RESEARCH ARTICLE

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A Retrospective Evaluation of Births in Our Clinic in the Past 10 Years

Kliniğimizde Son 10 Yılda Gerçekleşen Doğumların Geriye Dönük Değerlendirmesi

ABSTRACT

Objective

To retrospectively evaluate the annual distribution and indications of births in our clinic over the past 10 years.

Material and Methods

The medical records of 44,962 births at the Department of Obstetrics from 2015 to 2024 were retrospectively retrieved from the hospital database. Numbers of vaginal births, primary and recurrent cesarean sections, and the indications for cesarean deliveries were analyzed and compared by years.

Results

The lowest primary cesarean rate in the 10-year study period was 18.98% in 2015, rising to 37.5% in 2024. The lowest mean maternal age was 27.95±6.13 in 2015, and increased to 29.06±6.23 in 2024. The most common indication for cesarean delivery was previous uterine surgery at 45.67%, followed by fetal distress at 14.31%, and cephalopelvic disproportion at 7.38%. The least frequent indication was cord prolapse at 0.35%.

Conclusions

The findings of this study show that the primary cesarean section rate has increased, especially in the last two years.

Key Words

Cesarean indications, Primary cesarean, Vaginal delivery

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ÖZ

Amaç

Kliniğimizde son 10 yıl içinde doğumların yıllık dağılımını ve endikasyonlarını geriye dönük olarak değerlendirmek.

Gereç ve Yöntemler

Hastanemiz Kadın Doğum Kliniği'nde 2015-2024 yılları arasında gerçekleşen 44,962 doğumun kayıtlarına hastane veri tabanından geriye dönük olarak erişilmiştir. Vajinal doğum sayıları, primer ve tekrarlayan sezaryen sayıları ile sezaryen doğumlara yönelik endikasyonlar yıllara göre analiz edilmiş ve karşılaştırılmıştır.

Bulgular

On yıllık çalışma döneminde en düşük primer sezaryen oranı 2015 yılında %18.98 iken, 2024 yılı itibarıyla %37.5'e yükselmiştir. En düşük ortalama maternal yaş 2015 yılında 27.95±6.13, 2024 yılında ise 29.06±6.23 olarak kaydedilmiştir. Sezaryen doğum için en sık görülen endikasyon, %45.67 ile geçirilmiş uterus cerrahisidir; bunu %14.31 ile fetal stres ve %7.38 ile kafa-pelvis uyumsuzluğu takip etmektedir. En az görülen endikasyon ise %0.35 ile kordon prolapsusudur.

Sonuçlar

Bu çalışmanın bulguları, primer sezaryen oranının özellikle son iki yılda arttığını göstermektedir.

Anahtar Kelimeler

Sezaryen endikasyonları, Primer sezaryan, Vajinal doğum

INTRODUCTION

The term "Cesarean section" refers to the surgical incision of the abdominal wall and uterus when vaginal delivery of a baby weighing over 500 grams is not possible. This surgical delivery method was first performed in 1881 in Germany. The maternal mortality rate was initially approximately 80%, but this has decreased due to advances in surgical techniques, easier access to blood and blood products, and antibiotics that reduce the risk of infection (1). Hysterectomy was also performed in the past following cesarean section in order to reduce postpartum bleeding (2, 3). Although it is now considered a commonly performed obstetric surgical procedure, it should be remembered that it entails risks associated with both the surgery and the anesthesia used. It should be performed under appropriate indications, keeping the health of both the mother and the baby in mind at all times (3).

