Analysis of Cesarean Section Rates Using the Robson Classification System in a Training and Research Hospital in Turkey

Türkiye'deki Bir Üniversite Hastanesinde Robson Sınıflandırılması Sistemini Kullanarak Sezeryan Oranlarının Analizi

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ABSTRACT

Objective: In our study, we aimed to evaluate cesarean section rates, causes, and changes over the years in an education and research hospital in eastern Turkey using the Robson 10-Group Classification System.

Methods: A retrospective cross-sectional study was conducted that included all women who gave birth in a training and research hospital in eastern Turkey between January 2018 and December 2022. Digital data of all deliveries were extracted from the hospital information system, and all groups were compared using the obstetric parameters in the Robson 10-Group Classification System.

Results: During a total of 5 years, 4265 (51.47%) of 8287 pregnant women who applied to the hospital for delivery were delivered by cesarean section. Most of the pregnant women admitted to the hospital are multiparous (group 3 + group 4 = 35.9%). Cesarean section was performed in 99.88% of the pregnant women who had a previous cesarean section (group 5). Women in groups 1, 2, and 5 are the largest contributors to the overall cesarean section rate in our hospital.

Conclusions: In our study, cesarean section rates should be reduced in women in the first, second, and fifth groups. In this context, physicians should increase vaginal deliveries after cesarean section and avoid unnecessary labor inductions. In terms of midwives and nurses, education and training should be planned and implemented for pregnant women/couples within the scope of prenatal care services consultancy service. A pregnant education program should be established in which the advantages and disadvantages of cesarean and vaginal delivery are explained.

Keywords: Cesarean section, classification of cesarean section, Robson 10-Group Classification System, pregnancy, delivery

ÖZ

Amaç: Çalışmamızın amacı, Türkiye'nin doğusundaki bir eğtim araştırma hastanesinde, sezaryen ile doğum (SD) oranlarını, nedenlerini ve yıllar içindeki değişimlerini Robson On Grup Sınıflandırma Sistemi (ROGSS) kullanarak değerlendirmektir.

Yöntemler: Ocak 2018 ile Aralık 2022 yılları arasında Türkiye'nin doğusunda bir eğitim araştırma hastanesinde doğum yapan tüm kadınları kapsayan retrospektif kesitsel bir çalışma yapıldı. Tüm doğumların dijital verileri, hastane bilgi sisteminde çıkarılarak Robson On Gruplu Sınıflandırma Sistemindeki obstetrik parametreler kullanılarak bütün gruplar karşılaştırılarak incelendi.

Bulgular: Toplam 5 yıllık süre zarfında hastaneye doğum için başvuran 8287 gebeden 4265 tanesi (%51,4) sezaryen yoluyla doğurtulmuştur. Hastaneye başvuran gebelerin büyük bir bölümü multipar (Grup 3 + Grup 4 = %35,9) olarak başvurmaktadır. Daha önce sezaryen olmuş gebelerin (Grup 5) %99,8'ine sezaryen yapılmıştır. Grup 1, 2 ve 5'teki kadınlar, hastanemizdeki genel SD oranına en büyük katkı sağlayan gruplardır. Nullipar makat gelişlerde (grup 6) %100 ve multipar makat

gelişlerde (Grup 7) %95,5'lik sezaryen oranı izlenmiştir. Çoğul gebelik nedeniyle kabul edilen gebelerin oranı (grup 8) %0,9 ve sezaryen oranı ise %94,9 olarak bulunmuştur.

Sonuç: Çalışmamızda hedef grup olarak tespit edilen; Grup 1, 2 ve 5'teki kadınlar için sezaryen oranlarının azaltılması gerekmektedir. Sezaryen oranlarının azaltılması için gebelerin doğum öncesi eğitim almaları, SD sonrası vajinal doğumun arttırılması, gereksiz doğum indüksiyonlarından yapılmaması, tüp ligasyonu gerekçesiyle isteğe bağlı sezaryenden kaçınılması gerekmektedir.

Anahtar Kelimeler: Sezaryen, sezaryen sınıflandırması, Robson On Gruplu Sınıflandırma Sistemi, gebelik, doğum.

