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# Comparison of Perinatal and Neonatal Outcomes of Adolescent and Adult Pregnant Women

## Adölesan ve Erişkin Gebe Kadınların Perinatal ve Neonatal Sonuçlarının Karşılaştırılması

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**ÖZ**

**Amaç:** Adölesan ve erişkin gebeler arasında obstetrik ve neonatal sonuçları karşılaştırmak.
**Araçlar ve Yöntem:** Çalışma kriterlerine uygun 309'u adölesan, 307'si erişkin toplamda 616 gebe tıbbi kayıtları hastane bilgi sistemi üzerinden retrospektif case-control çalışma olarak incelenerek çalışmaya dahil edildi. Araştırmaya katılan gebelerin yenidoğan bebeklerinin hastanede yatış durumu, APGAR skorları ve doğum ağırlıkları bilgileri edinildi.
**Bulgular:** Çalışma sonuçlarımızda adölesan grubu gebelerde; fetal distres, oligohidramniyos, erken doğum, erken membran rüptürü ve intrauterin gelişim geriliği yetişkin yaş gebelere göre daha yüksek oranlarda saptandı. Her iki grup arasında; polihidramniyos, IUMF, gestasyonel diyabet, plasenta previa, ablasyo plasenta, birinci ve beşinci dakika APGAR skorları, preeklampsi ve yenidoğan yoğun bakım ünitesine yatış oranı arasında anlamlı fark saptanmadı. Yenidoğanların doğum ağırlıkları adölesan grubunda erişkine göre düşük saptandı.
**Sonuç:** Çalışmamız adölesan gebeliklerin fetal distres, oligohidramniyos, erken doğum, erken membran rüptürü, intrauterin fetal ölüm ve düşük doğum ağrılığı açısından riskli olduğunu göstermiştir.

**Anahtar Kelimeler:** ergenlik döneminde gebelik; gebelik; gebelik sonuçları

**ABSTRACT**

**Purpose:** The aim of this study is to perform a comparative analysis of obstetric and neonatal outcomes in pregnant women in two age groups: adolescents and adults.
**Materials and Methods:** A total of 616 pregnant women's medical records, comprising 309 adolescents and 307 adults who met the study criteria, were retrospectively analyzed as part of a case-control study using hospital information systems. Information regarding the hospitalization status of the newborns, APGAR scores, and birth weights of the infants born to the participating mothers was obtained.
**Results:** In our study, adolescent pregnant women showed higher rates of fetal distress, oligohydramnios, preterm birth, premature rupture of membranes, and intrauterine growth restriction compared to adult pregnant women. There were no significant differences between the two groups in terms of polyhydramnios, intrauterine fetal demise (IUMF), gestational diabetes, placenta previa, placental abruption, first and fifth minute APGAR scores, preeclampsia, and rate of admission to the neonatal intensive care unit. The birth weights of newborns were found to be lower in the adolescent group compared to the adult group.
**Conclusion:** Our study has demonstrated that adolescent pregnancies are at higher risk for fetal distress, oligohydramnios, preterm birth, premature rupture of membranes, intrauterine fetal demise, and low birth weight.

**Keywords:** gravidity; pregnancy in adolescence; pregnancy outcomes

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## INTRODUCTION

World Health Organization (WHO) defines adolescence as the period beginning with puberty and ending with the development of adult attitudes and behaviors. The developmental period in question encompasses the age range of 10 to 19 years.[1] Adolescent pregnant women often exhibit delayed initiation of prenatal care as a result of several factors, including limited educational opportunities, challenges in obtaining healthcare facilities, familial influences, and apprehension.[2]

WHO regards adolescent pregnancies as a matter of public health concern due to their impact on the health of both the mother and the infant.[3] Adolescent pregnancies have an increased susceptibility to several unfavorable consequences, such as preterm birth, low birth weight, neonatal problems, and infant mortality. Hence, it is imperative to modify prenatal and postnatal care in order to cater to the unique requirements of teenage pregnant women.[4]