The World Health Organization (WHO) recommends that the proportion of cesarean sections should not exceed 15% of all births (4). According to data from the Health Statistics Annual, the rate of cesarean births in Türkiye has been rising on a yearly basis, from 21% in 2002 to 36.7% in 2008, 50.4% in 2013, 54.9% in 2018, and 60.1% in 2022 (5). From another perspective, the rate of cesarean births tripled in the two decades between 2002 and 2022. Statistical data show high rates of cesarean births in many countries. According to 2021 data from the OECD, Israel has the lowest cesarean rate at 14.3%, followed by Iceland at 14.4%, and the Netherlands at 15.2% (6-8).
The increase in cesarean rates can be attributed to several factors, including improved monitoring of risky fetuses due to advances in modern medicine, challenging living conditions and professional and career pressures leading to higher maternal ages and decreased fertility, and the fact that a first birth by cesarean section adds to the likelihood of subsequent cesareans. Furthermore, in recent years, obstetricians have preferred cesarean deliveries in order to avoid malpractice lawsuits, along with a fear of normal delivery, and since these allow them to schedule the time and place of delivery, all of which have contributed to the rise in cesarean birth rates (1, 9).

The purpose of this study was to retrospectively evaluate the births taking place in our clinic over the previous 10 years, determining the distribution of births by year, the cesarean rate, and the indications for cesarean sections, as well as investigating the factors affecting the cesarean rate.

MATERIALS and METHODS

Ethics committee approval was obtained on 06.06.2024 with decision number 2024/157. The study was carried out in accordance with the principles of the Declaration of Helsinki. The records of patients who had a live birth or stillbirth at term gestational age in the obstetrics clinic between January 2015 and December 2024 were retrospectively reviewed from the hospital electronic database. The distribution of vaginal and cesarean (primary and re-

current) deliveries among a total of 44,962 deliveries was analyzed on a yaerly basis. The data collected included the age of the mother at delivery, gestational age at delivery, birth weight, and fetal sex, along with the duration of pregnancy, birth weight, fetal sex, and cesarean indications categorized by years.

Statistical analyses were performed using SPSS version 26.0 for Windows software (SPSS, Chicago, IL, USA). Continuous variables were presented as mean ± standard deviation (SD) and categorical variables as the number of cases and percentages.

RESULTS

A total of 44,962 births took place at the Department of Obstetric and Gynecology Antalya Education and Research Hospital Department of Obstetrics and Gynecology between 1 January, 2015, and 31 December, 2024, of which 24,668 (54.86%) were cesarean deliveries and 20,294 (45.14%) vaginal. The primary cesarean rate was 24.21% and the repeat cesarean rate was 30.65%. The distribution of births according to vaginal and cesarean methods over the years is presented in Table I, and proportional changes are shown in Figure 1. Accordingly, the primary cesarean rate was lowest in 2015, rising to 37.5% in 2024, revealing an increasing trend over the 10-year study period.

Table I. The distribution of vaginal and cesarean births by years.

Years	Vaginal Birth (n=) (%)	Cesarean (n=) (%)	Primary Cesarean (n=) (%)	Recurrent Cesarean (n=) (%)
2015				
4,564	2,674	1,890	866	1,024
(%)	(58.59)	(41.41)	(18.98)	(22.43)
2016				
5,159	2,741	2,418	1,159	1, 259
(%)	(53.13)	(46.87)	(22.47)	(24.4)
2017				
4,849	2,534	2,315	1,010	1,305
(%)	(52.26)	(47.74)	(20.83)	(26.91)
2018				
4,709	2,155	2,524	1,142	1,382
(%)	(46.4)	(53.6)	(24.25)	(29.35)
2019				
4,375	1,919	2,456	1,047	1,409
(%)	(43.86)	(56.14)	(23.93)	(32.21)
2020				
4,170	1,822	2,348	821	1,527
(%)	(43.69)	(56.31)	(19.69)	(36.62)
2021				
4,453	2,073	2,380	891	1,489
(%)	(46.55)	(53.45)	(20.01)	(33.44)
2022				
4,198	1,686	2,512	1,021	1,491
(%)	(40.16)	(59.84)	(24.32)	(35.56)
2023				
4,408	1,423	2,985	1,399	1,586
(%)	(32.28)	(67.72)	(31.74)	(35.98)
2024				
4,077	1,237	2,840	1,529	1,311
(%)	(30.34)	(69.66)	(37.5)	(32.16)
Total				
n=44,962	20,294	24,668	10,885	13,783
%	(45.14)	(54.86)	(24.21)	(30.65)