INTRODUCTION

Cesarean section (CS) is defined as the delivery of the fetus by making an abdominal and uterine incision. However, it is recommended to be done in cases where there is a life risk that may occur during vaginal delivery (for the mother or baby).[1] Although delivery with CS has been increasing in many countries in recent years, the reasons that trigger this surgical procedure are not fully understood. World Health Organization (WHO) in 1985 reported that the ideal CS rate should be 10%-15%. Unfortunately, these increasing rates of CS have become an important public health problem for society in recent years. It has been shown that cesarean procedures performed without a clinical justification do not reduce maternal or infant mortality rates, although they are performed at a rate greater than 10%-15%.[2]

When we look at the Turkey Demographic Health Survey (TDHS) 2018 data, in Turkey, the rate of CS in all births is 52%. It can be seen in Figure 1 that CS births have increased significantly in Turkey. This rate of change is quite striking. The CS rate, which was 7% in 1993, increased to 52% in 2018. While cesarean delivery was 68% in private hospitals, it was 41% in public hospitals. In addition, according to the results of the research, 83% of the deliveries were performed by doctors, 8% by midwives, and 8% by health professionals such as nurses.[3] Many different systems have been developed in order to better understand the reasons that trigger this increase in CS rates and to calculate and compare CS rates between different countries. The most important of these is the 10-group Classification system (Robson Classification), which is recommended by the WHO to the whole world. Thanks to this system, it is possible to define all pregnant women who applied to the hospital for delivery, to define obstetrically related groups prospectively, and to investigate the differences in CS rates among these relatively homogenized groups of women.[4] In our country, the "Robson 10-Group Classification System" (RTGCS) has been used in obstetrics clinics since May 2012 in order to investigate the rapidly increasing rates of CS and to set a standard in birth statistics throughout the country.[5] According to the Robson classification system, in a comprehensive study conducted in our country, it was found that the overall rate of CS in Turkey is 51.2%, and it is CS in public (39.7%), private (70.6%), and tertiary centers (70.3%).[6] In April 2015, WHO recommended that RTGCS be used as a global standard for monitoring and comparing cesarean delivery rates across hospitals.[7] It is also one of the main targets proposed by WHO to reduce maternal and infant morbidity and mortality by 2030. One of the recommended ways to achieve this goal is to avoid unnecessary CSs.[8] One of the reasons for unnecessary CS is the fear of childbirth in pregnant women who will give birth for the first time. It is known that approximately 10% of pregnant women experience severe clinical fear of childbirth.[9] It is also known that pregnant women who are afraid avoid normal birth and want to turn to CS.[10] Pregnant women need training to cope with the prenatal birth process and to develop their skills related to baby care, puerperium, and parenting after birth. It has been reported that prenatal education interventions cause a decrease in CS rates.[11] In this context, it is obvious that it is vital to identify the groups with increased CS rates and take measures to prevent unnecessary CS rates.

In this study, we aimed to identify the target groups with increased CS rates by analyzing the change in CS rates by groups over the years by using Robson classification for deliveries that occurred in a tertiary education and research hospital.

METHODS

Within the University, human research has been approved by the health and sports sciences Erzincan Binali Yıldırım University Ethics Committee (Date: January 11, 2023, approval number: 2022/12-10). Our study was planned and carried out in line with the recommendations of the 1964 Helsinki Declaration. Since there was a retrospective study and no contact with the patients during our study, no personal information was collected and a consent form was not obtained.