Maternal wellness is at risk when a woman has her initial pregnancy at a young age. While teenage births are 11% of the total global births, they contribute to 23% of the overall illness burden associated with pregnancy and delivery across all age groups of women. Pregnancy and delivery problems constitute the primary cause of mortality among women aged 15-19 in low- and middle-income countries.[5] In middle-income countries, there is a notable disparity in mortality rates during the initial week and month of life between children born to women under the age of 20 and those born to mothers aged 20-29. Specifically, the former group has a 50% higher mortality rate. Furthermore, it is important to note that the risk of mortality increases as the age of the mother decreases.[5]

The societal impacts of adolescent pregnancy encompass several negative outcomes, such as discontinuing schooling (leading to diminished social prospects, including poorer educational achievements and decreased lifetime incomes) and increased instances of violence, including suicide and homicide.[6]

The objective of this study is to conduct a comparative analysis of delivery technique rates, neonatal morbidity and death rates, as well as perinatal and neonatal complication rates, between pregnant women in the adult age group and pregnant women in the teenage group.

## MATERIALS and METHODS

From January 1, 2019 to June 25, 2022, a retrospective review was conducted on the medical records of 616 pregnant women who were admitted to the Gynecology and Obstetrics Clinic of Istanbul Bakırköy Dr. Sadi Konuk Training and Research Hospital. Among these women, 309 were adolescents and 307 were adults, and they all met the criteria set for the study. The review was conducted using the hospital information system. A comprehensive informed consent was obtained from all participants. This study was approved by the Clinical Research Ethics Committee of Bakırköy Dr. Sadık Konuk Training and Research Hospital (dated 15/08/2022 and numbered 2022-16-07).

The patients were categorized based on their age, with a cutoff age of 19. Individuals who were 19 years old or less were classified as adolescent patients, while those beyond the age of 19 were classified as adult patients. The study excluded twin and triple pregnancies, patients with genetic and structural anomalies, pregnancies terminated before the 20th gestational week, those diagnosed with malignancy, as well as those with cardiological, endocrine system, immune system, and gastrointestinal system conditions, in line with the indicated exclusion criteria. The gestational weeks of the patients were determined based on the information provided on their last menstrual cycle and first trimester ultrasound data.

The study examined the gestational week of the patients involved, as well as their age at the time of admission recorded in the hospital information system. Additionally, the study investigated the number and type of birth, as well as various pregnancy complications including preeclampsia, oligohydramnios, preterm birth, eclampsia, fetal distress, intrauterine fetal death (IUMF), gestational diabetes, polyhydramnios, premature rupture of membranes (PROM), placenta previa, abruptio placentae, and intrauterine growth retardation (IUGR). These data were obtained from the hospital information system and used to create

comprehensive records. In contrast, the hospitalization status, APGAR scores at the 1st and 5th minute, and birth weights of the newborn infants belonging to the pregnant women who were part of the study were extracted from the hospital information system in order to gather their respective data.

During the follow-up of pregnant women using the non-stress test (NST), many indicators were assessed to determine fetal distress. These indicators included fetal bradycardia, persistent atypical variable deceleration, late deceleration, continuing and unresolved loss of variability, and tachycardia. The diagnosis of gestational diabetes mellitus (GDM) was established by doing oral glucose tolerance tests (OGTT) with either 50-100 g or 75 g of glucose. These tests were administered between the 24th and 28th weeks of gestation, following the guidelines provided by the International Association of the Diabetes and Pregnancy Study Group (IADPSG) and the American College of Obstetricians and Gynecologists (ACOG). Oligohydramnios was determined when the vertical dimension of the greatest amniotic fluid pocket, excluding fetal extremities or umbilical cord, measured less than 2 cm in centimeters. PROM was determined when spontaneous rupture of membranes occurs any time before the onset of labor. The diagnosis of PROM can be made by observing amniotic fluid before the start of labor or by positive results of some diagnostic kits such as 'amnisur'. Conversely, polyhydramnios was diagnosed when the vertical dimension measured 8 cm or greater in centimeters.