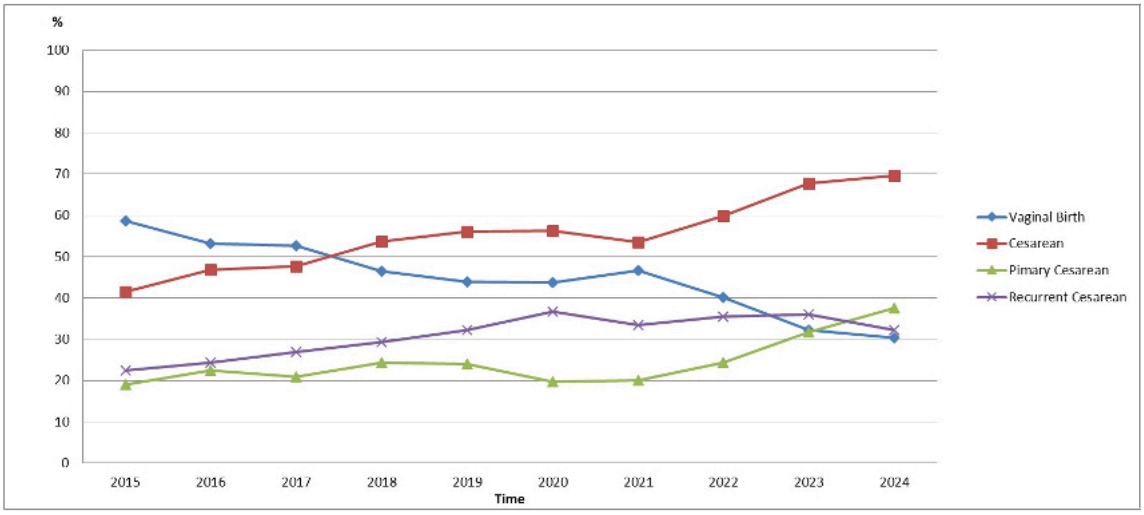

Figure 1. The distribution of vaginal and cesarean births by years.

Table II shows the distributions of age, gestational age at delivery, birth weight, and gender of the newborn undergoing cesarean sections by years. The average maternal age tended to increase in a time-dependent manner, while there was no significant time difference in gestational age at delivery, birth weight, or the distribution of infant genders.

Table II. Age, gestational age at delivery, birth weight, and gender in cesarean sections by years

Years	Age (years)	Gestational Age (weeks)	Birth Weight (g)	Gender (%)	
				Male	Female
2015	27.95±6.13	38.26±2.18	3,216.48±580.43	2,309 (50.6)	2,255 (49.4)
2016	27.67±6.52	38.22±2.06	3,203.46±565.88	2,657 (51.5)	2,502 (48.5)
2017	27.98±6.35	38.04±2.35	3,173.72±601.23	2,473 (51.0)	2,376 (49.0)
2018	28.40±6.41	38.01±2.29	3,143.27±632.39	2.449 (52.0)	2,260 (48.0)
2019	28.55±6.43	37.67±2.28	3,133.68±644.44	2,244 (51.3)	2,131 (48.7)
2020	28.37±6.39	37.64±2.40	3,097.69±657.68	2,056 (49.3)	2,114 (50.7)
2021	28.39±6.29	37.65±2.53	3,087.74±658.46	2,249 (50.5)	2,204 (49.5)
2022	28.69±6.18	37.61±2.58	3,043.22±689.56	2,204 (52.5)	1,994 (47.5)
2023	28.91±6.13	37.56±2.40	3,054.39±669.72	2,213 (50.2)	2,195 (49.8)
2024	29.06±6.23	37.15±2.57	2,974.46±709.97	2,067 (50.7)	2,010 (49.3)

The distribution of cesarean indications over the years is listed in Table III. Accordingly, 45.6% of cases were due to previous uterine surgery, 14.31% to fetal distress, 7.38% to cephalopelvic disproportion, 6.58% to presentation anomalies, 3.55% to hypertensive disease of pregnancy, 4.02% to multiple pregnancies, 3.77% to prolonged labor, 1.89% to placental anomalies, 1.84% to macrosomia, 0.64% to maternal request, 0.35% to umbilical cord prolapse, while 7.56% were due to other anomalies. Figure 2 illustrates the distributions of the three most common cesarean indications by years. The rate of cesarean births due to previous uterine surgery exhibited an increasing trend.

