

## Original Article

## Is very advanced maternal age associated with increased prevalence of placenta previa?

Çok ileri anne yaşı, artmış plasenta previa prevalansı ile ilişkili midir?

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## Abstract

**Background:** Pregnancies of advanced maternal age have been increasing worldwide in recent years. Advanced maternal age pregnancies have adverse obstetric, perinatal, and neonatal outcomes. This study aims to investigate the frequency of placenta previa in pregnant women of very advanced maternal age and to examine the relationship between advanced maternal age and placenta previa using statistical methodologies.**Methods:** This retrospective study includes 140 pregnant women aged 46-48 years who applied to the hospital between September 2018 and December 2019 in our clinic. Patients were divided into two groups according to the mode of delivery: (i) normal vaginal delivery (NVD) (n=99) and (ii) cesarean section (C-section) (n=41). Demographic characteristics, pregnancy outcomes, C-Section rates, preterm delivery rates, fetal growth restriction rate, neonatal outcomes, and C-Section indications were recorded.**Results:** A significant difference was found in infant birth weight and the gestational week at delivery between the NVD and C-section groups ( $p<0.05$  for both). According to the independent samples t-test, infant birth weight was significantly higher in the NVD group compared to the C-section group ( $p<0.05$ ). Placenta previa was detected in 8 (19.5%) patients in the C-Section group.**Conclusion:** The results indicate that placenta previa, which is one of the location anomalies of the placenta, is more common in pregnancies of very advanced maternal age than in pregnancies of normal reproductive age and that having a less fertile uterus at an older age can cause to adverse pregnancy outcomes.**Keywords:** Advanced maternal age, Placenta previa, Normal vaginal delivery, Cesarean section

## ÖZ

**Amaç:** Son yıllarda dünya çapında ileri anne yaşındaki gebelikler artmaktadır. İleri anne yaşındaki gebeliklerin olumsuz obstetrik, perinatal ve neonatal sonuçları vardır. Bu çalışmanın amacı çok ileri anne yaşındaki gebelerde plasenta previa sıklığını araştırmak ve ileri anne yaşı ile plasenta previa arasındaki ilişkiyi istatistiksel yöntemlerle incelemektir.**Materiyal ve metod:** Bu retrospektif çalışma, kliniğimizde Eylül 2018 ile Aralık 2019 tarihleri arasında hastaneye başvuran 46-48 yaş arası 140 gebeyi içermektedir. Hastalar çalışma şekline göre iki gruba ayrılmıştır. doğum: (i) normal vajinal doğum (n=99) ve (ii) sezaryen (n=41). Demografik özellikler, gebelik sonuçları, Sezaryen oranları, erken doğum oranları, fetal büyüme geriliği oranı, neonatal sonuçlar ve Sezaryen endikasyonları kaydedildi.**Bulgular:** Normal vajinal doğum ve sezaryen grupları arasında bebeğin doğum ağırlığı ve doğumdaki gebelik haftası açısından anlamlı bir fark bulundu (her ikisi için  $p<0.05$ ). Bağımsız örneklem t-testine göre bebek doğum ağırlığı normal vajinal doğum grubunda sezaryen grubuna göre anlamlı olarak daha yüksekti ( $p<0.05$ ). Sezaryen grubunda 8 (%19,5) hastada plasenta previa saptandı.**Sonuç:** Sonuçlar, plasentanın yerleşim anomalilerinden biri olan plasenta previa'nın çok ileri anne yaşındaki gebeliklerde normal üreme çağındaki gebeliklere göre daha sık görüldüğünü ve ileri yaşta daha az fertil bir uterusu sahip olmanın olumsuz gebelik sonuçlarına neden olabileceğine işaret etmektedir.**Anahtar Kelimeler:** İleri anne yaşı, Plasenta previa, Normal vajinal doğum, Sezaryen

## INTRODUCTION

Working women prefer to give birth between the ages of 35 and 44 due to their desire to gain financial stability and their aim for a successful career, thus leading to a substantial increase in pregnancies at advanced maternal age. Furthermore, the failure of traditional family planning methods and housewives' desire to have a larger family has resulted in a rise in advanced maternal age in the regions with low socioeconomic status.

Although many researchers define advanced maternal age as an age of 35 years and above (1-6), the term "advanced maternal age" in the medical literature is often defined as an age over 40 years (7-10).

The birth rate of mothers aged 35 to 39 and 40 to 45 years is gradually increasing throughout the world, while this rate has notably increased within the last three years in women aged 35 to 40 years. In turn, these increasing trends lead to raised cesarean delivery rates and serious complications associated with advanced maternal age (11,12).