The identification of placenta previa was established with the use of sonographic imaging, specifically by observing the presence of echogenic placental tissue positioned above the internal cervical os, either partially or entirely, during the second or third trimester. Transvaginal ultrasonography (TVUS) was the preferred method for doing this imaging. The categorization of birth weight was established as follows: low birth weight (LBW) was classified as infants weighing fewer than 2500 grams, very low birth weight (VLBW) as infants weighing less than 1500 grams, and very low birth weight (ELBW) as infants weighing less than 1000 grams.

The statistical analysis was conducted using the NCSS (Number Cruncher Statistical System) application. The study data was evaluated using descriptive statistical methods, including measures such as the mean, standard deviation, median, frequency, percentage, minimum, and maximum. The normality of the numeric data was assessed using both the Shapiro-Wilk test and graphical exams. The Mann-Whitney U test was employed to compare two sets of quantitative data that had non-normal distribution. The Pearson chi-square test and Fisher's exact test were employed to conduct a comparative analysis of qualitative data. The threshold for statistical significance was determined to be $p<0.05$.

**RESULTS**

The research was performed at Istanbul Bakırköy Sadi Konuk Training and Research Hospital from January 1, 2019 to June 25, 2022. A total of 616 women between the ages of 15 and 34, with an average age of 22.70, were included in the study. The defining characteristics of the patients included in the research were outlined in Table 1. The study findings revealed that 309 respondents, accounting for 50.2% of the participants, were classified as adolescents, while the remaining 307 subjects, constituting 49.8% of the sample, fell into the adult category. The study findings revealed that a majority of instances, specifically 60.9%, experienced a vaginal delivery, while a minority, accounting for 39.1%, underwent a cesarean section. The study findings revealed that 60.8% of the birth manner were classified as delivery without episiotomy, while 39.2% were categorized as delivery with episiotomy.

The occurrence of operative delivery was recorded in 0.8% of the patients.

The study findings revealed that 49.2% of the cases exhibited a single live delivery, while 29.4% saw two births. Additionally, 14.4% of the cases involved three births, and a minority of 4.1% The data revealed that a total of 25 individuals, constituting 1% of the sample, had given birth to four children. Additionally, 11 individuals, accounting for 1.8% of the sample, had five live births. Furthermore, 7 individuals, representing 1.1% of the sample, had six living births. The gestational duration of the patients varied between 21 and 41 weeks, with a mean of 38.09.

The birth length of the infants varied between 19 and 57 cm, with a mean of 48.33 cm, while their birth weight ranged from 150 to 4980 grams, with an average of 3064.33 kg. Fetal distress was observed in 7% of cases, IUMF in 1.3%, preeclampsia in 3.7%, oligohydramnios in 14%, polyhydramnios in 2.8%, preterm labor in 22.6%, PROM in 8.1%, GDM in 2.1%, IUGR in 7.5%, placenta previa in 0.5%, placental abruption in 1.3%, and 12.7% of newborns were admitted to the intensive care unit (NICU). The APGAR scores in the 1st minute varied from 0 to 10, with an average score of 7.38. Similarly, the APGAR scores at the 5th minute ranged from 0 to 10, with an average score of 8.63. The provided information is displayed in Table 2.

**Table 1.** Distribution of descriptive characteristics.

| | | |
|---|---|---|
| Age | Mean±Sd | 22.70±6.27 |
| | Median (Min-Max) | 19 (15-34) |
| Birth Age (%) | Adolescent | 309 (50.2) |
| | Adult | 307 (49.8) |
| Birth Type (%) | NSD | 375 (60.9) |
| | Cesarean section | 241 (39.1) |
| Episiotomy (n=176) | No | 107 (60.8) |
| | Yes | 69 (39.2) |
| Operative Birth | No | 611 (99.2) |
| | Yes | 5 (0.8) |
| Number of Live Births | 1 Birth | 303 (49.2) |
| | 2 Birth | 181 (29.4) |
| | 3 Birth | 89 (14.4) |
| | 4 Birth | 25 (4.1) |
| | 5 Birth | 11 (1.8) |
| | 6 Birth | 7 (1.1) |
| Pregnancy Period (week) | Mean±Sd | 38.09±2.75 |
| | Median (Min-Max) | 39 (21-41) |
| Birth Length (cm) | Mean±Sd | 48.33±3.59 |
| | Median (Min-Max) | 49 (19-57) |
| Birth Weight (gr) | Mean±Sd | 3064.33±588.23 |
| | Median (Min-Max) | 3115 (150-4980) |

