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Robson ten-group classification of cesarean sections in a secondary-level obstetric unit: A five-year comparative analysis with national data

İkinci basamak bir merkezde sezaryenlerin Robson on grup sınıflamasına göre değerlendirilmesi: Beş yıllık ulusal verilerle karşılaştırmalı analiz

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ABSTRACT

Aim: This study aimed to evaluate the distribution of deliveries over a five-year period in a secondary-level obstetric unit according to the Robson TGCS and to determine the contribution of each group to the overall cesarean rate. Findings were also compared with national data to identify potential targets for reducing cesarean rates.

Materials and Methods: This retrospective cohort included women aged ≥ 18 years who delivered between January 1, 2020, and December 31, 2024, in a secondary-level center. Pregnancies with a gestational age ≥24 weeks or birth weight ≥500 g were included, and cases with missing data were excluded. All deliveries were classified according to the Robson TGCS. For each group, the number of deliveries, cesarean sections, group-specific cesarean rates, and contributions to the overall cesarean rate were calculated.

Results: A total of 7,630 deliveries were analyzed, with a cesarean rate of 33.3%. Robson Group 3 was the largest group (47.6%), while Group 5 accounted for 67.4% of all cesareans. Cesarean rates in Group 1 and 3 were 11.3% and 6.4%, respectively, both lower than national data. In contrast, the rate in Group 2 was high (79.9%). The primary cesarean rate was 12.0%. The overall cesarean rate was significantly lower than the national data ($p<0.001$).

Conclusions: Lower cesarean rates were mainly driven by low-risk groups, particularly Robson Groups 1 and 3. Targeted strategies focusing on these groups may be more effective. Incorporating data from secondary care settings may better reflect real-world practice and support more rational evidence-based evaluation of cesarean rates.

Keywords: cesarean rates, Robson, secondary care

ÖZ

Amaç: *Çalışmanın amacı, ikinci basamak bir obstetrik merkezde beş yıllık dönemde gerçekleşen doğumların Robson On Grup Sınıflama Sistemi'ne göre dağılımını değerlendirmek ve her grubun toplam sezaryen oranına katkısını belirlemektir. Ayrıca elde edilen bulgular ulusal veriler ile karşılaştırılarak sezaryen oranlarının azaltılmasına yönelik hedef alanların belirlenmesi amaçlanmıştır.*

Gereç ve Yöntem: *Bu retrospektif kohorta, 1 Ocak 2020 ile 31 Aralık 2024 tarihleri arasında ikinci basamak bir merkezde doğum yapan ≥18 yaş gebeler dahil edilmiştir. Gestasyonel yaşı ≥24 hafta veya doğum ağırlığı ≥500 g olan olgular çalışmaya alınmış, temel obstetrik verileri eksik olanlar dışlanmıştır. Tüm olgular Robson On Grup Sınıflama Sistemi'ne göre sınıflandırılmıştır. Her grup için toplam doğum sayısı, sezaryen sayısı, grup içi sezaryen oranı ve toplam sezaryen oranına katkı hesaplanmıştır.*

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Bulgular: *Toplam 7.630 doğum analiz edilmiş olup bunların %33,3'ü sezaryen ile gerçekleşmiştir. En büyük grubu %47,6 ile Robson Grup 3 oluştururken, toplam sezaryenlerin %67,4'ü Grup 5'ten kaynaklanmıştır. Grup 1 ve 3'te sezaryen oranları sırasıyla %11,3 ve %6,4 olup ulusal verilerden belirgin olarak düşüktür. Buna karşılık Grup 2'de sezaryen oranı yüksektir (%79,9). Çalışmada primer sezaryen oranı %12,0 olarak bulunmuştur. Toplam sezaryen oranı ulusal verilerden anlamlı olarak düşük saptanmıştır (%33,3'e karşı %60,57; p<0,001).*

Sonuç: *İkinci basamak bir merkezde gözlenen nispeten düşük sezaryen oranı, büyük ölçüde düşük riskli gebelikleri temsil eden Robson Grup 1 ve 3'teki düşük oranlara bağlıdır. Bu gruplara yönelik hedeflenmiş stratejiler toplam sezaryen oranlarının azaltılmasında etkili olabilir. Ayrıca sezaryen oranlarının değerlendirilmesinde ikinci basamak sağlık hizmeti verilerinin kullanılması, gerçek yaşam obstetrik pratiğini daha iyi yansıtabilir ve daha rasyonel, kanıta dayalı klinik karar süreçlerini destekleyebilir.*

Anahtar Sözcükler*: Robson, sezaryen, ikinci basamak merkez*

INTRODUCTION

Cesarean delivery is a life-saving surgical intervention for both the mother and the fetus when performed for appropriate indications. However, over the past two decades, cesarean section rates have shown a marked and steady increase worldwide(1,2). Turkey is among the countries with the highest cesarean rates within the OECD, raising important concerns about the quality and rational use of obstetric care(3).