Placenta previa is a severe complication of pregnancy that caused adverse outcomes for maternal and fetal health, including adherence to the placenta, antepartum hemorrhage, intrauterine growth restriction, postpartum hemorrhage, malpresentation, preterm labor, septicemia, and thrombophlebitis (13) Therefore, pregnancies complicated by placenta previa have a higher risk for adverse maternal and neonatal outcomes (14).

The present study aims i) to evaluate the effect of very advanced maternal age which becomes a crucial social problem, on pregnancy and neonatal outcomes, ii) to investigate whether pregnancy outcomes, neonatal outcomes, and delivery patterns of pregnant women are associated with very advanced maternal age. These results will be beneficial for clinicians performing antenatal follow-ups of pregnant women at very advanced maternal age.

## Methods

### Research population and design

This single-center retrospective study included 140 pregnant women aged between 46-48 years who were followed up in our clinic between September 2018 and December 2019. Patients were divided into two groups according to the mode of delivery: (i) normal vaginal delivery (NVD) (n=99) and (ii) cesarean section (C-section) (n=41). Both groups were further divided into three subgroups according to maternal age: (1) 46 years, (2) 47 years, and (3) 48 years.

All criteria for inclusion were singleton pregnancy, age 46 years and over, non-smoking, ongoing use of iron, folic acid, multivitamin replacement, and regular antenatal pregnancy follow-up. Patients with prior use of Assisted Reproductive Techniques (ART) and those aged 45 years and younger were excluded from the study. Demographic characteristics, pregnancy outcomes, gestational week, infant birth weight, neonatal outcomes, mode of delivery, and C-Section indications were recorded for each patient.

### Statistical analysis

The data was analyzed using SPSS for Windows version 22.0 (Armonk, NY: IBM Corp.). The normal distribution of continuous variables was assessed using the Kolmogorov-Smirnov test. Continuous variables were expressed as mean  $\pm$  standard deviation, and categorical variables were expressed as frequencies (n) and percentages (%). Continuous variables were compared using the Independent Samples *t*-test, and categorical variables were compared using the Chi-square test. A *p*-value of <0.05 was considered significant.

## Results

The findings indicated a significant difference between the NVD and C-section groups in terms of infant birth weight and gestational week at delivery ( $p < 0.05$  for both) (Table 1). However, there was no significant difference concerning maternal age ( $p > 0.05$ ).

**Table 1. Distribution of delivery weeks**

Gestational week at delivery	C-Section (N=41)	NVD (N=99)
32	1 (2.4%)	0 (0%)
33	1 (2.4%)	0 (0%)
35	4 (9.8%)	1 (1%)
36	4 (9.8%)	3 (3%)
37	8 (19.5%)	31 (31.3%)
38	16 (39%)	46 (46.5%)
39	4 (9.8%)	12 (12.1%)
40	3 (7.3%)	6 (6.1%)

*C-Section: Cesarean Section, NVD: Normal vaginal delivery*

Independent Samples t-test showed that infant birth weight was significantly higher in the NVD group compared to the C-section group ( $p<0.05$ ) (Table 2).

**Table 2. Descriptive statistics and analysis results**

Maternal age (years)	C-Section (n=41)	NVD (n=99)	<i>p</i>
46	19 (46.3%)	53 (53.5%)	<sup>b</sup> 0.731
47	12 (29.3%)	22 (22.2%)	
48	7 (17.1%)	14 (14.1%)	
49	3 (7.3%)	10 (10.1%)	
Mean maternal age (years)	46.85 ± 0.96	46.81 ± 1.03	<sup>a</sup> 0.808
Mean infant birth weight (kg)	3055.4 ± 766.6	3360.1 ± 471.1	<sup>a</sup> 0.022*
Gestational week at delivery			
32-36	10 (24.4%)	4 (4.0%)	<sup>b</sup> 0.003*
37	8 (19.5%)	31 (31.3%)	
38	16 (39.0%)	46 (46.5%)	
39-40	7 (17.1%)	18 (18.2%)	

C-Section: Cesarean Section, NVD: Normal vaginal delivery, \* $p<0.05$ ;

<sup>a</sup> Independent Samples t-test; <sup>b</sup> Chi-square test

According to Chi-Square test results, no significant difference was found in the mode of delivery between the gestational weeks of 38 and 39-40, while the proportion of patients who gave delivery at the week of 37 was significantly higher in the NVD group compared to the C-section group (31.5% vs. 19.5%) ( $p<0.05$ ). In contrast, the rate of patients with a gestational period of 32-36 weeks was significantly higher in the C-section group compared to the NVD group (24.4% vs. 4%) ( $p<0.05$ ) (Tables 1 and 2). Among the C-Section indications, placenta previa was detected in 8 (19.5%) patients (Table 3).

