needed for the mechanical ventilation support in the control group. While the infants born to adolescent mothers who connected to the ventilator needed an average of 8.1 ± 9.2 days of ventilator support during their hospitalization, it was observed that in, the infants born to non-adolescent mothers spent 14.2 ± 8.0 days of ventilator support ($p=0.261$). While 27 (24.1%) of the hospitalized adolescent mothers needed total parenteral nutrition support for 10.5 days during the hospitalization period, 9 (22.5%) of their babies needed an average of 10.3 days during their hospitalization. 27 (24.1%) of the infants born to adolescent mother were fed with total parenteral nutrition for 10.5 days while 9 (22.5%) of the babies born to non-adolescent mothers needed an average of 10.3 days of total parenteral nutrition during hospitalization ($p=0.949$).

Three (2.7%) infants who were hospitalized in the adolescent group and two (5%) of the infants born to non-adolescent mothers died during hospitalization. Mortality rate among hospitalized infants born to non-adolescent mothers was significantly higher ($p=0.002$).

Discussion

We evaluated the outcomes of babies born to adolescent mother who gave birth in our hospital which is one of the important tertiary referral hospital in our country. Babies born to adolescent mother had worse fetal outcome during antenatal period, despite the results of those hospitalized babies in the first 28-day period were similar compared to babies born to non-adolescent mothers. Although there are studies examining the results of adolescent pregnancies in our country, our study is the first study that compared the babies born to adolescent pregnant with the non-adolescent pregnant who were hospitalized in the neonatal period.

Adolescent pregnancy is usually an unintended pregnancy mostly seen among women who have an unsteady lifestyle and were unmarried in the western countries. In our country, adolescent pregnancy is usually seen as a result of early marriage especially in low socio-economic groups. However, these pregnancies are mostly intended and planned according to the expectations of the families of the parents. In our study, the rate of extramarital pregnancy in adolescents was 5.5% and was significantly higher than non-adolescent pregnant. However, this rate was found to be lower compared to other studies (5-7). According to the World Health Organization, low level of education and living in rural areas increase the incidence

of adolescent pregnancy and childbirth. In our study, the educational level of adolescent pregnant women was significantly lower ($p < 0.001$) compared to adult pregnant women. Similarly, there are studies reporting low education level in the adolescent pregnant women in the literature (6,8). A large proportion of pregnant women in our country were married and have a regular daily life. Drug use or alcoholic beverage consumption were almost never present.

Gestational week and birth weight are important in neonatal morbidity and mortality. In our study, there was no difference in the rate of preterm birth in adolescent and adult group. The findings of Suparp Thaitha and Thato (9), Raatikain et al. (10) and Chen et al. (5) were in agreement with our study. However, in many other studies; the rates of preterm delivery were found to be higher in the adolescent pregnant women compared to the non-adolescent pregnant women (6-8,11-13). In our country, according to the Demographic and Health Survey of Turkey; the rate of low birth weight babies was found to be 12.2% in born to mother <20 year, 11.9% in born to mother between 20-34 years, and 11.8% in born to mother between 35-49 years (14). In the present study, birth weights of infants born to adolescent mothers were found to be significantly lower compared to infants born to adult mothers. In another study conducted in our hospital, Sultan Kavuncuoğlu et al. (15) reported the ratio of low birthweight as 9%. There are several studies reporting similar results to our study (7,10,12,13). However, some of the studies reported no significant difference between the groups (5,9). Similar to the study conducted by Shrim et al. (13) in our study, the rate of low APGAR scores (1st minute) was found to be significantly higher in the adolescent pregnant women compared to the non-adolescent pregnant women. Chen et al. (5) and Kongnyuy et al. (6) reported lower 5th minute APGAR scores in the babies of adolescent mothers compared to those of the non-adolescent mothers. However, Thaithae and Thato (9), Rasheed et al. (10) and Rahheed et al. (8) showed no statistically significant difference in terms of 1st and 5th minute APGAR scores between the adolescent and the non-adolescent pregnant women.

In our study, hospitalization rates and average hospitalization day among newborns did not differ between the groups ($p = 0.104$ and $p = 0.707$). There are varying findings in the literature. Rasheed et al. (10), found no significant difference among hospitalization rates while Shrum et al. (13) and Rasheed et al. (9) reported higher hospitalization rates in the adolescent group ($p < 0.001$ and $p < 0.01$, respectively).

There were some limitations of the study. Our study was designed as single center and retrospective. And also this study reported the short duration of follow-up to

identify morbidities and mortality, as some outcomes may take a longer duration to develop. The findings from our study hopefully lend itself to form a template for further and prospective, multicentre clinical study.

Conclusion

Our results showed that 1st minute Apgar scores and birth weight, height and head circumference were lower and cesarean delivery rate, early neonatal morbidities (respiratory distress, MAS, hypoglycemia) and hospitalization rates were higher in the newborns born to the adolescent mothers compared to the non-adolescent mothers. Prematurity rate was similar in both groups, and among hospitalized patients, there was no difference in the duration of hospitalization when the level of hospitalization and the etiologies were taken into account. Our study is the first comprehensive study including adolescent pregnant women and outcomes of their babies in neonatal period. Also, there is still urgent need of multi-centered studies evaluating long-term outcomes and morbidities related to growth, development and neurodevelopmental prognosis of these infants.

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Authorship Contributions

Concept: B.C., Design: B.C., M.Ç., S.K., Data Collection or Processing: B.C., Analysis or Interpretation: B.C., T.E.E., Z.E., M.Ç., S.K., Literature Search: B.C., Writing: B.C.

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