



# Retrospective Analysis of Maternal and Perinatal Outcomes in Late Term Pregnancies

## Geç Term Gebeliklerin Maternal ve Perinatal Sonuçlarının Retrospektif Analizi

✉ Damla Yasemin Yenliç Kay<sup>1</sup>, ✉ Yücel Kaya<sup>2</sup>, ✉ Veli Mihmanlı<sup>3</sup>, ✉ Murat İbrahim Toplu<sup>3</sup>, ✉ Yağmur Ölmez<sup>4</sup>

<sup>1</sup>Medipol University Esenler Hospital, Department of Obstetrics and Gynecology, İstanbul, Turkey

<sup>2</sup>University of Health Sciences Turkey, Antalya Training and Research Hospital, Clinic of Perinatology, Antalya, Turkey

<sup>3</sup>University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital, Clinic of Obstetrics and Gynecology, İstanbul, Turkey

<sup>4</sup>Bahçelievler State Hospital, Clinic of Obstetrics and Gynecology, İstanbul, Turkey

### Abstract

**Objective:** The purpose of this study was to evaluate the maternal and perinatal outcomes of pregnancies beyond 40 weeks gestation.

**Method:** The study included 476 patients who gave birth between October 2016 and October 2017 at the Obstetrics and Gynecology Clinic of Prof. Dr. Cemil Taşcıoğlu City Hospital, University of Health Sciences Turkey. Of the patients included in the study, 342 had delivered between 40<sup>0/7</sup> and 40<sup>6/7</sup> gestational weeks, 115 between 41<sup>0/7</sup> and 41<sup>6/7</sup> gestational weeks, and 19 between 42<sup>0/7</sup> and 42<sup>6/7</sup> gestational weeks. Statistical analysis was conducted using the SPSS software, Windows version 24.0, and a p-value <0.05 was considered statistically significant.

**Results:** In our study, we found that maternal and perinatal outcomes, excluding cesarean deliveries, had a similar distribution across the weeks. The cesarean delivery rates for primiparous patients were significantly higher than those for multiparous patients between 40<sup>0/7</sup> and 41<sup>0/7</sup> weeks of gestation, but similar results were obtained at 42 weeks. There was no significant association between maternal age and maternal outcome. For pregnancies in women under 18 years of age, the need for a neonatal intensive care unit was significantly increased compared to other age groups. Primiparity and male fetus were associated with adverse maternal and perinatal outcomes.

**Conclusion:** There was no significant difference in adverse maternal and perinatal outcomes between 40<sup>0/7</sup> and 42<sup>6/7</sup> gestational weeks. However, the cesarean section rate was significantly increased at 40 weeks of gestation and in primiparous patients. In addition, primiparity

### Öz

**Amaç:** Bu çalışmanın amacı 40 hafta ve üzeri gebeliklerin maternal ve perinatal sonuçlarının değerlendirmektir.

**Yöntem:** Sağlık Bilimleri Üniversitesi, Prof. Dr. Cemil Taşcıoğlu Şehir Hastanesi, Kadın Hastalıkları ve Doğum Kliniği'nde Ekim-2016 ile Ekim-2017 yılları arasında doğum yapan 476 hasta çalışmaya dahil edildi. Çalışmaya alınan hastaların 342'si 40<sup>0/7</sup> ile 40<sup>6/7</sup> gebelik haftası arasında, 115'i 41<sup>0/7</sup> ile 41<sup>6/7</sup> gebelik haftası arasında, 19'u 42<sup>0/7</sup> ile 42<sup>6/7</sup> gebelik haftası arasında doğumunu gerçekleştirmişti. İstatistiksel analizler için SPSS Windows version 24.0 paket programı kullanılmış ve p<0,05 istatistiksel olarak anlamlı kabul edildi.

**Bulgular:** Çalışmamızda sezaryen doğum hariç maternal ve perinatal sonuçlar haftalara göre dağılımını benzer bulduk. Primipar hastaların multipara göre sezaryen doğum oranları 40<sup>0/7</sup>'den 41<sup>0/7</sup>'ye kadar olan gestasyonel haftada anlamlı olarak daha yüksek bulundu, ama 42 haftada benzer sonuç elde edildi. Maternal yaş ile maternal sonuçlar arasında anlamlı bir bağlantı saptanmadı. On sekiz yaş altı gebeliklerde diğer yaş gruplarına göre yenidoğan yoğun bakım ünitesi ihtiyacı anlamlı olarak artmıştı. Primiparite ve erkek fetüs olumsuz maternal ve perinatal sonuçlarla birliktelik gösterdi.