The recent increase in cesarean section rates cannot be explained solely by clinical indications. Structural factors related to the healthcare system, physician-related practices, medicolegal issues, patient preferences, and the evolving nature of obstetric care appear to play a role. In particular, the rise in primary cesarean deliveries and the subsequent cesareans have become the main contributors to the overall cesarean burden. Additionally, the increasing use of labor induction, advanced maternal age, higher rates of obesity and the increasing use of Assisted reproductive technologies (ARTs) have also been identified as contributing factors(4–6).

A standardized and clinically relevant classification system is needed to evaluate cesarean section rates more effectively and to allow comparisons between centers. The Robson Ten-Group Classification System (TGCS) was developed to meet this need, categorizes all pregnant women into ten groups based on key obstetric characteristics and is widely accepted as the gold standard for the analysis of cesarean section rates(7). Although its use has been recommended globally by the World Health Organization (WHO), a substantial proportion of studies using the Robson classification are based on data from tertiary referral centers. This may lead to an overestimation of cesarean rates due to the inherently higher risk patient populations in these settings. Therefore, data derived from secondary care institutions may better reflect real-world obstetric practice and clinical decision-making processes.

The aim of this study was to evaluate the distribution of deliveries over a five-year period in a secondary care center according to the Robson classification system, and to determine the contribution of each group to the overall cesarean section rate. In addition, the findings were compared with the existing literature and national data to identify potential target areas for reducing cesarean rates. This approach may help guide more rational and evidence-based obstetric practice.

MATERIALS and METHODS

Study Design

This retrospective cohort study was conducted at the Department of Obstetrics and Gynecology of Torbali State Hospital, a secondary care center. Data from all deliveries that occurred at our institution between January 1, 2020, and December 31, 2024, were evaluated.

All pregnant women aged 18 years and older who delivered at our center during the study period, with a gestational age of ≥24 weeks or a birthweight of ≥500 g, were included. Cases with missing essential obstetric data required for Robson classification were excluded from the analysis.

Data were obtained retrospectively from hospital records. Maternal age, parity, history of previous

cesarean delivery, gestational age, fetal presentation, multiple pregnancy status, and mode of delivery were recorded. All cases were classified according to the Robson Ten-Group Classification System (Table-1). For each Robson group, the total number of deliveries, number of cesarean deliveries, group-specific cesarean rate, and contribution to the overall cesarean rate were calculated.

Table-1. Robson Ten-Group Classification System

Robson Group	Definition
R1	Nulliparous, single, cephalic, ≥37 weeks, spontaneous labor
R2	Nulliparous, single, cephalic, ≥37 weeks, induced labor or pre-labor cesarean section
R3	Multiparous (without previous cesarean), single, cephalic, ≥37 weeks, spontaneous labor
R4	Multiparous (without previous cesarean), single, cephalic, ≥37 weeks, induced labor or pre-labor cesarean section
R5	Previous cesarean, single, cephalic, ≥37 weeks
R6	All nulliparous breech pregnancies
R7	All multiparous breech pregnancies (including previous cesarean)
R8	All multiple pregnancies (including previous cesarean)
R9	All transverse or oblique lie (including previous cesarean)
R10	All single, cephalic, <37 weeks (including previous cesarean)

Ethical Approval

Ethical approval for the study was obtained from the Ethics Committee of Ege University (Approval No: 26-3.1T/26, Date: 19.03.2026). The study was conducted in accordance with the Declaration of Helsinki and Good Clinical Practice guidelines. All data were anonymized prior to analysis, and patient confidentiality was strictly maintained.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics, Version 26.0 (IBM Corp., Armonk, NY, USA). The distribution of continuous variables was assessed using the Kolmogorov–Smirnov test and visual inspection of histograms. Normally distributed variables were presented as mean ± standard deviation, while non-normally distributed variables were expressed as median (interquartile range). Categorical variables were summarized as frequencies and percentages (%).