It was conducted as a cross-sectional retrospective study on deliveries from January 1, 2018, to December 31, 2022, in our Training and Research Hospital. The data were obtained retrospectively from the hospital's electronic information system and from the birth records of the women who gave birth in this period. Hospital deliveries are managed from the 28th week and pregnant women < 28 weeks are referred to the reference hospital for advanced neonatal unit support when necessary. The study population included women who gave birth to live infants or a live-born infant weighing at least 500 grams after at least 24 weeks of gestation during the study period. As an exclusion criterion, it was determined that women who had given birth in another hospital despite having had their follow-up in our hospital.
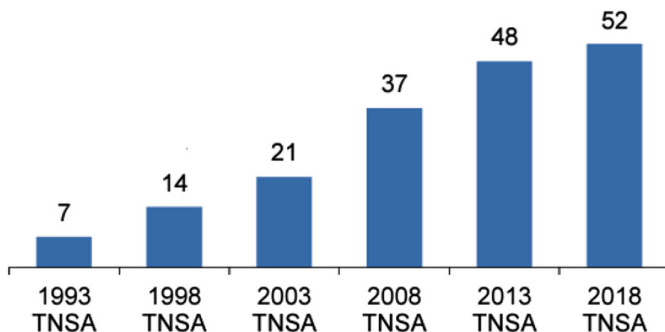

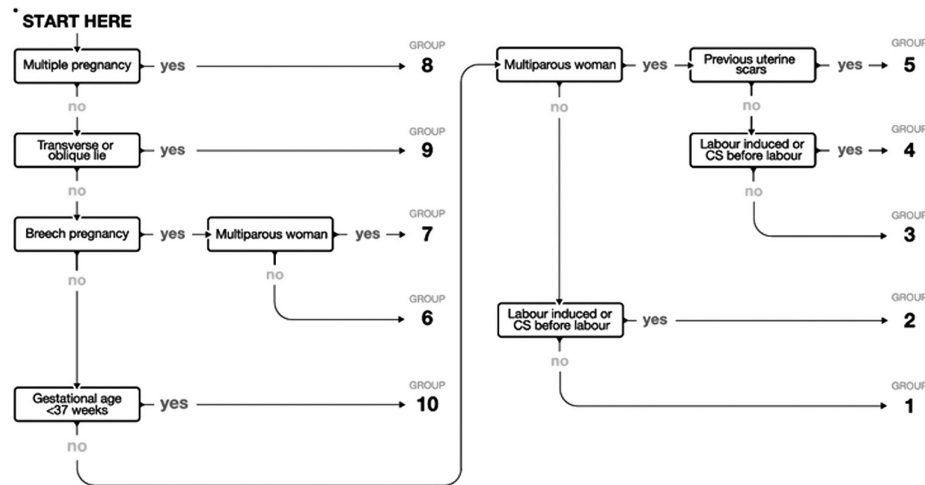**Figure 1.** Cesarean section percentages by years in Turkey.

Figure 2. Flow chart for the system of women in the Robson Classification.

Data Collection Tools

During our study, all women who gave birth at 24 weeks of gestation or longer were classified (by RTGCS) using the flowchart in Figure 2 to categorize them.[12] Table 1 shows a list of Robson groups that included each pregnant woman. For statistical analysis, in the data processing, besides Statistical Package for the Social Sciences 25.0 program, MS Excel Professional Plus (2019) programs were used. Analyzed data were given as n (%) and 95% confidence interval.

RESULTS

The deliveries occurring in our hospital from 2018 to 2022 were classified according to Robson criteria, and all 8287 deliveries were included in the study. During the 5-year period included in the study; 4265 (51.4%) of these women gave birth with CS. There are fluctuations in hospital CS rates over the years. The CS rate, which was 53.5% in 2018, increased to 54.6% in 2022. The CS