**Sonuç:** 40<sup>0/7</sup> ile 42<sup>6/7</sup> gebelik haftaları arasında olumsuz maternal ve perinatal sonuçlarda belirgin fark bulunmamıştır. Ancak 40. gebelik haftasında ve primipar hastalarda sezaryen oranı anlamlı olarak artmıştır. Ek olarak, primiparitenin belirgin olumsuz maternal sonuçlarla birlikte gösterdiği ve ayrıca erkek yenidoğan cinsiyetinin hem olumsuz



**Address for Correspondence:** Yücel Kaya, University of Health Sciences Turkey, Antalya Training and Research Hospital, Clinic of Perinatology, Antalya, Turkey

**E-mail:** yucekaya0007@gmail.com **ORCID:** orcid.org/0000-0003-4597-2922 **Received:** 28.12.2023 **Accepted:** 27.02.2024

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## Abstract

was associated with significant adverse maternal outcomes, and male neonate gender was associated with both adverse maternal and adverse perinatal outcomes.

**Keywords:** Maternal-fetal relations, pregnancy complications, pregnant woman, prolonged pregnancy

## Öz

maternal sonuçlarla hem de olumsuz perinatal sonuçlarla beraber olduğu saptanmıştır.

**Anahtar kelimeler:** Gebe kadın, gebelik komplikasyonları, maternal-fetal ilişkiler, uzamış gebelik

## Introduction

Postterm pregnancies, considered to have exceeded the normal upper limit of gestational age, have been a subject of debate and discussion, ranging from nomenclature to definition, incidence, pathophysiology, monitoring, management, and mode of delivery preference. The American College of Obstetricians and Gynecologists (ACOG) has introduced a new classification in their definitions. According to ACOG, gestational ages are categorized as follows: Early term for pregnancies between 37<sup>0/7</sup> and 38<sup>6/7</sup> weeks of gestation from the first day of the last menstrual period (LMP), full term for pregnancies between 39<sup>0/7</sup> and 40<sup>6/7</sup> weeks of gestation, a late term for pregnancies between 41<sup>0/7</sup> and 41<sup>6/7</sup> weeks of gestation, and postterm for pregnancies beyond 42 weeks (1).

The most common risk factor for late term and postterm pregnancies is a history of postterm pregnancy (2). Many risk factors for post-term pregnancy, such as nulliparity, male fetus, and maternal obesity, are supported by observational studies. Although their exact physiological reasons are not known, some fetal diseases, such as anencephaly and placental sulfatase deficiency, are also associated with postterm pregnancy (1).

Many studies have shown that late term and postterm pregnancies are associated with increased perinatal morbidity and mortality. In postterm pregnancies, maternal risk, the risk of intrauterine death, perinatal asphyxia, shoulder dystocia, and neonatal mortality are increased (3). In pregnancies that go beyond term, the fetus continues to grow while the placenta-fetus ratio decreases. This situation can lead to impaired substrate transfer to the fetus and, ultimately result in fetal hypoxia. Observational studies that examine the relationship between an increase in gestational weeks and maternal and obstetric complications have also shown an increase in severe perineal tears, infections, postpartum bleeding, and cesarean deliveries in late term and postterm pregnancies (1,4). Hence, the management of patients between 40<sup>0/7</sup> and 42<sup>6/7</sup> weeks of gestation appears to be an essential problem for clinicians.

This study aimed to evaluate maternal and perinatal outcomes of pregnancies over 40 weeks of gestation.

## Materials and Methods

### Study Population

The study was conducted in the obstetrics and gynecology clinic of the University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital. Approval for the study was obtained from the Ethics Committee of the same institution under protocol number 786 on December 19, 2017. The patient files and records of 3907 patients who gave birth between October 2016 and October 2017 were obtained from the Hospital Information Management System and were retrospectively analyzed.

