

RESEARCH ARTICLE

Assessment of Birth and Perinatal Outcomes in Pregnant Women Aged 50 and Over

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Abstract

Introduction: This study aimed to evaluate birth and perinatal outcomes in pregnant women aged 50 years and older, a rarely studied and high-risk demographic group.

Methods: This retrospective study included 24 pregnancies in women aged ≥ 50 who delivered at Ankara Bilkent City Hospital between January 2019 and March 2025. Data were collected on maternal demographics, obstetric history, pregnancy complications, delivery characteristics, and neonatal outcomes.

Results: Out of 44,136 total births, 24 (0.054%) occurred in women aged 50 or older. The median maternal age was 50.5 years. Chronic comorbidities were present in 41.7%, with hypothyroidism, type 2 diabetes, and asthma being most common. Half of the cohort experienced pregnancy-related complications, primarily gestational diabetes and hypertension (16.6% each). Cesarean delivery was performed in 79.2% of cases. Preterm birth and low birth weight occurred in 37.5% of deliveries. Neonatal intensive care unit (NICU) admission was required in 58.3% of newborns, with a median stay of 2 days. Trisomy 21 was diagnosed prenatally in two cases through amniocentesis. Most pregnancies were spontaneous (75%); 25% followed assisted reproductive techniques, including conventional IVF (12.5%), frozen embryo transfer (8.3%), and oocyte donation (4.2%).

Conclusion: Pregnancies in women aged 50 years and older are associated with high rates of maternal and neonatal complications, including preterm birth, low birth weight, and NICU admission. The findings highlight the need for individualized prenatal care, comprehensive counseling, and close perinatal monitoring to mitigate risks in this growing but vulnerable population.

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Introduction

Advances in assisted reproductive technologies (ART) and improvements in maternal health-care have enabled women to conceive and deliver at increasingly advanced ages. Although pregnancies in women over the age of 35, classified as advanced maternal age, have been extensively studied, conception and childbirth at or beyond the age of 50 remain rare and are often associated with substantial maternal and perinatal risks.^{1,2} In recent decades, the number of such pregnancies has increased, largely due to oocyte donation, in-vitro fertilization (IVF), and embryo cryopreservation.^{3,4}

Pregnancy at very advanced maternal age is physiologically challenging. Natural fertility declines sharply after the age of 40, with spontaneous conception beyond 50 years being exceptionally rare.⁵ When conception does occur, either spontaneously or through ART, older mothers face higher rates of complications such as gestational hypertension, preeclampsia, gestational diabetes, and placental abnormalities.⁶ Perinatal risks are also heightened, including preterm birth, low birth weight (LBW), intrauterine growth restriction, and increased rates of neonatal intensive care unit (NICU) admission.^{3,4}

While the obstetric outcomes of women in their 40s have been investigated in large cohorts, there is limited literature specifically examining pregnancies in women aged 50 years and above. The rarity of such pregnancies means that most evidence is derived from small case series or single-center retrospective studies, often with heterogeneous populations and clinical practices.^{2,7,8} Furthermore, the interplay between age-related comorbidities, the higher prevalence of ART, and the unique physiological demands of pregnancy at this age remain incompletely understood.

In Turkey, data on pregnancies in women aged 50 years and older are scarce. Given the growing accessibility of ART and shifting sociocultural attitudes toward delayed childbearing, it is important to characterize the clinical profiles, pregnancy complications, and neonatal outcomes in this demographic. The present study aims to describe the demographic features, obstetric histories, maternal complications, delivery characteristics, and perinatal outcomes of pregnant women aged 50 years and older who delivered at a tertiary referral hospital over a six-year period.

Material and Methods

Design and study population

This study was conducted at the Perinatology Clinic of Ankara Bilkent City Hospital between January 2019 and March 2025. Institutional review board approval was obtained from the Ethics Committee of the Republic of Turkey Ministry of Health Ankara City Hospital (Approval number: TABED 1-25-1575; Date of approval: 13.08.2025). All stages of the study adhered to the principles of the Declaration of Helsinki.