rates by year and the CS contribution rates of each Robson group over the years are shown in Table 2. All women were classified according to RTGCS over the 5-year period as seen in Table 1. Trends in the proportions of women in 10 groups over time and the CS ratio per group over time are shown in Table 2. When column 4 is examined in Table 2 and the average of the 5-year data in our study population is taken, groups 1, 3, and 5 were the largest groups in terms of the number of pregnant women (19.8%, 25.8%, and 30.6%, respectively) and constituted 76.3% of the total pregnant women. When column 6 is examined, groups 5, 1, and 2 contributed the most to the overall CS ratio (30.6%, 8.5%, and 3.3% of all cases, respectively) and contributed 42.4% to the total CS (51.4%). groups 1+2 size (nullipara, ≥37, single cephalic) was 28.2%, lower than Robson's reference range (35%-42%). Also, the group 1/group 2 ratio is 2.3, a higher ratio than the 2 : 1 recommended by the Robson guideline. This result shows that we have sufficiently induced nulliparous pregnant women ≥ 37 weeks. Cesarean section rate for group 1, when column 5 in Table 2 is examined, values below 10% can be reached according to Robson (Table 3). In the current study, this value was found to be as high as 43.1%. When we look at group 2, it is recommended that the CS rate is between 20% and 35% according to the Robson criteria. In our study, this rate was found to be as large as 39%. For group 3 (multiparous normal delivery, >37 weeks), the water should normally not be greater than 3% when examining 5, whereas it was found to be 12.7% in the current study. Reasons for this include either misinterpretation of data or increased rates of optional CS for tubal ligation. When column 5 is examined for group 4, it is rarely predicted to be greater than 15%. Our hospital data show that this rate is 17.5%. A high rate may indicate poor quality of data collection (such as the inclusion of women with uterine scars in group 4, who should be included in group 5). In addition, one of the reasons for the high CS rate in group 4 may be that the pregnant women who gave their first birth by normal spontaneous vaginal delivery gave birth with CS upon the request of the mother. Among the reasons for this, poor obstetric experiences, tubal ligation may be preferred in environments where access to contraception methods is difficult. When Table 3 is examined, the total CS (G6 + G7) was found to be 1.9%, in accordance with the WHO (must be below 4%) recommendation for group 6, which constitutes breech nulliparas, and group 7, which includes all women with multipara, single breech pregnancies, as

Table 1. Group Description of Robson's Classification System	
Group	**Obstetric Population**
1	Nulliparous, singleton, cephalic, ≥37 weeks pregnant women in spontaneous labor
2	Nulliparous, singleton, cephalic, ≥37 weeks pregnant, induction or cesarean section before labor
3	Multiparous women in spontaneous labor with no previous uterine scar, single, cephalic, ≥37 weeks of pregnancy
4	Multiparous, no previous uterine scar, singleton, cephalic, ≥37 weeks of pregnancy, induction before labor or women who have had a cesarean section
5	Multiparous, all women with at least 1 previous cesarean section, singleton head presentation, ≥37 weeks of pregnancy
6	Nulliparous, singleton, all women with breech pregnancy
7	All women with a breech-presentation pregnancy, including multiparous, singleton, previous cesarean section
8	All women with multiple pregnancies, including those with a previous cesarean section
9	All women with a singleton, transverse, or oblique presentation, including those with a previous cesarean section
10	All women with a singleton, cephalic presentation, <37 weeks of pregnancy, including those with prior cesarean section