The gestational age of all patients was calculated using LMP and early ultrasound (US) data. Patients with undetermined gestational age, those with a history of cesarean section, pregnancies with non-cephalic presentation, multiple pregnancies, pregnancies with congenital fetal anomalies, placenta previa, placental abruption, and those diagnosed with severe preeclampsia were excluded from the study. The remaining 476 patients were included in the study, with 342 of them between 40<sup>0/7</sup> and 40<sup>6/7</sup> weeks, 115 between 41<sup>0/7</sup> and 41<sup>6/7</sup> weeks, and 19 were 42 weeks or beyond.

From the hospital data system and patient files, maternal age, number of parities, LMP, chronic diseases, US and non-stress test (NST) data, mode of delivery, maternal hemogram values at the time of hospitalization and hospital extirpation, indications for cesarean delivery, maternal blood transfusion requirements, maternal intensive care unit (ICU) needs, neonatal genders, neonatal 1<sup>st</sup> and 5<sup>th</sup> minute Apgar scores, meconium-stained amniotic fluid status, birth trauma, birth weight, NICU needs and stillbirth data were recorded.

### Gestational Age Calculation

Gestational age calculation was done based on LMP and US measurements taken between the 6<sup>th</sup> and 12<sup>th</sup> weeks of pregnancy. If there was consistency between LMP and US

measurements, LMP was employed to calculate gestational age. In instances of inconsistency or when the patient's LMP information was unavailable, gestational age was determined based on US measurements taken between the 6<sup>th</sup> and 12<sup>th</sup> week.

### Study Design

As per the protocol of the Department of Obstetrics and Gynecology at University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital, all pregnant women beyond 41 weeks of gestation are interned. Pregnant women between 40<sup>0/7</sup> and 40<sup>6/7</sup> gestational weeks are called for follow-up every 2 days and evaluated with NST and US.

Cesarean delivery, operative vaginal delivery, postpartum blood loss of more than 1000 cc, need for blood transfusion, patients with non-severe preeclampsia and maternal ICU requirement were defined as composite adverse maternal outcomes. The amount of blood loss was calculated by comparing the complete blood count of the patient upon admission to the hospital and after discharge and each 1 unit decrease in hemogram was calculated as 500 mL blood loss.

Meconium-stained amniotic fluid, 1<sup>st</sup> and 5<sup>th</sup> minute Apgar scores, birth trauma, birth weight, NICU requirement and stillbirth were specified as composite adverse perinatal outcomes. Those with a 1<sup>st</sup> minute Apgar score below 4 and a 5<sup>th</sup> minute Apgar score below 7 were grouped. According to birth weight, newborns were further grouped as below 2500 g and above 4000 g. The routine practice in our hospital does not involve the measurement of cord blood gas pH in all newborns; hence, this factor was not included in the study.

### Statistical Analysis

The conformity of the data to normal distribution was tested with the Shapiro-Wilk test. The independent samples t-test was used to compare normally distributed characteristics between the two independent groups, while the Mann-Whitney U test was employed for non-normally distributed characteristics. Additionally, for comparing numerical data among more than two independent groups, One-Way Analysis of Variance and least significant difference post hoc tests were used for normally distributed features, and the Kruskal-Wallis test and All pairwise multiple comparison tests were employed for non-normally distributed characteristics. The relationship between categorical variables was analyzed using the chi-squared test. Descriptive statistics including mean  $\pm$  standard deviation for numerical variables and counts

with percentages for categorical variables were provided. Statistical analyses were performed using the SPSS software version 24.0 for Windows, and a significance level of  $p < 0.05$  was considered statistically significant.