Table III. Distribution of cesarean indications by years.

Year (n=24,668)	Previous Uterine Surgery (n=11,266)(45.67%)	Non-progressive Labor (n=1,618) (6.56%)	Dystocia (n=1,821) (7,38%)	Fetal Distress (n=3,530)(14.31%)	Presentation Abnormalities (n=1,624)(6,58%)	Cord Prolapsus (n=88) (0.35)	Hypertensive Disorders of Pregnancy (n=876) (3.55%)	Multiple Pregnancies (n=885) (3.59%)	Macrosomia (n=453) (1.84%)	Placental Anomalies (n=467) (1.89%)	Mother's Request (n=159) (0.64%	Other (n=706) (7.56%)
2015 (1,890) (%).	756 (40.0)	142 (7.5)	125 (6.7)	340 (17.9)	157 (8.2)	8 (0.42)	54 (2.9)	41 (2.17)	24 (1.3)	18 (0.95)	5 (0.26)	220 (11.6)
2016 (2,418) (%)	1,088 (45.0)	150 (6.2)	185 (7.6)	339 (14.0)	160 (6.7)	9 (0.35)	81 (3.32)	86 (3.6)	41 (1.7)	39 (1.61)	13 (0.51)	227 (9.39)
2017 (2,315) (%)	1,057 (45.5)	139 (6.0)	183 (7.8)	327 (14.1)	149 (6.33)	7 (0.30)	77 (3.23)	81 (3.4)	37 (1.6)	33 (1.32)	11 (0.48)	230 (9.94)
2018 (2,524) (%)	1,113 (44.1)	169 (6.73)	191 (7.6)	359 (14.2)	181 (7.1)	10 (0.39)	93 (3.7)	101 (4.0)	53 (2.1)	47 (1.8)	17 (0.69)	190 (7.59)
2019 (2,456) (%)	1,108 (45.19)	158 (6.43)	186 (7.57)	353 (14.35)	157 (6.39)	8 (0.32)	89 (3.62)	93 (3.65)	47 (1.91)	49 (1.99)	16 (0.65)	193 (7.87)
2020 (2,348) (%)	1,068 (45.48)	141 (1.32)	189 (4.14)	331 (9.19)	151 (7.51)	6 (0.30)	81 (6.07)	89 (5.22)	43 (5.53)	41 (3.54)	15 (0.54)	187 (7.96)
2021 (2,380) (%)	1,087 (45.67)	139 (5.85)	194 (8.16)	331 (13.91)	147 (6.18)	7 (0.29)	88 3.69()	92 (3.87)	49 (2.05)	47 (1.97)	14 (0.59)	185 (7.77)
2022 (2,512) (%)	1,191 (47.42)	161 (6.4)	189 (7.52)	357 (14.22)	159 (6.33)	9 (0.33)	91 (3.62)	94 (3.74)	49 (1.95)	53 (2.11)	18 (0.72)	141 (5.61)
2023 (2,985) (%)	1,423 (47.97)	218 (7.44)	198 (6.69)	406 (13.69)	187 (6.26)	13 (0.44)	113 (3.79)	107 (3.68)	57 (1.9)	71 (2.38)	27 (0.9)	145 (4.86)
2024 (2,840) (%)	1,381 (48.63)	201 (7.07)	181 (6.37	387 (13.63)	176 (6.2)	11 (0.39)	109 (3.83)	101 (3.56)	53 (1.87)	69 (2.43)	23 (0.81)	148 (5.21)