**Table 2.** Distribution of risky pregnancy situations and age groups.

| **Variables** | | **n=** | **Adolescent** | **Adult** | **p** |
|---|---|---|---|---|---|
| Fetal distress | No | 573 (93.0) | 276 (89.3) | 297 (96.7) | [a] 0.001** |
| | Yes | 43 (7.0) | 33 (10.7) | 10 (3.3) | |
| Intrauterine fetal death (IUMF) | No | 608 (98.7) | 305 (98.7) | 303 (98.7) | [b] 1.000 |
| | Yes | 8 (1.3) | 4 (1.3) | 4 (1.3) | |
| Preeclampsia | No | 593 (96.3) | 295 (95.5) | 298 (7.1) | [a] 0.295 |
| | Yes | 23 (3.7) | 14 (4.5) | 9 (2.9) | |
| Oligohydramnios | No | 530 (86.0) | 255 (82.5) | 275 (89.6) | [a] 0.012* |
| | Yes | 86 (14.0) | 54 (17.5) | 32 (10.4) | |
| Polyhydramnios | No | 599 (97.2) | 299 (96.8) | 300 (97.7) | [a] 0.469 |
| | Yes | 17 (2.8) | 10 (3.2) | 7 (2.3) | |
| Preterm birth | No | 477 (77.4) | 216 (69.9) | 261 (85.0) | [a] 0.001** |
| | Yes | 139 (22.6) | 93 (30.1) | 46 (15.0) | |
| Premature Rupture of Membranes (PROM) | No | 566 (91.9) | 271 (87.7) | 295 (96.1) | [a] 0.001** |
| | Yes | 50 (8.1) | 38 (12.3) | 12 (3.9) | |
| Gestational Diabetes (GDM) | No | 603 (97.9) | 303 (98.1) | 300 (97.7) | [a] 0.770 |
| | Yes | 13 (2.1) | 6 (1.9) | 7 (2.3) | |
| Intrauterine Growth Retardation (IUGR) | No | 570 (92.5) | 277 (89.6) | 293 (95.4) | [a] 0.006** |
| | Yes | 46 (7.5) | 32 (10.4) | 14 (4.6) | |
| Placenta Previa | No | 613 (99.5) | 308 (99.7) | 305 (99.3) | [b] 0.623 |
| | Yes | 3 (0.5) | 1 (0.3) | 2 (0.7) | |
| Ablation Placeta | No | 608 (98.7) | 302 (97.7) | 306 (99.7) | [b] 0.069 |
| | Yes | 8 (1.3) | 7 (2.3) | 1 (0.3) | |
| APGAR 1 min | Mean±Sd | 7.38±1.47 | 7.34±1.49 | 7.43±1.45 | [c] 0.221 |
| | Median (Min-Max) | 8 (0-10) | 8 (0-10) | 8 (0-9) | |
| APGAR 5 min | Mean±Sd | 8.63±1.27 | 8.63±1.21 | 8.63±1.32 | [c] 0.832 |
| | Median (Min-Max) | 9 (0-10) | 9 (0-10) | 9 (0-10) | |
| Newborn ICU | No | 538 (87.3) | 269 (87.1) | 269 (87.6) | [a] 0.832 |
| | Yes | 78 (12.7) | 40 (12.9) | 38 (12.4) | |