## Results

### Patient Population

Out of the 3.907 patient files examined, 476 patients were included in the study, with 342 patients (71.8%) giving birth between 40<sup>0/7</sup> and 40<sup>6/7</sup> weeks of gestation, 115 patients (24%) between 41<sup>0/7</sup> and 41<sup>6/7</sup> weeks, and 19 patients (4%) between 42<sup>0/7</sup> and 42<sup>6/7</sup> weeks of gestation. The age of the patients included in the study ranged from 14 to 43 years, with a mean age of 26.78 $\pm$ 5.44. Age ranged between 14 and 42 years for women between 40<sup>0/7</sup> and 40<sup>6/7</sup> gestational weeks with a mean of 26.84 $\pm$ 5.46, between 18 and 39 years for women between 41<sup>0/7</sup> and 41<sup>6/7</sup> gestational weeks with a mean of 26.56 $\pm$ 5.09, between 19 and 43 years for women between 42<sup>0/7</sup> and 42<sup>6/7</sup> gestational weeks with a mean of 27.11 $\pm$ 7.13. There were 6 patients (1.2%) under 18 years old, 421 patients (88.4%) were between 18-34 years old, and 49 patients (10.2%) were older than 35 years. There was no significant difference observed among maternal age groups in terms of gestational weeks (Table 1).

Of 476 patients, 219 (46%) were nulliparous, 257 (54%) were multiples and the number of parities ranged between 1 and 8 with a mean of 2.03 $\pm$ 1.2. According to gestational weeks, 150 (43.8%) were nulliparous and 192 (56.1%) were multiparous between 40<sup>0/7</sup> and 40<sup>6/7</sup> gestational weeks, 62 (53.9%) were nulliparous and 53 (46%) were multiparous between 41<sup>0/7</sup> and 41<sup>6/7</sup> gestational weeks, 7 (36.8%) were nulliparous and 12 (63.1%) were multiparous above 42 gestational weeks. There was no statistically significant relationship between parity status and gestational weeks (Table 1).

Out of the patients included in the study, 13 (2.7%) had gestational diabetes, 10 (2.1%) had gestational hypertension, 22 (4.6%) had thyroid disorders, 34 (7.1%) had other conditions such as hematological and orthopedic disorders, while 397 patients (83.4%) had no known medical conditions. Statistically similar results were obtained between medical history and gestational weeks (Table 1).

### Maternal Outcomes

Statistical analysis revealed a statistically significant difference only in the group of patients who underwent a cesarean section when maternal outcomes were compared by gestational weeks ( $p < 0.05$ ) (Table 2). There was a higher

rate of cesarean section (19.2%) among the 66 patients who gave birth between 40<sup>0/7</sup> and 40<sup>6/7</sup> weeks of gestation when compared to other gestational weeks. When the cesarean section status was analyzed according to parity status, 43 (65.2%) primiparous patients between 40<sup>0/7</sup> and 40<sup>6/7</sup> gestational weeks, 38 (84.4%) patients between 41<sup>0/7</sup> and 41<sup>6/7</sup> gestational weeks, and 1 (20%) patient beyond 42 gestational weeks delivered by cesarean section, respectively. The cesarean section rates for primiparous patients were significantly higher compared to multiparous patients between 40<sup>0/7</sup> to 40<sup>6/7</sup> and 41<sup>0/7</sup> to 41<sup>6/7</sup> gestational weeks, but similar results were obtained for gestational weeks 42 and beyond (Table 3).

When examining the indications for cesarean section, 30 patients (6.3%) had fetal distress, 5 patients (1.1%) had maternal factors, 34 patients (7.1%) had arrested labor, 12 patients (2.5%) had cephalopelvic disproportion, 33 patients (6.9%) had macrosomic infants, and 2 patients (0.4%) had non-severe preeclampsia. No statistically significant difference was found between indications for cesarean section and gestational weeks (Table 4).

Maternal mortality, eclampsia, chorioamnionitis and endometritis were not observed in any of the patients Postpartum >1000 cc bleeding was observed in 83 patients (17.4%), and blood transfusions were administered to 24 patients (5%). One patient (0.8%) at 41 weeks of gestation

**Table 1. Patient characteristics**

	Gestational week								p
	40 (n=342)		41 (n=115)		42 (n=19)		Total (n=476)		
	n	%	n	%	n	%	n	%	
Maternal age range									0.414
<18	6	1.7	0	0	0	0	6	1.2	
18-34	299	87.4	106	92.1	16	84.2	421	88.4	
≥35	37	10.8	9	7.8	3	15.7	49	10.2	
Parity									0.124
Primiparous	150	43.8	62	53.9	7	36.8	219	46.0	
Multiparous	192	56.1	53	46.0	12	63.1	257	53.9	
Disease									0.377
Gestational DM	11	3.2	2	1.7	0	0	13	2.7	
Gestational HT	9	2.6	1	0.8	0	0	10	2.1	
Thyroid disease	14	4.0	8	6.9	0	0	22	4.6	
Other	28	81.8	6	5.2	0	0	34	7.1	
None	280	81.8	98	85.2	19	100	397	83.4	