Table 2. Distribution of Women who Gave Birth in 2018-2022 by Robson Groups

Years	Column 1 Group	Column 2 Number of CS in the Group	Column 3 Number of Women in the Group	Column 4 Group Size[1]	Column 5 Group CS Rat(%)[2]	Column 6 Group Contribution to Total CS Ratio (%)[3]	Column 7 Relative Contribution of the Group to the Total CS Ratio (%)[4]
2018	1	156	374	20.02	41.71	8.35	15.60
	2	72	127	6.80	56.69	3.85	7.20
	3	65	506	27.09	12.85	3.48	6.50
	4	34	170	9.10	20.00	1.82	3.40
	5	596	596	31.91	100.00	31.91	59.60
	6	22	22	1.18	100.00	1.18	2.20
	7	12	13	0.70	92.31	0.64	1.20
	8	27	28	1.50	96.43	1.45	2.70
	9	3	3	0.16	100.00	0.16	0.30
	10	13	29	1.55	44.83	0.70	1.30
	Total	**1000**	**1868**	**100.00**	**53.53**	**53.53**	**100.00**
2019	1	183	396	21.63	46.21	9.99	19.08
	2	52	112	6.12	46.43	2.84	5.42
	3	68	493	26.93	13.79	3.71	7.09
	4	34	188	10.27	18.09	1.86	3.55
	5	563	564	30.80	99.82	30.75	58.71
	6	20	20	1.09	100.00	1.09	2.09
	7	14	14	0.76	100.00	0.76	1.46
	8	13	13	0.71	100.00	0.71	1.36
	9	6	6	0.33	100.00	0.33	0.63
	10	6	25	1.37	24.00	0.33	0.63
	Total	**959**	**1831**	**100.00**	**52.38**	**52.38**	**100.00**
2020	1	112	324	21.16	34.57	7.32	15.28
	2	50	121	7.90	41.32	3.27	6.82
	3	41	411	26.85	9.98	2.68	5.59
	4	24	145	9.47	16.55	1.57	3.27
	5	444	445	29.07	99.78	29.00	60.57
	6	19	19	1.24	100.00	1.24	2.59
	7	13	14	0.91	92.86	0.85	1.77
	8	11	11	0.72	100.00	0.72	1.50
	9	4	4	0.26	100.00	0.26	0.55
	10	15	37	2.42	40.54	0.98	2.05
	Total	**733**	**1531**	**100.00**	**47.88**	**47.88**	**100.00**
2021	1	104	253	15.68	41.11	6.44	13.25
	2	51	210	13.01	24.29	3.16	6.50
	3	48	393	24.35	12.21	2.97	6.11
	4	29	177	10.97	16.38	1.80	3.69
	5	496	497	30.79	99.80	30.73	63.18
	6	15	15	0.93	100.00	0.93	1.91
	7	16	17	1.05	94.12	0.99	2.04
	8	9	12	0.74	75.00	0.56	1.15
	9	3	3	0.19	100.00	0.19	0.38
	10	14	37	2.29	37.84	0.87	1.78
	Total	**785**	**1614**	**100.00**	**48.64**	**48.64**	**100.00**

(Continued)

Table 2. Distribution of Women who Gave Birth in 2018-2022 by Robson Groups (*Continued*)

Years	Column 1 Group	Column 2 Number of CS in the Group	Column 3 Number of Women in the Group	Column 4 Group Size[1]	Column 5 Group CS Rat(%)[2]	Column 6 Group Contribution to Total CS Ratio (%)[3]	Column 7 Relative Contribution of the Group to the Total CS Ratio (%)[4]
2022	1	153	296	20.51	51.69	10.60	19.42
	2	54	128	8.87	42.19	3.74	6.85
	3	51	342	23.70	14.91	3.53	6.47
	4	22	151	10.46	14.57	1.52	2.79
	5	440	440	30.49	100.00	30.49	55.84
	6	15	15	1.04	100.00	1.04	1.90
	7	9	9	0.62	100.00	0.62	1.14
	8	15	15	1.04	100.00	1.04	1.90
	9	13	13	0.90	100.00	0.90	1.65
	10	16	34	2.36	47.06	1.11	2.03
	Total	**788**	**1443**	**100.00**	**54.61**	**54.61**	**100.00**
2018-2022	1	708	1643	19.83	43.09	8.54	16.60
	2	279	698	8.42	39.97	3.37	6.54
	3	273	2145	25.88	12.73	3.29	6.40
	4	143	831	10.03	17.21	1.73	3.35
	5	2539	2542	30.67	99.88	30.64	59.53
	6	91	91	1.10	100.00	1.10	2.13
	7	64	67	0.81	95.52	0.77	1.50
	8	75	79	0.95	94.94	0.91	1.76
	9	29	29	0.35	100.00	0.35	0.68
	10	64	162	1.95	39.51	0.77	1.50
	Total	**4265**	**8287**	**100.00**	**51.47**	**51.47**	**100.00**

[1]Group size (%)=n number of women in the group/total N women who gave birth in hospital × 100.
[2]Group C/S ratio (%)=n total N women in C/S group/group × 100.
[3]Actual contribution (%)=n total in C/S group/total number of N women who gave birth in hospital × 100.
[4]Relative contribution (%)=n total in C/S group/total C/S in hospital N × 100.

well as all women with breech pregnancies who had a previous CS. When Table 3 is examined again, it is seen that the G6/G7 ratio is 1.3 and is lower than 2 : 1. While cesarean rates are 100% for G6, this rate is 95.5% in G7. For group 8, including multiple pregnancies, when column 5 (Table 2) is examined, the CS rate is generally around 60%. In our study, this rate was found to be 94.9%, and it varies according to the way the twins arrive at the time of birth and whether the mother has had CS before. Group 9 represents transverse arrivals, with a magnitude of 0.35%, with a CS ratio of 100% as expected. The cesarean rate for group 10 is around 30% in most populations when viewed in column 5. In the current study, this rate is 39.5% and it is higher than 30% because it is usually due to preterm, high-risk pregnancy cases requiring CS before labor starts (e.g., fetal growth retardation, preeclampsia).