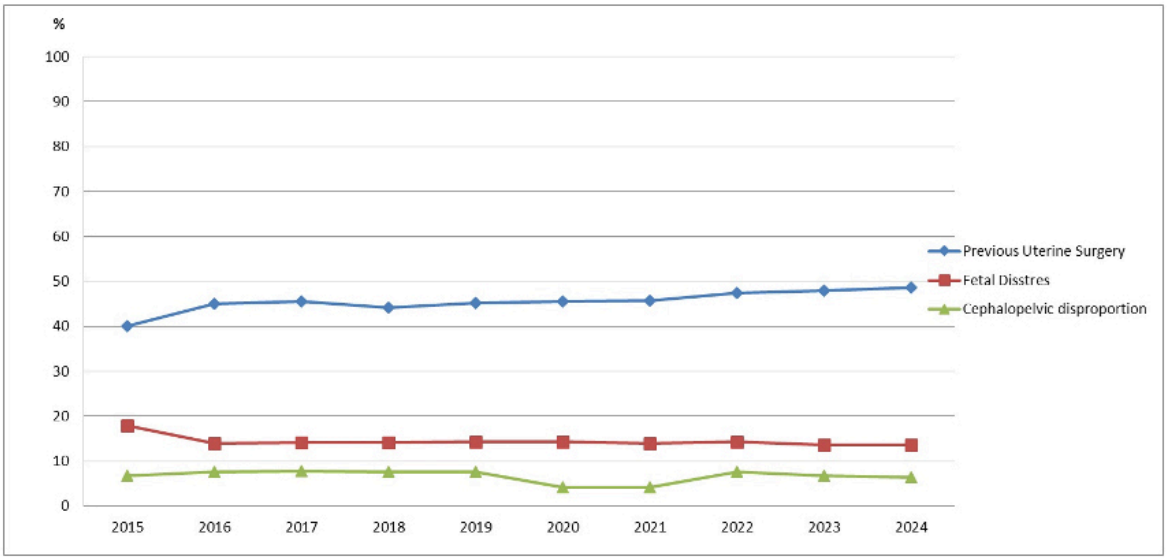

Figure 2. The distribution of the previous uterine surgery, fetal distress, and cephalopelvic disproportion according to the years.

DISCUSSION

This retrospective study evaluated the annual distribution of births in our clinic over the previous 10 years. The primary cesarean rate increased significantly over that time, particularly in the last two years. Age at conception was increased, and the three most common indications for cesarean delivery were, in descending order, previous uterine surgery, fetal distress, and cephalopelvic disproportion.
Cesarean section, which was initially performed to save the fetus of a mother who was about to die, and originally entailed a high mortality rate, has been performed as a safer method of delivery since the 19th century due to advances in asepsis, anesthesia, surgical techniques, and safe blood transfusion (10). Cesarean sections performed due to medical necessity positively affect maternal and fetal mortality and morbidity statistics. However, when performed without medical justification, they have become the subject of medical and ethical debate. Additionally, high cesarean rates lead to significant healthcare costs. Considering both the risks and high costs associated with cesarean sections, the ongoing rise in cesarean rates is regarded as a fundamental public health issue (11).

The WHO has recommended since 1985 that cesarean sections should represent 10-15% of all births. According to the 2018 Turkey Demographic and Health Survey, the frequency of cesarean births in Turkey was 59.6% for the year 2020, 60.9% for 2021, and 62.8% for 2022, while the rates for primary cesarean sections were 30%, 30.3%, and 32.5%, respectively. In 2020, 42.8% of births in public hospitals, 71.4% in university hospitals, and 74.1% in private hospitals in Turkey were performed by cesarean section, while the rates for primary cesarean sections were 16.8%, 17.5%, and 18.5%, respectively. In 2021, 44.6% of births in public hospitals, 73.1% in university hospitals, and 75.5% in private hospitals were performed by cesarean section, with primary cesarean section rates of 36.4%, 36.8%, and 38.8%, respectively. In 2022, 46.4% of births in public hospitals, 74.4% in university hospitals, and 78.1% in private hospitals were performed by cesarean section, with primary cesarean section rates of 41.8%, 42.3%, and 46.2%, respectively (1, 12, 13).