Comparisons between groups were performed using the Student's t-test or Mann–Whitney U test for continuous variables, and the chi-square test or Fisher's exact test for categorical variables, as appropriate.

In addition, subgroup analyses were conducted within primary groups excluding women with a previous cesarean section (Robson groups 1, 2, 3, 4, and 6), and cesarean rates within these groups were evaluated separately.

A p-value <0.05 was considered statistically significant.

RESULTS

A total of 7,630 deliveries that occurred at our hospital during the study period were included in the analysis. Of these, 5,087 (66.7%) resulted in vaginal delivery and 2,543 (33.3%) in cesarean section. The mean maternal age was 26.9 ± 5.4 years, and the median parity was 1. The mean birth weight was 3,232 ± 440 g.

Of the study population, 12.8% were nulliparous, 47.9% had one previous delivery, and 39.4% had two or more previous deliveries. According to the Robson classification, the largest group was Group 3 (47.6%), followed by Group 5 (22.7%) and Group 1 (22.4%). The descriptive characteristics of the study population are presented in Table-2.

When compared according to mode of delivery, the mean maternal age was 26.1 ± 5.3 years in the vaginal delivery group and this was significantly higher in the cesarean section group (28.4 ± 5.4 years, p<0.001). There was no significant difference between the groups in terms of birth weight (p=0.059). In terms of parity, cesarean delivery was more common among nulliparous women and those with one previous delivery, whereas vaginal delivery was more frequent in multiparous women (p<0.001). The comparison of cases according to mode of delivery is presented in Table-3.

When the distribution of the 2,543 cesarean deliveries was analyzed according to the Robson classification, Group 5 was identified as the largest contributor to the overall cesarean rate (n=1,714;

67.4%). This group also had the highest group-specific cesarean rate (99.0%) and alone accounted for approximately two-thirds of all cesarean deliveries. Although Robson Group 3 represented the largest proportion of the cohort (47.6%), the cesarean rate within this group was relatively low (6.4%), and its contribution to the overall cesarean rate was limited (9.1%). The cesarean rate was 11.3% in Group 1, whereas it increased markedly to 79.9% in Group 2. The distribution of cesarean section rates according to Robson groups is presented in Table-4.

A significant association was observed between cesarean indications and Robson groups (χ^2=8343, p<0.001). In Group 5, the indication for cesarean delivery was previous uterine surgery in nearly all cases (98.8%). In Group 1, the most common indication was prolonged labor (83.9%). Fetal distress was the leading indication in Groups 2 and 3, while non-cephalic presentations predominated in Groups 6 and 7. In Group 8, multiple pregnancy was identified as the main indication (Table-5).

Cesarean rates were further analyzed in groups excluding women with a previous cesarean section (Groups 1, 2, 3, 4, and 6). Among a total of 5,715 deliveries in these groups, 684 (12.0%) resulted in cesarean section. The highest primary cesarean rates were observed in Group 6 (97.0%) and Group 2 (79.9%). However, in terms of overall contribution, the largest share of primary cesarean deliveries originated from Group 3 (33.8%) and Group 1 (28.2%). The distribution of primary cesarean deliveries according to Robson groups is presented in Table-6.

In Figure-1, cesarean section rates in our center are presented according to Robson groups and compared with WHO reference group-specific cesarean rates derived from multicenter data, as well as national data(8). Cesarean section rates in our center were lower than the reference values, particularly in Robson 1 and 3; whereas higher values were observed in Groups 2,8 and 10. The remaining groups showed results comparable to WHO reference data.

Table-7 shows the comparison of group-specific cesarean section rates between our cohort and national data(8). Cesarean rates differed significantly in Robson Groups 1, 2, 3, and 4 (p<0.001 for all). In contrast, no significant differences were observed in Groups 5 and 6 (p=0.068 and p=0.514, respectively). In Groups 7 and 8, cesarean rates were significantly different from national data (p=0.002 and p<0.001, respectively), whereas no statistically significant differences were found in Groups 9 and 10 (p=0.414 and p=0.056, respectively). Overall, the total cesarean rate in our center was significantly lower than the national rate (33.3% vs 60.57%; p<0.001).