According to Robson, looking at Column 7 (the group's relative contribution to the total CS ratio) for groups 1, 2, and 5, these 3 groups constitute 2/3 (66%) of all CSs. In our current study, this rate was 16.6%, 6.5%, and 59.5%, respectively, between 2018 and 2022, and a high rate of 82.6% of all CSs was found. According to Robson's guidelines: If the hospital wants to reduce cesarean rates, it should focus its attention on these 3 groups. The higher the overall CS rate, particular attention should be paid to nulliparous women with a pregnancy >37 weeks (group 1). In our current

study, when column 7 in Table 2 is examined, group 5's relative contribution to the total CS rate was as high as 59.5%, compared to those in group 1 (nullipar >37 weeks) and group 2 (Nullipar >37 weeks, ind/CS) indicates high CS rates.

DISCUSSION

In the current study, we classified all deliveries performed in our hospital between 2018 and 2022 according to the Robson classification system. When our data set was examined, the total CS rates in our hospital population were significantly higher than the values recommended by the WHO, and it was also found to be higher than in many countries.[13] Again, in our study, it was observed that the number and rates of nulliparous (G1+G2) and multiparous pregnant women (G3+G4) who applied to the hospital were different from WHO recommendations.[8]

In a study conducted in a tertiary hospital in Turkey in 2019, cesarean rates (23.1% in nulliparous patients and 39.2% in multiparous patients) were similar to our study results but far from WHO recommendations.[14] In another study conducted in Turkey, results close to WHO recommendations were found.[2] In the Robson 10 system, most patients were categorized in group 5 (previously CS, ≥37), followed by group 3 (multiparous normal delivery, ≥37) and group 1 (spontaneous nulliparous delivery, ≥37). Group 5 is

Table 3. Comparison of the Data of Women who Gave Birth in 2018-2022 by Robson Groups with WHO Recommendations