DM: Diabetes mellitus, HT: Hypertension

**Table 2. Evaluation of maternal outcomes according to gestational weeks**

	Gestational week								p
	40 (n=342)		41 (n=115)		42 (n=19)		Total (n=476)		
	n	%	n	%	n	%	n	%	
Cesarean section	66	19.2	45	39.1	5	26.3	116	24.3	<0.001 <sup>a</sup>
Operative vaginal delivery	2	0.5	1	0.8	0	0	3	0.6	0.888
Postpartum hemorrhage (>1000 cc)	53	15.4	28	24.3	2	10.5	83	17.4	0.069
Need for blood transfusion	15	4.3	8	6.9	1	5.2	24	5.0	0.552
Preeclampsia <sup>b</sup>	3	0.8	1	0.8	0	0	4	0.8	0.92
Maternal ICU admission	0	0	1	0.8	0	0	1	0.2	0.207

<sup>a</sup>: p-value <0.05 was considered statistically significant, <sup>b</sup>: Non-severe preeclampsia, ICU: Intensive care unit

required admission to the maternal ICU due to HELLP syndrome. In 4 patients (0.8%), non-severe preeclampsia was observed, while 3 patients (0.6%) had operative vaginal deliveries (Table 2).

In our study, no statistically notable difference was found between maternal age and adverse maternal outcomes. When we evaluated the relationship between parity status and maternal outcomes, we found that the composite adverse maternal outcome, operative vaginal delivery, postpartum bleeding >1000 cc and need for blood transfusion were statistically significantly higher in primiparous patients compared to multiparous patients ( $p<0.05$ ). In the comparison between male and female fetuses, it was found to be statistically significant that male fetuses had a higher incidence of compound adverse maternal outcomes and cesarean section deliveries ( $p<0.05$ ) (Table 5).

### Perinatal Outcomes

Of all neonates, 246 (51.7%) were male and 230 (48.3%) were female, and there was no statistical relationship between

gestational age at birth and neonatal sex. The mean birth weight of the newborn was  $3498.76\pm 437.04$  g, and no statistically significant correlation was found between gestational weeks and birth weights (Table 6).

An analysis of 1-minute and 5-minute Apgar scores, the presence of meconium-stained amniotic fluid, birth trauma, and the necessity for NICU did not reveal any statistically significant differences concerning gestational weeks (Table 6). Since no stillbirths were observed among the patients included in the study, it could not be calculated whether there was a significant association with the weeks of gestation.

The analysis of the relationship between maternal age and perinatal outcomes revealed a statistically significant association only with the need for NICU admission ( $p<0.05$ ). Particularly, in pregnancies involving individuals under the age of 18, the need for NICU admission was significantly higher compared to other age groups ( $p<0.05$ ). In primiparous women, the incidence of birth weight less than 2500 g was found to be statistically significantly higher

**Table 3. Cesarean section distribution based on parity status**

	Caesarean section						p
	No		Yes		Total		
	n	%	n	%	n	%	
40 weeks of pregnancy							<0.001 <sup>a</sup>
Primiparous	107	38.8	43	65.2	150	43.9	
Multiparous	169	61.2	23	34.8	192	56.1	
41 weeks of pregnancy							<0.001 <sup>a</sup>
Primiparous	24	34.3	38	84.4	62	53.9	
Multiparous	46	65.7	7	15.6	53	46.1	
42 weeks of pregnancy							0.603
Primiparous	6	42.9	1	20.0	7	36.8	
Multiparous	8	57.1	4	80.0	12	63.2	