**Table 3.** Evaluation of descriptive characteristics by age groups.

| | | Adolescent | Adult | p |
|---|---|---|---|---|
| Type of Birth | NSD | 182 (58.9) | 193 (62.9) | [a] 0.313 |
| | Cesarean section | 127 (41.1) | 114 (37.1) | |
| Birth Method | Spontaneous | 58 (59.8) | 49 (62.0) | [a] 0.763 |
| (n=176) | Episiotomy | 39 (40.2) | 30 (38.0) | |
| Operative Birth | No | 307 (99.4) | 304 (99.0) | [b] 0.685 |
| | Yes | 2 (0.6) | 3 (1.0) | |
| Number of Live Births | 1 Birth | 214 (69.3) | 89 (29.0) | [a]0.001** |
| | 2 Birth | 83 (26.9) | 98 (31.9) | |
| | 3 Birth | 10 (3.2) | 79 (25.7) | |
| | ≥4 Births | 2 (0.6) | 41 (13.4) | |
| Pregnancy Period (week) | Mean±Sd | 37.82±2.96 | 38.37±2.49 c | 0.007** |
| | Median (Min-Max) | 39 (23-41) | 39 (21-41) | |
| Fetal Length (cm) | Mean±Sd | 47.97±3.75 | 48.68±3.40 c | 0.005** |
| | Median (Min-Max) | 48.5 (23-57) | 49 (19-55.5) | |
| Fetal Weight (gr) | Mean±Sd | 2980.84±584.49 | 3148.36±580.90 c | 0.001** |
| | Median (Min-Max) | 3055 (470-4490) | 3175 (150-4980) | |

There was no statistical significance observed in the comparison of delivery types, procedures, and intervention rates based on maternal age at childbirth. However, a statistically significant difference was found in the distribution of live births based on maternal age (p=0.001). The incidence of live births among cases in the adult group, particularly those aged 30 or older, was significantly higher compared to cases in the adolescent group.

The researchers discovered a statistically significant difference in gestational age between the adult and adolescent groups (p=0.007). The study found that the birth height and weight of the children in the sample were significantly bigger than those of the adolescents (p=0.005) (Table 3). Furthermore, there was a statistically significant difference in the incidence of fetal distress between the adolescent and adult groups (p=0.001). There is no statistically significant difference (p>0.05) in the occurrence rates of IUMF, preeclampsia, polyhydramnios, GDM, placenta previa, ablatio placenta, and NICU hospitalization based on birth age analysis. There was a statistically significant difference in the occurrence of oligohydramnios between the adolescent and adult groups (p=0.012), according to the research.

The study revealed a statistically significant increase in the occurrence of preterm delivery and PROM among adolescent group patients compared to adult group cases (p=0.001). In a same manner, it was shown that the prevalence of IUGR among adolescents was substantially greater than in the adult population (p=0.006). There was no statistically significant difference seen in the APGAR 1st and 5th minute measures of infants based on their birth age (p>0.05) (Table 2).

## DISCUSSION

Many studies have documented an increased incidence of poor obstetric and neonatal outcomes in adolescents who become expectant. The teen birth rate has consistently declined over the past decade.[7] Although the exact reason for the decline in adolescent births is unknown, it is believed that the increased availability of effective contraception for adolescents is the primary cause. The increased availability of therapeutic abortions, which is reported to account for up to 56% of all adolescent pregnancies, is another factor in the decline in adolescent pregnancy rates.[8] However, adolescents, particularly young adolescents, typically represent a distinct demographic group than older women of reproductive age, and therefore the risks of obstetric and neonatal outcomes may differ.

Compared to adult pregnant women, the rates of fetal distress, oligohydramnios, preterm birth, PROM and IUGR were higher in adolescent pregnant women. In terms of polyhydramnios, IUMF, GDM, placenta previa, ablatio placenta, 1st and 5th minute APGAR scores, preeclampsia, and the rate of hospitalization in the NICU, there was no significant difference between the two groups. Compared to adults, infants in the adolescent cohort have lower birth weights.