Table-2. General characteristics of the cohort

Variable	Overall cohort
Total deliveries, n	7630
Vaginal delivery, n (%)	5087 (66.7)
Cesarean delivery, n (%)	2543 (33.3)
Age, years	26.9 ± 5.4
Parity, median (IQR)	1 (1)
Birth weight, g	3232 ± 440
Nulliparous, n (%)	973 (12.8)
Parity = 1, n (%)	3651 (47.9)
Parity ≥2, n (%)	3006 (39.4)
Robson group 1, n (%)	1710 (22.4)
Robson group 2, n (%)	149 (2.0)
Robson group 3, n (%)	3631 (47.6)
Robson group 4, n (%)	126 (1.7)
Robson group 5, n (%)	1731 (22.7)
Robson group 6, n (%)	99 (1.3)
Robson group 7, n (%)	64 (0.8)
Robson group 8, n (%)	42 (0.6)
Robson group 9, n (%)	39 (0.5)
Robson group 10, n (%)	39 (0.5)

Values are presented as mean ± standard deviation, median (IQR), or n (%), as appropriate.

Table-3. Comparison of baseline characteristics according to delivery route

Variable	Vaginal delivery (n=5087)	Cesarean delivery (n=2543)	p value
Age, years	26.1 ± 5.3	28.4 ± 5.4	<0.001
Birth weight, g	3225 ± 433	3246 ± 452	0.059
Parity category, n (%)			<0.001
0	609 (12.0)	364 (14.3)	
1	2376 (46.7)	1275 (50.1)	
≥2	2102 (41.3)	904 (35.5)	

Values are presented as mean ± standard deviation, median (IQR), or n (%), as appropriate. Continuous variables were compared using Student's t-test or Mann–Whitney U test, and categorical variables were compared using the chi-square test.

Table-4. Distribution of cesarean deliveries across Robson classification groups

Robson group	Cesarean deliveries, n	Proportion of all cesarean deliveries (%)	Total births, n	Proportion of all deliveries (%)	Group-specific cesarean rate (%)	Proportion of all deliveries represented by cesareans in this group (%)
R1	193	7.6	1710	22.4	11.3	2.5
R2	119	4.7	149	2.0	79.9	1.6
R3	231	9.1	3631	47.6	6.4	3.0
R4	45	1.8	126	1.7	35.7	0.6
R5	1714	67.4	1731	22.7	99.0	22.5
R6	96	3.8	99	1.3	97.0	1.3
R7	55	2.2	64	0.8	85.9	0.7
R8	30	1.2	42	0.6	71.4	0.4
R9	39	1.5	39	0.5	100.0	0.5
R10	21	0.8	39	0.5	53.8	0.3
Total	**2543**	**100.0**	**7630**	**100.0**	**33.3**	**33.3**

Values are presented as n or %. Group-specific cesarean rate was calculated as the number of cesarean deliveries in each Robson group divided by the total number of deliveries in that group. The proportion of all cesarean deliveries was calculated relative to the total number of cesarean deliveries in the cohort.

Table-5. Leading cesarean section indications according to Robson group

Robson group	Total cesarean deliveries, n	Most common indication, n (%)	Second most common indication, n (%)	Third most common indication, n (%)
R1	193	Prolonged labor, 162 (83.9)	Presentation abnormalities, 22 (11.4)	Placental abnormalities, 6 (3.1)
R2	119	Fetal distress, 46 (38.7)	Cephalopelvic disproportion, 38 (31.9)	Prolonged labor, 22 (18.5)
R3	231	Fetal distress, 112 (48.5)	Uterine surgery history, 81 (35.1)	Prolonged labor, 22 (9.5)
R4	45	Prolonged labor, 14 (31.1)	Cephalopelvic disproportion, 12 (26.7)	Fetal macrosomia, 8 (17.8)
R5	1714	Uterine surgery history, 1693 (98.8)	Fetal distress, 7 (0.4)	Cephalopelvic disproportion, 5 (0.3)
R6	96	Presentation abnormalities, 90 (93.8)	Fetal distress, 4 (4.2)	Uterine surgery history, 2 (2.1)
R7	54	Presentation abnormalities, 47 (87.0)	Uterine surgery history, 3 (5.6)	Twin pregnancy, 2 (3.7)

R8	30	Twin pregnancy, 28 (93.3)	Uterine surgery history, 2 (6.7)	–
R9	39	Presentation abnormalities, 24 (61.5)	Uterine surgery history, 11 (28.2)	Placental abnormalities, 2 (5.1) / Cephalopelvic disproportion, 2 (5.1)
R10	21	Uterine surgery history, 9 (42.9)	Fetal distress, 5 (23.8)	Abruptio placentae, 4 (19.0)

Values are presented as n (%), with percentages calculated within each Robson group. Only cesarean deliveries with a recorded indication were included in this analysis (n=2542). One cesarean case had missing indication data and was excluded.