The study included pregnant women aged 50 years or older who were followed up in the inpatient services of the high-risk pregnancy unit and delivered at the hospital. A retrospective review of hospital records was conducted to collect comprehensive data on all cases. This included demographic characteristics (age, smoking status, and presence of chronic illnesses), body mass index (BMI, [calculated by dividing weight in kilograms by the square of height in meters]), obstetric history (gravida, parity, history of abortion, number of living children, and history of vaginal bleeding), and use of assisted reproductive technologies. Information on the presence of multiple pregnancies, prenatal screening results (e.g., non-invasive prenatal testing [NIPT]), antenatal follow-up processes, and indications for labor (e.g., spontaneous onset, induction for maternal or fetal indications, or elective cesarean delivery) was recorded. Additional data included whether invasive diagnostic procedures (e.g., amniocentesis) or detailed second-trimester ultrasonographic evaluations were performed. Obstetric complications, placental pathologies (e.g., placenta previa, abruption, accreta spectrum), gestational age at delivery, and birth weight were also documented. Perinatal outcomes such as 1- and 5-minute APGAR scores, umbilical cord blood pH, neonatal intensive care unit (NICU) admission status, and duration of NICU stay were systematically extracted. Preterm birth was defined as delivery occurring before 37 completed weeks of gestation.⁹ LBW was defined as a birth weight below 2500 grams.¹⁰

All patients were managed under high-risk pregnancy protocols. Low-dose aspirin (100 mg/day) was initiated before 16 weeks for preeclampsia prevention.¹¹ Gestational diabetes screening was performed between 24–28 weeks using either a two-step method (50 g glucose challenge test followed by a 100 g OGTT if positive) or a one-step 75 g OGTT,

depending on clinician preference and patient characteristics. Fetal surveillance included serial growth ultrasounds every 3–4 weeks and non-stress testing starting at 32 weeks. Follow-up visits occurred every 2–3 weeks in the second trimester and weekly thereafter. Antenatal corticosteroids and magnesium sulfate were administered when preterm birth was anticipated. Delivery was generally planned between 37–39 weeks unless earlier intervention was clinically indicated.

Statistical analysis

Statistical Package for Social Sciences (SPSS version 26.0; Chicago, IL, USA) was utilized for data analysis. Median (interquartile range [IQR]) or mean±standard deviation represented continuous variables, while counts (percentages, %) measured categorical variables. The study assessed the normal distribution of variables through the Kolmogorov–Smirnov test.

Results

During the study period, a total of 44,136 births were recorded at the hospital, of which 24 were to mothers aged 50 years or older, representing a prevalence of approximately 0.054%. The median age of the cases is 50.5 (IQR 12). Chronic diseases were present in 41.7%, most commonly hypothyroidism (12.5%), type 2 diabetes (8.3%), and asthma (8.3%). Smoking was reported by 12.5%. Median gravida and parity were 4 (IQR 5) and 2 (IQR 5), respectively.

Cesarean delivery occurred in 79.16%, with a median gestational age at delivery of 37 weeks (IQR 4). Preterm birth and LBW each occurred in 37.5%. Mean birth weight was 2799.4 ± 888 g. Median APGAR scores were 7 (IQR 1) and 9 (IQR 1) at 1 and 5 minutes, respectively. NICU admission was required in 58.3% of newborns, including 11 who were monitored for at least 10 days due to postnatal respiratory distress syndrome. The median NICU stay for all admitted newborns was 2 days (IQR 9). Detailed information on the clinical and demographic characteristics of pregnant women aged 50 years and older and their perinatal outcomes are presented in Table 1.

Table 1. Clinical and demographic characteristics and perinatal outcomes of pregnant women aged 50 years and older

Cases (n=24)	
Demographic characteristics	
Age	50.5(12)
BMI (kg/m ²)	29.1(5.1)
Maternal chronic diseases	10(41.7%)
Smoking	3(12.5%)
Gravida	4(5)
Parity	2(5)
History of abortion	0(2)
Number of living children	2(4)
Antenatal period	
Combined first-trimester screening	13(54.2%)
NIPT	2(8.3%)
Amniocentesis	2(8.3%)
Mid-trimester obstetric US	10(41.7%)
Aneuploidy (Trisomy 21)	2(8.3%)
Obstetric and perinatal outcomes	
Cesarean section	19(79.16%)
GA at delivery (weeks)	37(4)
Preterm birth	9(37.5%)
Low birth weight (<2500g)	9(37.5%)
Birth weight (g)	2799.4±888
APGAR score (1st min.)	7(1)
APGAR score (5th min.)	9(1)
Umbilical cord arterial pH	7.34(0.11)
NICU admission	14(58.3%)
NICU hospitalization (day)	2(9)

BMI: body mass index, GA: gestational age, NICU: neonatal intensive care unit, NIPT: non-invasive prenatal testing, US: ultrasound.