Criterion		Robson Proposal	Hospital Data	Comment
1. Group 1+see group 2 elders (Column 4) – Nulliparous women with a ≥37-week single head presentation pregnancy	Total G1/G2 ratio	Pregnant 35%-42% 2:1	28.2% 2.3	Since most of the population is represented by multiparous women, our 28.2% result is less than 35% for groups 1+2 combined. Usually 2:1 or higher. In our study, it is 2.3 and it is close to 2:1, which means that we have induced enough. According to Robson, below 10% can be reached. In principle, the higher the group 1:2 size ratios, the higher the cesarean rate for both group 1 and group 2 separately. It should be around 20-35% on a stable basis. In hospitals where there are many multiparous pregnant women, G1+G2 is over 30%. It is always higher than the group 1/group 2 ratio in the same institution, greater than 2:3. It is a very reliable finding in confirming data quality and organizational culture. It is generally expected to be less than 3%. If it is high, it may be due to low data quality or tubal ligation request. It is usually less than 15%. Our study result being 10% indicates that the rates of cesarean section due to maternal request and optional CS are low. If the size of this group is larger, it means that there has been a high cesarean section rate in the past years, especially in groups 1 and 2. In places with high cesarean rates, the size of this group may be >15%. Rates of 50%-60% are considered appropriate and indicate that you have good maternal and perinatal outcomes. If rates are higher, it is probably due to the large size of group 5.2 (having 2 or more previous cesarean section). Another reason for this may be the policy of planning a cesarean section before labor begins, without attempting to attempt labor for all women with a previous history of cesarean section. If the total is greater than 4%, the most common cause is usually a high rate of preterm birth or a higher proportion of nulliparous women. If it is over 4%, it is usually a high rate of preterm birth or a high proportion of nulliparous women. If the ratio is different, suspect either unusual nullipara/multipara ratio or inaccurate data collection. The CS rate is around 60%. If higher, that center is likely either tertiary (high risk, referral center) or running a fertilization program. If it is lower, it is likely that most twin pregnancies are referred out and especially the remaining twins have a low cesarean rate. Group 9 size should be less than 1%. CS Ratio must be 100%. If she has had a vaginal delivery with an internal version, it should generally be classified as head or breech. Group size should be less than 5% in most normal risk environments. If the cesarean rate in this group is high (>30%), it may indicate that cesarean section performed by the service provider before the start of labor due to fetal growth retardation or preeclampsia and other pregnancy and medical complications.
Group 1: Nulliparous normal delivery, ≥37	Cesarean rate	10%	43.9%	
Group 2: Nullipar ≥37 w, ind/cs	Cesarean rate	20%-35%	39.9%	
Group 3+group 4 Group 3/group 4	Total Ratio	30% >2:1	35.9% 2.5	
Group 3: Multiparous normal delivery, ≥37	Cesarean rate	<3%	12.7%	
Group 4: Multipar ind/cs, ≥37 w	Cesarean rate	<15%	17.2%	
Group 5: CS, ≥37 w	Size Cesarean rate	15% 50%-60%	30.6% 99.8%	
Group 6/Group 7	Total Ratio	3%-4% 2:1	1.9% 1.3	
Group 6: Nulliparous breech	Cesarean rate	4%	100%	
Group 7: Multiparous breech, CS	Cesarean rate	4%	95.5%	
Group 8: Multiple pregnancy, CS	Size Cesarean rate	1.5%-2% 60%	0.9% 94.9%	
Group 9: Transverse, CS	Size Cesarean rate	<1% 100%	0.3% 100%	
Group 10: Preterm birth,<37 w, CS	Size Cesarean rate	<5% 30%	1.9% 39.5%	

the group with the most pregnant women among the 10 groups in terms of the number of women. When the group contribution to the total CS ratio was examined, the groups that contributed the most were found to be group 5, group 1, and group 2, respectively. These 3 groups constituted 82.3% of the total CSs in this study. Groups 1 and 3 decreased in size over the 5-year research period. Groups 2, 4, and 10 sizes increased on average. In 2015, WHO analyzed the contribution of specific obstetric populations to changes in cesarean rates using the Robson classification of deliveries in 287 hospitals in 21 countries on the Robson system. In the WHO study, groups 1 and 3 had the largest proportion of patients, ranging from 25% to 45%, respectively, and group 1 generally had a lower proportion than group 3.[15] In our current study, group 5 and group 3 were the groups with the largest patient ratio. Group 1 took third place with 19.8%. However, in our current study, unlike the WHO study, the largest group was found to be 5. These data show similarities with a study conducted in Turkey in 2022.[16] In another study in Turkey, group 5 was the second largest group after group 3. These study results were similar to group 3 in our current study.[6] The association between group 5 and high CS rate was previously reported by Robson.[4] Being greater than 15% according to the Robson guideline is associated with higher cesarean rates in group 1 and group 2. The cesarean rate in the private sector in both Brazil and Australia has been found to be actually high, or about 47%.[13,17] In countries with a medium human development index such as Brazil or Latin American countries, the cesarean rate in group 5 (multiple pregnancies with previous CS) ranged from 70% to 99%.[18,19] The high rate of CS in these studies was similar to our current study (group 5). Conversely, in countries with lower cesarean rates such as the Netherlands, France, or Scandinavian countries, the cesarean rate in group 5 was between 40% and 60%, and this rate is lower in contrast to our current study. This rate is lower than our current study.[20] In our study, the results of the groups that contributed the most to the CS ratio were groups 1, 2, and 5; it was similar to the results of studies conducted in Latin America[19] and Lithuania.[21] In this