[H1]

Table-6. Distribution of cesarean deliveries in definite-primary Robson groups

Robson group	Total births, n	Cesarean deliveries, n	Group-specific cesarean rate (%)	Proportion of cesarean deliveries within definite-primary groups (%)
R1	1710	193	11.3	28.2
R2	149	119	79.9	17.4
R3	3631	231	6.4	33.8
R4	126	45	35.7	6.6
R6	99	96	97.0	14.0
Total	**5715**	**684**	**12.0**	**100.0**

Values are presented as n and %. Definite-primary Robson groups were defined as groups 1, 2, 3, 4, and 6, in which previous cesarean delivery is excluded. Group-specific cesarean rate was calculated as the number of cesarean deliveries divided by the total number of deliveries in the corresponding Robson group.

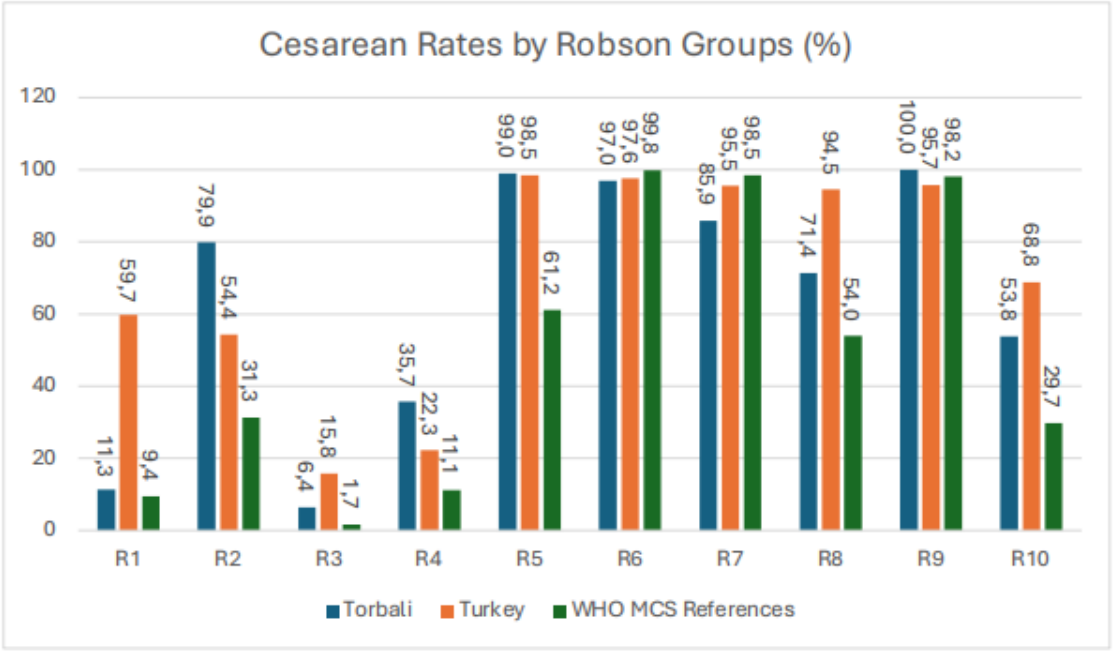

Figure-1. Comparison of cesarean section rates by Robson groups with Turkey and WHO reference data (data derived from Birinci et al.(8))

Table-7. Comparison of group-specific cesarean section rates between our cohort and national data

Robson group	Torbali Group-specific cesarean rate (%)	Türkiye Group-specific cesarean rate (%)	P value
R1	11.3	59.67	<.001
R2	79.9	54.37	<.001
R3	6.4	15.84	<.001
R4	35.7	22.33	<.001
R5	99.0	98.48	0.068
R6	97.0	97.61	0.514
R7	85.9	95.54	0.002
R8	71.4	94.47	<.001
R9	100.0	95.72	0.414
R10	53.8	68.84	0.056
Total	**33.3**	**60.57**	**<.001**

DISCUSSION

In this study, deliveries in a secondary care center were evaluated according to the Robson classification system, and the contribution of each group to the overall cesarean section rate was assessed. The most notable finding was that although the overall cesarean rate in our cohort (33.3%) was significantly lower than the national data, this difference was mainly attributable to lower cesarean rates in Robson Groups 1 and 3, which represents low-risk pregnancies. In contrast, cesarean rates in Groups 5 and 6 characterized by previous cesarean delivery and higher-risk obstetric features, were comparable to national data. These findings suggest that differences in overall cesarean rates are largely determined by group-specific distributions rather than uniformly reduced rates across all obstetric populations.