<sup>a</sup>: p-value <0.05 was considered statistically significant

**Table 4. Indications for caesarean section**

	Gestational week								p
	40 (n=342)		41 (n=115)		42 (n=19)		Total (n=476)		
	n	%	n	%	n	%	n	%	
Fetal distress	16	4.7	12	10.4	2	10.5	30	6.3	0.066
Maternal factors	5	1.5	0	0	0	0	5	1.1	0.138
Non-progressive labor	16	4.7	17	14.8	1	5.3	34	7.1	0.275
CPD	6	1.8	6	5.2	0	0	12	2.5	0.571
Macrosomia	21	6.1	10	2.9	2	10.5	33	6.9	0.537
Preeclampsia <sup>b</sup>	2	0.6	0	0	0	0	2	0.4	0.463

CPD: Cephalopelvic distortion, <sup>b</sup>: Non-severe preeclampsia

( $p < 0.05$ ). Lastly, it was statistically significant that male neonates had a higher rate of composite adverse perinatal outcomes and birth weight ( $>4000$  g) compared to female neonates ( $p < 0.05$ ) (Table 5).

## Discussion

This study, conducted to assess the maternal and perinatal outcomes of pregnancies of 40 weeks and over, revealed that there were no significant differences among the gestational weeks of 40<sup>0/7</sup>-40<sup>6/7</sup>, 41<sup>0/7</sup>-41<sup>6/7</sup>, and 42<sup>0/7</sup>-42<sup>6/7</sup>.

The characteristic features of the patients included in the study were parallel to those found in the literature. Some studies had excluded patients with any disease so as not to cause confounding results, while others included them. Considering the diverse perspectives, we have incorporated the notion that the presence of a maternal illness would not impact the outcomes in our assessment. As anticipated, no significant correlation was found between maternal illness and gestational age at birth. In order to assess the

impact of maternal age on maternal-perinatal morbidity and mortality, three groups were examined ( $<18$ , 18-34, and  $\geq 35$  years), and maternal age factor had no significant effect except the need for NICU. In contrast, another study revealed an increased risk of adverse maternal and perinatal morbidity in pregnancies over 40 years of age, particularly in late-term and post-term pregnancies (5). Our research indicates a significant increase in the need for NICU in pregnancies of women below 18 years of age, so we believe that additional support should be provided for this group, given the number of patients involved. In a study conducted with a broader patient population, it has been reported that neonatal morbidity, including the need for NICU, significantly increased in adolescent pregnancies (6). In light of this, advancing the time of delivery to earlier weeks in the adolescent age group has been suggested as a potential positive contribution to maternal-perinatal morbidity and mortality.

Despite numerous studies suggesting an association between nulliparity and prolonged gestational weeks with

**Table 5. Maternal and perinatal outcomes based on maternal age, parity status and neonatal gender**

	Maternal age							Parity status					Neonatal gender				
	<18		18-34		$\geq 35$			Primipar		Multipar			Male		Female		
	(n=6)	(n=421)	(n=49)					(n=219)	(n=257)				(n=246)	(n=230)			
	n	%	n	%	n	%	p	n	%	n	%	p	n	%	n	%	p
Compound maternal adverse outcome	1	16.7	161	38.2	18	36.7	0.549	132	60.3	48	18.7	<0.001 <sup>a</sup>	107	43.5	73	31.7	0.008 <sup>a</sup>
Cesarean section	0	0.0	100	23.8	16	32.7	0.146	82	37.4	34	13.2	<0.001 <sup>a</sup>	77	31.3	39	17.0	<0.001 <sup>a</sup>
Operative vaginal delivery	0	0.0	2	0.5	1	2.0	*	1	0.5	2	0.8	*	1	0.4	2	0.9	0.612
Postpartum hemorrhage (>1000 cc)	1	16.7	78	18.5	4	8.2	0.194	65	29.7	18	7.0	<0.001 <sup>a</sup>	46	18.7	37	16.1	0.453
Need for blood transfusion	1	16.7	23	5.5	0	0.0	0.108	19	8.7	5	1.9	0.001 <sup>a</sup>	16	6.5	8	3.5	0.132
Preeclampsia <sup>b</sup>	0	0.0	3	0.7	1	2.0	*	3	1.4	1	0.4	*	2	0.8	2	0.9	0.946
Maternal ICU admission	0	0.0	0	0.0	1	2.0	*	0	0.0	1	0.4	*	0	0.0	1	0.4	0.483
Compound perinatal adverse outcome	4	66.7	182	43.2	20	40.8	0.482	95	43.4	111	43.2	0.967	120	48.8	86	37.4	0.012 <sup>a</sup>
1-min Apgar score <4	0	0.0	3	0.7	0	0.0	*	1	0.5	2	0.8	*	3	1.2	0	0.0	0.249
5-min Apgar score <7	0	0.0	1	0.2	0	0.0	*	0	0.0	1	0.4	*	1	0.4	0	0.0	*
MAS	1	16.7	53	12.6	1	2.0	0.085	31	14.2	24	9.3	0.101	26	10.6	29	12.6	0.487
Birth trauma	0	0.0	36	8.6	7	14.3	0.307	16	7.3	27	10.5	0.225	23	9.3	20	8.7	0.804
Birth weight																	
<2500 g	0	0.0	4	1.0	0	0.0	*	4	1.8	0	0.0	0.044 <sup>a</sup>	1	0.4	3	1.3	0.357
>4000 g	0	0.0	54	12.8	9	18.4	0.35	26	11.9	37	14.4	0.418	48	19.5	15	6.5	<0.001 <sup>a</sup>
NICU admission	4	66.7	68	16.2	8	16.3	0.005 <sup>a</sup>	44	20.1	36	14.0	0.077	41	16.7	39	17.0	0.933
Stillbirth	0	0.0	0	0.0	0	0.0	*	0	0.0	0	0.0	*	0	0.0	0	0.0	*