Values are presented as mean ± standard deviation, median (IQR) or number (percentage).

Combined first-trimester screening tests were performed in 54.2% of cases. Only two women agreed to undergo prenatal diagnostic testing, both with singleton pregnancies. Amniocentesis was performed in both. In one case, the first trimester prenatal screening test revealed both an age-related risk and a trisomy 21 risk greater than 1/50, and mid-trimester obstetric ultrasound detected inlet and muscular ventricular septal defects in the fetal heart. In the second case, the NIPT result indicated a high risk for trisomy 21, and the first-trimester ultrasound raised suspicion of an atrioventricular septal defect, which was confirmed in a subsequent scan. Prenatal diagnostic testing in both pregnancies confirmed trisomy 21. No aneuploidy has been detected in any newborns except for these cases.

Pregnancy complications affected 50%, including gestational diabetes and hypertension (16.6% each), placental pathologies (12.5%), intrahepatic cholestasis (12.5%), antenatal bleeding (8.3%), preeclampsia (8.3%), fetal growth restriction (8.3%), and PPROM (4.2%). Among cesarean indications (n=19), the most frequent were prior cesarean (25%) and non-reassuring fetal heart tracing (20.8%), followed by severe preeclampsia (12.5%), multiple gestation (12.5%), and prior myomectomy (8.3%) (Table 2).

Table 2. Chronic and obstetric comorbidities and indications for cesarean section in pregnant women aged 50 years and older

Cases (n=24)		
	n	%
Maternal chronic diseases:10		
Hypothyroidism	3	12.5%
Type 2 diabetes mellitus	2	8.3%
Asthma	2	8.3%
Hypertension	1	4.2%
Malignancy	1	4.2%
Hepatitis C	1	4.2%
Obstetric complications:12		
Gestational diabetes	4	16.6%
Class A1	1	4.2%
Class A2	3	12.5%
Gestational hypertension	4	16.6%
Placental pathologies	3	12.5%
Placental hematoma	1	4.2%
Placenta previa	2	8.3%
Antenatal vaginal bleeding	2	8.3%
Intrahepatic cholestasis	3	12.5%
Preeclampsia	2	8.3%
Fetal growth restriction	2	8.3%
PPROM	1	4.2%
Cesarean indications:19		
Prior cesarean section	6	25%
Non-reassuring fetal heart tracing	5	20.8%
Severe preeclampsia	3	12.5%
Multiple gestation	3	12.5%
Prior myomectomy	2	8.3%

PPROM: preterm premature rupture of membranes.

Most pregnancies were spontaneous (75%); 25% followed ART, including conventional IVF (12.5%), frozen embryo transfer (8.3%), and oocyte donation (4.2%). Singleton pregnancies comprised

75%, twins 20.8%, and triplets 4.2%, with one multi-fetal reduction performed (Table 3). The case of a dichorionic triamniotic triplet pregnancy resulted in two newborns being monitored for transient tachypnea after birth, while one newborn required a 28-day NICU stay for neonatal sepsis. In another case, a woman with preterm premature rupture of membranes at 30 weeks underwent cesarean delivery at 32 weeks due to severe preeclampsia; the newborn developed retinopathy of prematurity and required a 41-day NICU stay.

Table 3. Pregnancy characteristics and number of fetuses in pregnant women aged 50 years and older

Cases (n=24)			
		n	%
Pregnancy characteristics			
Spontaneous		18	75%
ART pregnancies		6	25%
	Conventional IVF	3	12.5%
	Frozen embryo transfer	2	8.3%
	IVF with oocyte donation	1	4.2%
Number of fetuses in pregnancies			
Singleton		18	75%
Twin		5	20.8%
	Dichorionic diamniotic	3*	12.5%
	Monochorionic diamniotic	1	4.2%
	Monochorionic monoamniotic	1	4.2%
Triplet		1	4.2%
	Dichorionic triamniotic	1	4.2%

ART: assisted reproductive techniques, IVF: in-vitro fertilization.

* In one case, a triplet gestation underwent multifetal pregnancy reduction during the first trimester.