Recent statistical data shows that many other countries also exhibit high rates of cesarean births. According to OECD data for 2021, Israel has the lowest cesarean rate at 148 cesarean sections per 1,000 live births. Israel is followed by the Netherlands with 152 cesarean sections per 1,000 live births, while Sweden, Norway, and Iceland also report similar rates . Mexico has the highest rate, at 586 cesarean sections per 1,000 live births. Notably, Türkiye comes in just before last with 573 cesarean sections per 1,000 live births (14-16). In the present study evaluating Antalya province, located in the country's Mediterranean region, the total cesarean birth rate is 54.86%, close to the regional and national averages. During the 10-year study period, cesarean birth rates registered a significant increase, especially in 2023 and 2024.
Changes in fetal monitoring due to advances in technology, the postponement of marriage and pregnancy by women for work and career reasons, fear of vaginal birth, potential prolongation of vaginal birth, the increase in pregnancies resulting from assisted reproductive techniques, and presentation abnormalities are the most significant reasons for the rise in cesarean birth rates (4, 17). Frequent fetal monitoring during normal birth follow-up has been shown to increase the cesarean birth rate by 40%, although it has no impact on rates of admission to the neonatal intensive care unit or on fetal cerebral asphyxia (18).

The prevention of vaginal births requiring interventions such as vacuum extraction and forceps, along with complications arising after normal deliveries, has also, unfortunately, contributed to the increase in cesarean rates due to the rising numbers of malpractice lawsuits (1). In our clinic, vaginal births requiring interventions such as vacuum extraction and forceps are also not performed. None of the participants included in our study had vaginal births requiring interventions such as vacuum extraction and forceps.
Promoting vaginal births after cesarean deliveries may be one means of lowering elevated cesarean rates (19). A previous history of uterine surgery is the most common indication for cesarean delivery. In the present study, the most frequent cesarean indication was previous uterine surgery at 45.67%, a finding consistent with the literature. This elevation may be attributed to the belief that "once a cesarean, always a cesarean." If a previous cesarean delivery has been performed with a transverse incision in the lower uterine segment, the mother's pelvis is suitable for vaginal birth, the baby weighs under 4000 g, there has been no uterine rupture in previous deliveries, and the delivery room possesses adequate physical and technological infrastructure for vaginal birth, then a vaginal delivery may be attempted after previous uterine surgery, provided that there is an option for immediate cesarean in case of emergency (20).

Excess weight before and weight gain during pregnancy, advanced maternal age, hypertensive disorders of pregnancy, gestational diabetes mellitus, and smoking have been shown to increase primary cesarean rates (21, 22).
The Turkish Ministry of Health recommends cesarean delivery for pregnancies with breech presentation. In cases in which the mother has a previous history of vaginal birth and there are no indications for cesarean delivery, then vaginal delivery may be suggested after all risks and complications have been explained to the mother and her partner (1, 21). In the present study, the rate of indication for cesarean delivery due to hypertensive disorders of pregnancy was 3.55%. Vaginal delivery is initially attempted following cervical maturation with vaginal dinoprostone. However, if the conditions are not suitable, cesarean de-