Young adolescent pregnancies are a subset of all pregnancies that should be considered, particularly because they do not reflect the population as a whole. Every year, about 1 million girls under the age of 15 and about 16 million girls between the ages of 15 and 19 give birth, primarily in countries with low or middle incomes.[9]

Among the many variables linked to adolescent pregnancy is inadequate social and economic assistance.[10] It appears that adolescents with mental health symptoms or severe mental illness (e.g., major depression, bipolar disorder, psychotic disorders) have a higher risk of becoming pregnant.[11] Young women who gave birth during puberty were also more likely to have a lower socioeconomic status, poorer academic performance, and less maternal education. Numerous studies have revealed that childhood sexual abuse raises the risk of teenage pregnancy.[12,13] Similar to current study, adolescents appear to be at increased risk for deleterious pregnancy outcomes such as preeclampsia, premature birth, fetal growth retardation, and neonatal mortality. It is unclear if the sociodemographic characteristics linked to adolescent pregnancy—such as lower socioeconomic level, less education, and single status—or biological immaturity is to blame for these findings.[14-18] Teens should be given all available options (abortion, adoption or kinship care, parenthood) when they have conflicting sentiments about continuing the pregnancy.

Due to increased perinatal risks, adolescents who elect to carry their pregnancy to term should be referred to specialized prenatal care as soon as possible.[19] Teenagers younger than 15 are less likely to receive prenatal care, and late entry to prenatal care is associated with complications of premature or LBW delivery and preeclampsia.[20,21] Early testing for STDs, starting folic acid-containing prenatal vitamins, maintaining optimal diet, abstaining from alcohol and other drugs, and assessing underlying medical and family issues are all necessary for a safe pregnancy.[19-22] A healthcare provider can also assist a teen in quitting smoking by educating her about the negative effects of nicotine on the developing fetus and by encouraging her to cease.

The prevention of adolescent pregnancies requires a multifaceted strategy that includes comprehensive sexuality education, an emphasis on delaying sexual activity in young adolescents, and encouragement of the consistent and correct use of effective contraceptives.

The analysis conducted exhibits several limitations. Due to the cross-sectional design of the study, which aimed to establish connections rather than causal relationships, it is not possible to draw final findings. The level of education of expectant women is a significant factor influencing sociodemographic characteristics. In our investigation, we did not evaluate the socioeconomic and educational status of the expectant women. Nevertheless, due to its geographical positioning and expansive dimensions, our medical facility caters to a patient community that exhibits significant sociodemographic diversity.

The findings of our research indicate that pregnancies occurring during adolescence have significant risks in relation to fetal distress, oligohydramnios, preterm delivery, PROM, IUGR, and LBW. Adolescents are seemingly more susceptible to experiencing unfavorable pregnancy outcomes, including the birth of children with low birth weight and higher rates of infant death. Numerous negative socioeconomic consequences are associated with adolescent pregnancy for the mother, father, and child. As a limitation of study, we declare the study doesn't include racial demographic assessment. A large number of Syrian refugees are giving birth in Turkey. Based on various studies, it has been found that the obstetric and perinatal outcomes of pregnant Syrian refugees differ significantly from those of Turkish citizens. Syrian refugee women are at greater risk, particularly when it comes to early pregnancy during adolescence, premature birth, LBW, and anemia.[23,24] In addition, although the study was organized specifically on birth data, perinatal and postnatal outcomes could have been more included in the evaluations. It is recommended to evaluate this issue in future studies.

Healthcare practitioners should use caution when encountering an adolescent pregnant woman due to the heightened dangers involved. The prevention of adolescent pregnancies is a complex endeavor. The recommended approach entails the incorporation of comprehensive sexuality education, with an emphasis on promoting the delay of sexual activity among young adolescents, with the promotion of consistent and accurate utilization of efficacious contraceptive methods.

**Conflict of Interest**

The authors declare that there is not any conflict of interest regarding the publication of this manuscript.

**Ethics Committee Permission**

This study was approved by the Clinical Research Ethics Committee of Bakırköy Dr. Sadık Konuk Training and Research Hospital (dated 15/08/2022 and numbered 2022-16-07).

**Authors' Contributions**

Concept/Design: ME, UD, MCD. Data Collection and/or Processing: HKED, BG. Data analysis and interpretation: ÖA, ŞY, BG. Literature Search: UD, HKED. Drafting manuscript: UD, MCD, ŞY, BG, ÖA. Critical revision of manuscript: ŞY, ÖA, ME, HKED. Supervisor: ME, MCD, ÖA.

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