**Table 3. Distribution of C-Section indications**

Cesarean indications	C-Section (N=41)
Previous C-Section	17 (41.5%)
Fetal distress	7 (17.1%)
Non-progressive labor	2 (4.9%)
Umbilical cord prolapse	1 (2.4%)
Breech presentation	3 (7.3%)
Placental abruption	1 (2.4%)
Placenta previa	8 (19.5%)
Preeclampsia	2 (4.9%)

## Discussion

Advanced maternal age is becoming more common nowadays, which increases the risk of complications during pregnancy. Uterine blood flow decreases, and uteroplacental perfusion impairs in line with the physiological changes were associated with aging. In turn, having a less fertile uterus at an older age all by itself contributes to higher risks of adverse pregnancy outcomes [15]. In this retrospective study, we examined the relationship between advanced maternal age and placenta previa using statistical methodologies, as well as to investigate the frequency of placenta previa in pregnant women of very advanced maternal age by evaluating obstetric, perinatal, and neonatal outcomes.

The greatest strength of the present study is its number of participants. Placenta previa is a rare pregnancy complication, and large sample size is needed to detect such a situation. Our data were obtained from Sanliurfa Training and Research Hospital, where the fertility rate is the highest in Turkey (4.29 children per woman) according to the 2017 data of the Turkish Statistical Institute and where 73,000 births occur annually (16).

Literature indicates that with advancing age, both uterine function and pelvic compliance decrease, leading to prolonged labor. This situation results in increased cesarean delivery rates (17). Our findings were consistent with literature showing that very advanced maternal age alone could form an indication for C-Section. One of the reasons for the increase in cesarean delivery rates in advanced maternal age pregnancies is the location anomalies of the placenta. Placenta previa comes on in 0.3% to 2% of women of reproductive age (6) and in 18.8% of women aged 35 or older (18). The results showed that the prevalence of placenta previa was significantly higher in advanced age pregnancies than the prevalence of pregnancies in women of reproductive

age reported by Bi et al. (19). In the present study, placenta previa was detected in 8 out of 41 patients in the C-Section group, which suggests that the frequency of placenta previa may be closely related to the increased maternal age. A meta-analysis including 23 different studies reported that there was a relationship between advanced maternal age and placenta previa (6). Our findings are compatible with this meta-analysis and underscore the necessity of recommending early diagnosis and adequate treatment to pregnant women in advanced stages of pregnancy. Although most studies conducted on advanced maternal age (7-11) have been included pregnant women over 35 years, only a few studies have investigated the association between very advanced maternal age (> 40) and placenta previa (18-20). In this respect, present study is of high value since it examined the pregnancy outcomes of pregnant women aged 46-48 years in a single center.

Available evidence suggests that advanced maternal age is associated with increased pregnancy complications and adverse neonatal outcomes, including cesarean delivery, preterm labor, low birth weight, preeclampsia, gestational diabetes, maternal mortality, and perinatal mortality (11,21-25). However, most studies have focused on the results of pregnancies over the age of 35 and 40, while the studies conducted with very advanced maternal age groups (>45 years) are highly limited. A study conducted in Australia evaluated the results of 217 pregnant women aged over 45 years (26), and another study evaluated 924 pregnant women aged over 45 years out of 367,417 pregnant women from 149 different Japanese tertiary hospitals (11). Accordingly, the present study is highly specific since it evaluated 140 pregnant women aged 46 and over from a single center.

In addition, most of studies available in the literature were published approximately 20 years ago (11,27-29). Today, both male and female infertility are highly common in the society and thus the need for ART is greater and couples spend huge amounts of time and money to achieve a healthy pregnancy. As a result, the proportion of advanced-age mothers in the general population increases day by day (30). Depending on the studies in the literature investigating the poor obstetric and neonatal outcomes of ART pregnancies, we did not include ART pregnancies in our study (31).

### Conclusion

Very advanced maternal age is associated with the increased risk of placenta previa and raised cesarean delivery rates. Therefore, further large-scale studies investigating advanced maternal age are needed to elucidate the adverse outcomes of very advanced maternal age.

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**Ethical Approval:** Ethical approval was obtained from Alaaddin Keykubat University Research Ethics Committee (Approval No: 10354421-2020/25-21), and signed informed consent was obtained from each participant. Study protocols were conducted following the principles of the Declaration of Helsinki and the principles of Good Clinical Practice.

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