



## Results of Using the Robson Classification in Kazakhstan

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### Abstract

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**BACKGROUND:** Over the past few decades, the cesarean section frequency has increased significantly in many countries around the world, especially in the countries with high and medium income. The World Health Organization recommends 10–15% as the optimum cesarean section frequency. In Kazakhstan, the frequency of operative delivery in 2018 was 23.5%.

**AIM:** The article is aimed at analyzing the caesarean section frequency following the Robson classification in Kazakhstan at Level II and III obstetric institutions, identifying the groups that make the greatest contribution to the overall cesarean section frequency, studying the clinical reasons in these groups, and identifying the ways to reduce unneeded cesarean sections.

**METHODS:** A prospective study was performed at the Level II and III obstetric facilities in Almaty. On admission for delivery, all women were assigned following the Robson classification. The indices of cesarean section in each of 10 groups and the absolute and relative contribution to the overall cesarean section frequency were calculated. The patient data were prospectively entered into a computer application and processed in MS Excel and Statistica version 23. The results were presented using the Robson classification. The odds ratios were calculated with a confidence interval of 95%.

**RESULTS:** For the period from January 1, 2019, to December 31, 2019, 12,395 women parturied at Level II and III obstetric facilities. The main contributors to the overall cesarean section frequency at Level II and III obstetric facilities were Group 5 (multiparous women with uterine scars) – 46.3% (Level II facility) and 37.5% (Level III facility), Group 2 (12.4%) and (12.4%), Group 1 (12%) and (9.6%), and Group 10 (11.4%) at the Level III facility.

**CONCLUSION:** The Robson classification has been used for the 1<sup>st</sup> time in Kazakhstan which has made it possible to identify the reasons that make the greatest contribution to the overall cesarean section frequency. The use of monitoring for analyzing the cesarean section frequency will make it possible to compare the Kazakhstan data with the foreign data and determine the organizational measures aimed at reducing the frequency of operative delivery. The strategies to reduce unneeded cesarean section should focus on reducing the cesarean section frequency in nulliparous women. In the absence of contraindications, natural delivery should be advised to the women with uterine scars.

## Introduction

At present, one of the urgent problems in obstetrics is the increasing frequency of cesarean sections worldwide. The cesarean section frequency increased from 6.7% in 1990 to 19.1% in 2014, representing an absolute increase of 12.4% [1]. In 2015, 21.1% of the deliveries were through cesarean section, which exceeded twice the same figure for 2000 (12.1%) [2]. The highest cesarean section frequency has been observed in Latin America and the Caribbean, where it has been used in 44.3% of the cases, the lowest frequency has been observed in West and Central Africa (4.1%) [3]. The economic inequality in the access to emergency obstetric care in low-income and high-income countries is a pressing issue. It should be noted that the number of cesarean sections is increasing worldwide; however, in low-income countries, the frequency of surgical interventions has remained very low for several

decades [4], [5], [6]. In the Republic of Kazakhstan, the cesarean section frequency had increased from 4.6% in 1990 to 23.5% in 2018 [7] (Figure 1).

The results of the World Health Organization (WHO) study as well as the results of comprehensive scientific studies and systematic reviews confirm that the level of cesarean sections above 10–15% is hardly substantiated from the medical point of view, and further increase in the cesarean section frequency does not further decrease maternal and perinatal mortality [5], [8], [9]. The use of operative delivery leads to various consequences for the mother and the child, such as placentation anomalies, intraoperative complications, and the risk of hysterectomy; in addition, there is evidence that children born through cesarean section are exposed to various hormonal, physical, and bacterial effects [2], [10], [11], [12].

Due to the increased cesarean section frequency in the Republic of Kazakhstan and aiming

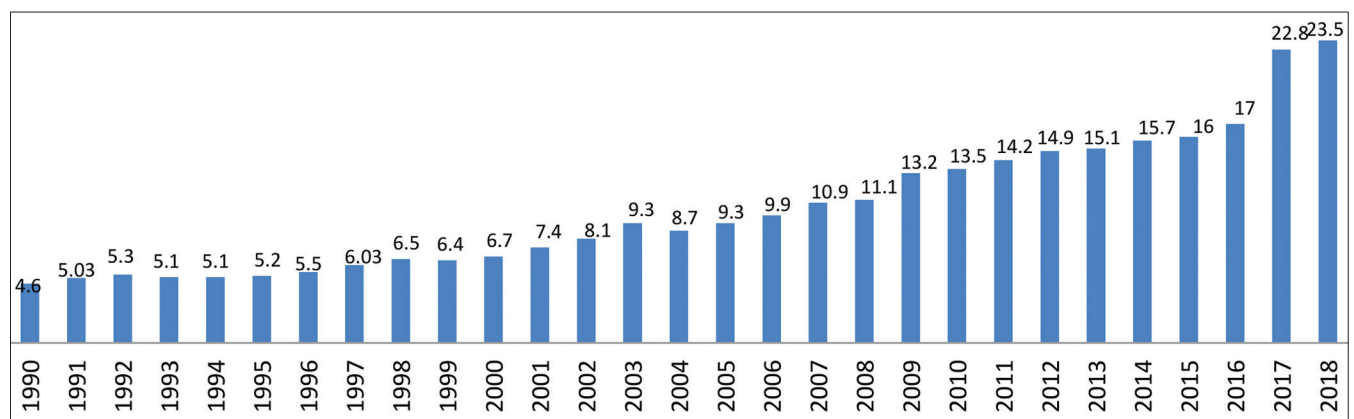


Figure 1: The cesarean section frequency in the Republic of Kazakhstan for 1990–2018

at identifying the ways to reduce unneeded cesarean section surgeries, the cesarean sections frequency for the period from January 2019 to December 2019 was analyzed for the 1<sup>st</sup> time overtime and across facilities using the Robson 10 group classification, as recommended by the WHO (2015) and the FIGO (2016) as a global standard for assessing, monitoring, and comparing the cesarean section frequency at health-care facilities [13], [14], [15], [16], [17].