\*: p-value not calculated, <sup>a</sup>: p-value <0.05 was considered statistically significant, <sup>b</sup>: Non-severe preeclampsia, ICU: Intensive care unit, MAS: Meconium aspiration syndrome, NICU: Neonatal intensive care unit

**Table 6. Perinatal outcomes**

	Gestation week								p <sup>a</sup>
	40 (n=342)		41 (n=115)		42 (n=19)		Total (n=476)		
	n	%	n	%	n	%	n	%	
Neonatal gender									0.772
Male	178	52.0	57	49.6	11	57.9	246	51.7	
Female	164	48.0	58	50.4	8	42.1	230	48.3	
1-min Apgar score <4	3	0.9	0	0	0	0	3	0.6	0.554
5-min Apgar score <7	1	0.3	0	0	0	0	1	0.2	0.822
Meconium-stained amniotic fluid	43	12.6	10	8.7	2	10.5	55	11.6	0.526
Birth trauma	30	8.8	12	10.4	1	5.3	43	9.0	0.729
Birth weight									
Mean ± SD	3484.18±440.03		3552.29±432.42		3437.16±402.09		3498.76±437.04		0.289 <sup>c</sup>
<2500 g	4	1.2	0	0	0	0	4	0.8	0.454
>4000 g	42	12.3	19	16.5	2	10.5	63	13.2	0.478
NICU admission	51	14.9	26	22.6	3	15.8	80	16.8	0.16
Stillbirth	0	0.0	0	0.0	0	0	0	0.0	

<sup>a</sup>: The p-value was obtained from the Pearson chi-square (Exact test), SD: Standard deviation, <sup>c</sup>: The p-value was obtained from the ANOVA test, NICU: Neonatal intensive care unit

male fetuses, our study did not observe a notable difference. All pregnancies presenting to our clinic over 41<sup>0/7</sup> weeks are designated for delivery, whereas pregnancies from 40<sup>0/7</sup> to 40<sup>6/7</sup> gestational weeks are optionally managed with inpatient care, which may have influenced the outcomes. In another study, it was reported that the risk of adverse pregnancy outcomes was higher in nulliparous pregnant women compared to multiparous women (5). In our study, compound adverse maternal outcomes, cesarean section rate and the need for blood transfusion were found to be significantly higher in nulliparous women despite the inability to calculate the p-value due to the low distribution of the number of patients in groups with operative vaginal delivery, non-severe preeclampsia and maternal ICU requirement. We observed a significantly increased rate of composite adverse maternal outcomes, cesarean delivery and macrosomia in pregnant women with male newborns compared to female newborns. Even though we did not find a significant difference between nulliparity and gestational weeks of male fetuses, we anticipate that our study, conducted between 40<sup>0/7</sup> and 42<sup>0/7</sup> gestational weeks, would align with the literature when compared with early term or full term pregnancies. According to widely accepted views, nulliparity and male fetus were associated with prolonged gestational age at delivery; thus, increased maternal morbidity was an expected outcome.