livery is performed.
Deliveries for patients with placenta accreta spectrum (PAS) are performed via cesarean section, and the cesarean rate due to PAS in our clinic is 1.89%. This elevation may be due to our clinic being a tertiary center. In cases of placental abruption, deliveries should be performed via cesarean if the fetus is alive. However, if the fetus has experienced in-utero death and the mother is hemodynamically stable, vaginal delivery may be preferred.
The cesarean rate due to multiple pregnancies in this study was 3.59%. Vertex presentation is the most frequently observed presentation in twin pregnancies, and vaginal delivery can be attempted in the absence of any other obstetric contraindications. However, cesarean delivery should be the first option in cases of breech-head or transverse positions. Cesarean delivery should also be preferred as the first option in multiple pregnancies with three or more fetuses. Approximately 60% of obstetricians regard elective cesarean delivery due to maternal request as appropriate. As the age of conception is delayed, women who conceive by means of assisted reproductive techniques, and fears surrounding vaginal birth pain, contribute to the increasing rate of cesarean deliveries. While it has been suggested that planned cesarean deliveries can prevent neurological damage and cerebral palsy associated with childbirth, it has also been reported that the type of delivery does not cause any acute or chronic neurological deficits (23, 24).
Pulmonary morbidity has increased in cesarean deliveries compared to vaginal births, and this risk is further heightened in cesarean deliveries before the 39th week of gestation. Additionally, it has been suggested that babies delivered by cesarean section have a higher incidence of autoimmune diseases such as type 1 diabetes mellitus, Crohn's disease, and multiple sclerosis, as well as allergic conditions including asthma, allergic rhinitis, and atopic dermatitis in their later lives (25).

The WHO recommends that mothers and newborns be discharged as soon as possible after delivery to minimize the risk of nosocomial infections (26). There is an increased risk of postpartum hemorrhage, endomyometritis, pulmonary thromboembolism, pneumonia, and sepsis in cesarean deliveries. Additionally, women who have undergone cesarean deliveries have a higher risk of placental abruption and PAS in subsequent pregnancies compared to those who have had vaginal births (1, 4).

There is no evidence showing benefits for the mother and baby in conditions in which cesarean delivery is not necessary. In fact, as with any surgical procedure, cesarean sections entail both short-term and long-term risks, including side-effects from anesthesia for the mother, increased postpartum bleeding, prolonged hospital discharge, and delayed recovery. All these risks can affect the health of both the mother and baby after childbirth, as well as potential complications in future pregnancies. The WHO statement that 'there is no justification for a cesarean rate exceeding 10-15% in any region' highlights the need for policies and practices that will address this issue, and it is anticipated that studies conducted within this framework will contribute to the literature.
Full and accurate data are important in order to understand the rising cesarean birth rate in Türkiye and to formulate appropriate policy recommendations. Cesarean section is a frequently performed surgical intervention in the event of any adverse situation during pregnancy or childbirth. While cesarean sections have significant benefits in high-risk pregnancies, frequent use can lead to adverse outcomes for both maternal and fetal health, as well as a significant cost burden on the healthcare system. In order to reduce primary cesarean rates, expectant mothers, obstetricians, and midwives should be educated and informed about vaginal birth, facilities for epidural anesthesia should be provided to reduce pain during vaginal delivery, the physical conditions in the delivery room should be improved, and vaginal birth after cesarean delivery should be encouraged. One potential weakness of the current study is that it involved retrospective research and the data pertain to a tertiary center. However, the large sample size represents a particular strength.

CONCLUSION

The findings of this study show that the primary cesarean section rate has increased, especially in the last two years.

Ethics Committee Approval

This research complies with all the relevant national regulations, institutional policies and is in accordance the tenets of the Helsinki Declaration, and has been approved by the Antalya Training and Research Hospital Ethical Committee, Health Science University (approval number: 2024/157).

Informed Consent

All the participants' rights were protected and written informed consents were obtained from the participants for potential future research use before the procedures according to the Helsinki Declaration.

Author Contributions

Concept – B.S.I., H.A.I.; Design – B.S.I., O.H., Z.O.I.; Supervision – B.S.I., O.H.; Resources - B.S.I., O.H., Z.O.I., H.A.I.; Materials – B.S.I., H.A.I.; Data Collection and/or Processing – O.H., Z.O.I.; Analysis and/ or Interpretation - B.S.I., O.H., Z.O.I., H.A.I.; Literature Search – H.A.I., Z.O.I.; Writing Manuscript - H.A.I., Z.O.I.; Critical Review - B.S.I., O.H., Z.O.I., H.A.I.

Conflict of Interest

The authors have no conflict of interest to declare.

Financial Disclosure

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