In recent years, a marked increase in cesarean section rates has been observed worldwide. Global analyses have shown that rates exceeding 10-15% do not provide additional benefits in terms of maternal and neonatal morbidity; however, current data indicate that cesarean rates have surpassed 50% in some countries (1,2). WHO recommends that cesarean rates be evaluated not only as an overall figure but also within clinically meaningful subgroups(9). In response to that, the Robson Ten-Group Classification System was developed and has become the most widely used and recommended method for analyzing cesarean section rates(7,10). TGCS classifies deliveries into ten groups according to variables such as parity, previous cesarean delivery, gestational age, fetal presentation, multiple pregnancy and onset of labor (9,10).

The findings of our study are largely consistent with the existing literature. In particular, the prominent contribution of Robson 5 to the overall cesarean burden aligns with the numerous studies demonstrating that a history of previous cesarean delivery is one of the most important determinants of cesarean rates(9,11). In our cohort, the cesarean rate in Robson Group 5 was 99.0%. Comparable rates have been reported by Eyi et al. (97%) and Tontus et al (96.9%), as well as in the nationwide study from Turkey by Birinci et al (98.48%)(8,12,13). In contrast, WHO reference data suggest that cesarean rates in this group should be considerably lower (around 61.2%), with VBAC strongly encouraged in selected cases. The low rate of VBAC in our setting might be related to medicolegal concerns, which are known to influence clinical decision-making in obstetric practice, consistent with prior literature. In our cohort, only a small number of VBAC cases were observed (n=17), most of which occurred when patients presented in active labor in admission.

Another notable finding of our study was the markedly low cesarean rates observed in Robson Groups 1 and 3, which represent low-risk pregnancies (11.3% and 6.4%, respectively). These rates were close to WHO reference values and significantly lower than those reported in national data. Previous studies have emphasized that, due to their large contribution to the overall number of deliveries, Robson Group 1 and 3 play a central role in determining overall cesarean rates, and even small changes within these groups may have a substantial impact on total cesarean rates(9). In a study conducted in Turkey, cesarean rates in Groups 1 and 3 were reported as 54.75% and 21.5%, respectively (14). Similarly, Tontus et al reported rates of 33.2% for Group 1 and 12.5% for Group 3 (13), while a nationwide

study by Birinci et al reported rates of 59.67% and 15.84%, respectively(8). In our cohort, Group 3 accounted for nearly half of all deliveries, yet the cesarean rate in this group was only 6.4%, making it one of the main contributors to the overall lower cesarean rate observed in our study. The most common indications for cesarean delivery in Groups 1 and 3 were prolonged labor (83.9%) and fetal distress (48.5%). These findings suggest that in these key groups where primary cesarean rates are largely determined, a more careful and standardized reassessment on indications such as fetal distress, prolonged labor, and cephalopelvic disproportion before proceeding to cesarean delivery may contribute to a meaningful reduction in overall cesarean rates.

A substantial proportion of nationally reported data are derived from tertiary referral centers. This may lead to an overestimation of cesarean section rates at the national level. Findings from the nationwide study by Birinci et al support this interpretation, showing that cesarean rates vary considerably according to the type of the healthcare institution(8). Cesarean rates have been reported as 44.2% in Ministry of Health hospitals, compared with 74-75% in university hospitals and up to 77.4% in private hospitals(8). Similarly, the study by Kinci et al, which was conducted in a university, reported a cesarean rate of 64.98%(14). The data presented by Eyi et al were also derived from a tertiary care setting(12). These differences are likely attributable, at least in part, to the higher risk-patient profiles typically managed in tertiary centers, as well as the referral of more complicated cases to these institutions. In addition, easier access to advanced diagnostic and interventional resources, greater medicolegal concerns, and a lower threshold for intervention aimed at minimizing potential maternal and fetal risks may further contribute to higher cesarean rates in these settings. Notably, even among comparable centers, cesarean rates may vary considerably. This suggests that factors beyond patient characteristics play an important role. Variability in the objectivity and standardization of cesarean indications, differences in clinical decision-making thresholds and experience among clinicians, institutional practices, and cultural factors may all contribute to this heterogeneity.