context, the increase in the CS ratio especially in group 1 and group 2 causes a domino effect for group 5. The reason for this is that women with CS once may cause medicolegal problems such as perinatal death risk and uterine rupture in other pregnancies. For this reason, physicians tend to repeat CS for pregnant women with a previous history of CS.[16] When all deliveries are examined in many developed countries, the first 4 groups (G1+G2: nulliparous, G3+G4: multiparous pregnants) without a previous CS make the highest contribution to the general CS rates.[14] In our current study, when we examined the proportion of the pregnant population to which each of the Robson 10 groups contributed, we found that the size of groups 1-4 accounted for >64% of all obstetric patients. In addition, we calculated that groups 1-4 total CSs gave a relative contribution of 32.8%. In the last 5 groups (groups 6-10), the total group size is 5.1%, and its relative contribution to the CS rate is 7.5%, which is quite low compared to the first 4 groups. In groups 1-4, our CS rates seem to be higher than WHO recommendations. Among the reasons for this, it has been reported that in primigravids, CS decisions are made more easily instead of induction application in the first place, and in this respect, more importance should be given to inductions, and also, CS decision is made more easily in multigravid pregnants because of the family's request for tubal ligation.[22] To reduce overall CS rates in hospitals, the WHO recommends that special consideration should be given to groups 1,2, and 5, which account for at least 66% of CS rates. In fact, it is recommended that the higher the overall CS rate, the greater the importance to be given to group 1.[23] Also, group 5 (group of pregnant women with ex-CS) is a group in which it is possible to reduce CS rates. The WHO recommends that this group should be 15% of the size and also have a CS ratio of 50%-60%. However, vaginal delivery after CS has significant limitations. Considering these and preparing suitable conditions and environments are important conditions for vaginal delivery after CS.[24] However, the fact that our hospital conditions are not suitable for normal delivery after CS is an important shortcoming. Other important factors affecting success are the patients who apply for the appropriate conditions and their willingness to do so in their pregnant women. However, the fact that the pregnant women who applied to our hospital had more than 2 CS and our hospital is a referral center for placenta perkrata and placenta previa cases cause the CS rate to be 99.8%, exceeding the 15% size in group 5. When we look at groups 6 and 7, the total group size for breech presentation is 1.9%, which is lower than the WHO recommendation (4%). These results are also compatible with other studies conducted in Turkey.[14,16] When group 8 (multiple pregnancies) was evaluated, its size was 0.9% and it was found less than the WHO (1.5%-2%) recommendation. The CS rate was found to be greater than 60% (94.9%). When assessing the quality of the data, WHO recommends that the size of group 9 be <1% and CD rates in this group be 100%.[25] In this study, the size of group 9 was found to be 0.35% the rate of CS in this group was found to be 100%, and the results are in line with WHO recommendations. Our data also show that preterm (<37 weeks gestation) single, cephalic infants account for 1.9 of all births, consistent with the WHO recommendation <5%, but the cesarean delivery rate was 39.5% in this patient group (group 10). This rate is higher than the WHO recommendation of 30%. The reason for this elevation may be that CS was performed before labor starts in risky pregnancies (due to fetal growth retardation, preeclampsia, and medical complications in other pregnancies) in our clinic.

Strengths and Limitations of the Study

All in-hospital births from 2018 to 2022 were included, and this may have reduced the selection bias. This study includes data from only 1 public hospital; therefore, results may not reflect all patient groups. Therefore, although it prevents the generalization of these data to the entire population, including the public and private sectors, it offers a roadmap to reduce CS rates.

In conclusion, it is necessary to take group-specific measures to reduce CS rates in target groups (group 1, group 2, and group 5). In order not to increase the rate of primary CS in nulliparous pregnant women, it may be recommended to insist on induction of labor for vaginal delivery, not to perform CS for tubal ligation in multiparous pregnant women, and to apply an external cephalic version before CS in breech presentations. In order to reduce these rates, scientific studies are needed to increase midwifery care practices and develop these practices in our country as well as in the world. Apart from this, in order to reduce the current CS rate in group 5, suitable conditions for vaginal delivery after CS should be provided. In terms of complications that may occur after these procedures, it is also necessary to legally secure health professionals.[26]

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