Discussion

This study presents one of the few datasets from Turkey evaluating obstetric risks and perinatal outcomes in women aged 50 years and older, a population in which pregnancy is rare but appears to be increasing with the wider availability of ART. In our cohort, such pregnancies accounted for 0.054% of all births over a six-year period, similar to the low prevalence reported in prior studies from other regions.^{3,8}

Consistent with previous literature, the majority of women in this age group had significant comorbidities, particularly hypothyroidism, type 2 diabetes, and asthma.^{3,6,7} Maternal age-related chronic conditions likely contribute to the elevated risk of pregnancy complications observed in this population. Half of our cohort developed obstetric complications, most

commonly gestational diabetes and gestational hypertension, which aligns with prior studies showing a two- to three-fold increase in these conditions among women of very advanced maternal age.^{2,6,8}

The cesarean section rate in our study was high (79.16%), comparable to reports by Paulson et al.¹ and Kort et al.⁷, where rates exceeded 80%. The leading indications, previous cesarean section and non-reassuring fetal heart tracing, reflect both the high prevalence of prior uterine surgery in this population and cautious obstetric management due to perceived fetal and maternal risks.

Perinatal outcomes were notable for a 37.5% incidence of preterm birth and LBW, in line with earlier findings from Salihu et al.³ and Maoz-Halevy et al.⁸, who reported preterm delivery rates between 30–45% in women ≥ 50 years. In addition, Simchen et al.¹² found that women aged ≥ 50 had significantly higher rates of preterm birth, LBW, and NICU admission compared with women aged 40–49, even after adjusting for parity and ART use. NICU admission was required in 58.3% of neonates, a figure higher than in general obstetric populations but consistent with the increased burden of respiratory distress and other complications in this age group. In our cohort, 11 newborns required NICU monitoring for ≥ 10 days due to respiratory distress syndrome, underscoring the vulnerability of infants born to very advanced-age mothers.

Aneuploidy risk is a key concern in this demographic. While most of our cohort did not undergo invasive prenatal testing, both women who consented to amniocentesis were found to have fetuses with trisomy 21, consistent with the established age-related increase in chromosomal abnormalities.^{5,6} This finding supports previous recommendations for thorough counseling and offering diagnostic testing to women of advanced maternal age.^{2,5}

Of note, our study included two illustrative cases highlighting the potential severity of neonatal complications: one dichorionic triamniotic triplet pregnancy complicated by neonatal sepsis and another case of preterm premature rupture of membranes followed by severe preeclampsia, in which the newborn developed retinopathy of prematurity requiring prolonged NICU care. Such cases illustrate that in addition to baseline risk factors, multifetal gestations and pregnancy complications can further worsen outcomes in this population.

It is important to note that oocyte donation is

legally prohibited in Turkey, in accordance with national regulations governing assisted reproductive technologies.¹³ Despite this restriction, one case in our study involved a pregnancy achieved through oocyte donation performed abroad. The patient, a 52-year-old woman with a history of primary infertility, underwent embryo transfer using a donor oocyte in a foreign clinic and returned to Turkey for antenatal follow-up and delivery. She delivered by cesarean section due to an unreassuring fetal heart rate trace during the term period. This case underscores the complex ethical, legal, and clinical challenges posed by cross-border reproductive care and highlights the need for standardized counseling and follow-up protocols for patients engaging in fertility treatments abroad.

Our findings are consistent with the broader literature in showing that pregnancies at age ≥ 50 are associated with high maternal and perinatal morbidity. While ART has enabled conception in this age group, it also carries a higher likelihood of multiple pregnancies, which independently increases obstetric risk.^{4,7} This reinforces the importance of careful embryo transfer policies and individualized counseling.

The main strengths of this study include the focus on a rare and understudied population, detailed clinical documentation, and inclusion of both spontaneous and ART-conceived pregnancies. Limitations include its retrospective single-center design, the small sample size inherent to the rarity of the condition, and the absence of a younger control group for direct outcome comparison. The limited number of cases restricts the statistical power of subgroup analyses and may not capture the full spectrum of clinical variability in this population. As the number of pregnancies in women aged ≥ 50 continues to rise with the increased use of ART, the findings presented here may be revisited and strengthened through future studies with larger, multicenter cohorts.

Conclusion

The pregnancies in women aged 50 years and older carry substantial risks for both mother and newborn, with high rates of obstetric complications, cesarean delivery, preterm birth, and NICU admission. These findings highlight the importance of preconception counseling, close antenatal surveillance, and multidisciplinary perinatal care for this growing but high-risk patient population.

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