In our study, when women with a previous cesarean section were excluded, the overall cesarean rate was 12.0%, indicating a relatively low primary cesarean burden. Previous studies have consistently shown that primary cesarean rates are a key determinant of overall cesarean rates, and that increases in primary cesareans contribute to a cumulative rise in repeat cesarean deliveries over time (6,9,11).

When the distribution of primary cesarean deliveries was examined by Robson groups, the highest rates were observed in Group 6 (97.0%) and Group 2 (79.9%). Notably, the rate in Group 2 exceeded the national average. The markedly high cesarean rate in Group 2 may reflect a more liberal approach to labor induction in nulliparous women or a lower threshold for pre-labor cesarean delivery. This finding is consistent with the literature identifying these groups as having an increased risk of cesarean delivery(8,14). It has been reported that, in Group 2, failed induction and pre-labor cesarean delivery are the main reasons of cesarean rates, whereas in Group 6, breech presentation plays a central role(10). Despite the high cesarean rates observed in these groups, several studies have shown that their overall contribution to total cesarean burden remains limited. In contrast, low-risk groups with a large share of total deliveries – particularly Groups 1 and 3 – are the main determinants of overall cesarean rates(9). In parallel with these findings, although Robson Group 3 constituted the largest proportion of our cohort (47.6%), the cesarean rate within this group was low, and its contribution to the overall cesarean rate remains limited.

One of the main strengths of this study is the comprehensive and standardized analysis of all deliveries using the Robson Ten-Group Classification System. The relatively large sample size, the inclusion of a five-year study period, and the use of real-world data from an unselected obstetric population in a secondary care center represent additional strengths of the study.

Most studies based on the Robson classification are derived from tertiary referral centers. This may lead to an overestimation of cesarean section rates due to the higher-risk patient populations in these settings. In contrast, the present study was conducted in a secondary care center, reflecting a more heterogenous and generally lower-risk obstetric population. From this perspective, our findings may better represent real-world obstetric practice.

This study has several limitations. First, due to its retrospective design, detailed data on factors that may influence clinical decision-making – such as physician and patient preferences and medicolegal issues – were not available. Second, the single center nature of the study may limit the generalizability of the findings. In addition, although the Robson classification is based on obstetric characteristics, it does not allow direct assessment of the clinical appropriateness or necessity of cesarean indications. The inclusion of the COVID-19 pandemic period may also have influenced obstetric management strategies and clinical decision-making. Given that several studies have reported increased cesarean rates during the pandemic, this should be considered a potential confounding factor when interpreting the results. The proportion of nulliparous women in our cohort (12.8%) was notably lower than national averages, which may reflect the demographic characteristics of the local population served by our center. As detailed data on the regional population profile were not available, the extent to which this may have influenced the distribution of Robson groups and the overall cesarean rate remains uncertain. Finally, the relatively small sample sizes in some Robson groups (particularly Groups 7,8,9 and 10) may have limited the statistical power of analyses within these groups. Moreover, the absence of multivariable analysis to control for potential confounders represents an additional limitation of the study.

CONCLUSION

This study provides a detailed analysis of cesarean section rates in a secondary care setting using the Robson classification system and highlights the importance of evaluating cesarean rates not only as an overall measure but also in terms of group-specific distributions.

The findings demonstrate that the relatively low overall cesarean rate observed in our cohort is largely attributable to lower rates in Groups 1 and 3, which represent low-risk pregnancies. Even modest reductions in cesarean rates within these groups may have a meaningful impact on the overall cesarean burden.

By presenting real-world data from a secondary care setting, this study further suggests that reductions in overall cesarean rates may be achieved primarily through improvements in low-risk Robson groups rather than high-risk populations. These findings may support a greater focus on secondary care settings and low-risk obstetric populations when designing strategies to reduce cesarean rates.

In conclusion, strategies aimed at reducing cesarean rates should be based on targeted, group-specific approaches – particularly on low-risk Robson groups – rather than generalized interventions applied to all pregnancies. Such an approach may help reduce unnecessary cesarean deliveries and support more rational, evidence-based obstetric care.

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