When reviewing the literature, we observed that the predominant opinion was that maternal and perinatal morbidity increased with advancing gestational age (7-9). It is widely accepted that when comparing gestational weeks between 40<sup>0/7</sup> and 42<sup>6/7</sup>, there is a significantly lower perinatal mortality rate, especially in the 41<sup>st</sup> week of pregnancy (2). According to our study, when analyzing gestational weeks between 40<sup>0/7</sup> and 42<sup>6/7</sup>, perinatal outcomes were found to be similar, with only the cesarean section rate being significantly higher from 40<sup>0/7</sup> to 40<sup>6/7</sup> gestational weeks in maternal outcomes. Despite the lack of statistically significant perinatal mortality in the patient group under investigation, we endorse routine induction of labor at 41 weeks of gestation, aligning with the perspectives of most authors. This recommendation is based on the increased cesarean section rate at the 40<sup>th</sup> week and the potential prevention of placental-related syndromes that may arise from prolonged pregnancies.

The timing of delivery between gestational weeks 40<sup>0/7</sup> and 42<sup>6/7</sup> has been a subject of debate. In a notable randomized controlled multicentric large study, it has been reported that elective induction of labor after the 39<sup>th</sup> week in nulliparous women reduces the risk of primary cesarean delivery and hypertensive disorders without altering perinatal mortality and morbidity, in addition to less neonatal respiratory distress in the induction group (9). In response to this

study, the society of maternal-fetal medicine published a statement endorsing elective induction at 39 weeks for low-risk nulliparous women, a view further supported by the ACOG (10). These data should be interpreted with caution as elective induction at 39<sup>0/7</sup> gestational weeks has been reported specifically for nulliparous women. In our study, the cesarean section rate was compared among gestational weeks, and additionally, the cesarean distribution between primiparous and multiparous patients was analyzed across gestational weeks. The cesarean rate at the 40<sup>th</sup> week was found to be statistically higher in primiparous patients between gestational weeks 40<sup>0/7</sup> and 41<sup>6/7</sup> compared to other gestational weeks. Since we found no difference, except cesarean delivery, between maternal and perinatal morbidity, we tend towards elective induction based on parity status and gestational week.

### Study Limitations

Our study has some limitations, one of which is the study's retrospective design. Our clinic had already initiated elective induction at 41<sup>0/7</sup> weeks; consequently, we have a smaller number of patients in the group with pregnancies at 42 weeks and beyond. Additionally, it includes a small patient group that is similar demographically and socioeconomically.

### Conclusion

In conclusion, there was no significant difference in adverse maternal and perinatal outcomes between 40<sup>0/7</sup> and 42<sup>6/7</sup> gestational weeks. However, the cesarean section rate was significantly increased at 40<sup>0/7</sup> to 40<sup>6/7</sup> gestational weeks and in primiparous patients. In addition, primiparity was associated with significant adverse maternal outcomes, and male neonatal sex was associated with both adverse maternal outcomes and adverse perinatal outcomes. The idea of determining the timing of delivery beyond 40 weeks based on parity status can be helpful for clinicians conducting future studies.

### Ethics

**Ethics Committee Approval:** University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital. Approval for the study was obtained from the Ethics Committee of the same institution under protocol number 786 on December 19, 2017.

**Informed Consent:** Not necessary for this manuscript.

### Authorship Contributions

Concept: V.M., D.Y.Y.K., Y.Ö., Design: V.M., D.Y.Y.K., Y.Ö., Data Collection or Processing: D.Y.Y.K., M.İ.T., Analysis or Interpretation: M.İ.T., Y.K., Drafting Manuscript: D.Y.Y.K., Y.K., Y.Ö., Critical Revision of Manuscript: V.M., Y.K., M.İ.T., Final Approval and Accountability: V.M., D.Y.Y.K., Y.K., M.İ.T., Y.Ö., Technical or Material Support: M.İ.T., Y.Ö., Supervision: M.İ.T., Y.Ö., Writing: V.M., D.Y.Y.K., Y.K., M.İ.T., Y.Ö.

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