## Materials and Methods

A prospective study was performed at the clinical base of the Department of Obstetrics and Gynecology of the Asfendiyarov Kazakh National Medical University (KazNMU) at Level II and III obstetric institutions of Almaty during the period from January 1, 2019, to December 31, 2019.

The Center for Perinatology and Pediatric Cardiac Surgery is a specialized Level III obstetric facility (Group 1,  $n = 6928$ ); the Maternity Hospital No. 5 (Unitary Enterprise based on the Right of Economic Management) is a Level II obstetric facility in Almaty (Group 2,  $n = 5472$ ).

Based on five obstetric characteristics, all women admitted for delivery were divided into 10 groups.

The study had been approved by the local ethics committee of KazNMU.

### Statistical processing

The patient data were prospectively entered into a computer application and processed in MS Excel and Statistica version 23. The differences were analyzed by Chi-square test with a significance level of  $< 0.05$ . The relative group size, the absolute contribution, the relative contribution, and the cesarean section frequency were calculated, and odds ratios

were calculated with a 95% confidence interval in each group.

## Results

The total of 12,395 women parturied in these hospitals. In the Level III obstetric facility, out of 6928 deliveries, 2502 (36.1%) were through cesarean section, and in the Level II obstetric facility, during the study period, 5472 women parturied, 948 of which had cesarean section (17.3%).

In the Level III obstetric facility, Groups 5 (13.6%), 2 (4.5%), 10 (4.1%), and 1 (3.5%) made the largest contribution to the overall cesarean section frequency –36.1%.

According to the Robson classification, at the Level II obstetric facility, the main contributors were Groups 5 (8.02%), 2 (2.2%), 1 (2.08%), and 4 (1.4%) in the overall cesarean section frequency of 17.3%. Distribution of the women by the Robson classification groups is shown in Table 1.

Cesarean section was performed in a planned manner in obstetrical facilities of the Level II (63.1%) and in the obstetrical facilities of the Level III (52.8%).

Emergency operative delivery was performed in 36.8% of the cases at the Level II hospital and 47.1% of the cases at the Level III hospital (Figure 2).

The analysis showed that the main reasons for emergency cesarean section at both hospitals were threatening fetal condition (30% and 37.6%), followed by inefficient induction (10.6% and 19%), 1<sup>st</sup> stage of labor (4.2% and 12.6%), etc. The results of analyzing the indications for operative delivery are shown in Figure 3.

The analysis showed that the main reasons for planned cesarean section at Level II and III hospitals were scar (scar + refusal of the woman) (46% and 58%), extragenital pathology (10% and 11.4%), pelvic (footing, transverse, and diagonal) fetus presentation

**Table 1: The results of the analysis following the Robson classification at the Level II and III hospitals in 2019–2020.**

Robson group	Number of CS		Number of deliveries		Relative group size							
	Level II hospital	Level III hospital	Level II hospital	Level III hospital	Level II hospital		Level III hospital					
					%	95% CI	%	95% CI				
Group 1	114	240	918	1,227	16.8	15.8–17.8	17.7	16.8–18.6				
Group 2	118	311	477	854	8.7	8–9.5	12.3	11.5–13.1				
Group 3	48	133	2,519	2,031	46.0	44.7–47.4	29.3	28.2–30.4				
Group 4	74	125	903	880	16.5	15.5–17.5	12.7	11.9–13.5				
Group 5	439	939	444	1056	8.1	7.4–8.9	15.2	14.4–16.1				
Group 6	51	115	52	119	1.0	0.7–1.2	1.7	1.4–2				
Group 7	50	126	57	134	1.0	0.8–1.3	1.9	1.6–2.3				
Group 8	9	176	10	195	0.2	0.1–0.3	2.8	2.4–3.2				
Group 9	18	53	18	58	0.3	0.2–0.5	0.8	0.6–1.1				
Group 10	27	284	74	374	1.4	1–1.7	5.4	4.9–5.9				
Total	948	2502	5472	6928	1,00.0	-	1,00.0	-				
Robson group	Absolute contribution				Relative contribution				CS frequency in each group			
	Level II hospital		Level III hospital		Level II hospital		Level III hospital		Level II hospital		Level III hospital	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Group 1	2.1	1.7–2.5	3.5	3.1–3.9	12.0	9.9–14.1	9.6	8.8–10.4	12.4	11.5–13.3	19.6	18.6–20.5
Group 2	2.2	1.8–2.5	4.5	4–5	12.4	10.3–14.6	12.4	11.5–13.3	24.7	23.6–25.9	36.4	35.3–37.6
Group 3	0.9	0.6–1.1	2	1.7–2.3	5.1	3.6–6.5	5.3	4.7–5.9	1.9	1.5–2.3	6.5	6–7.1
Group 4	1.4	1–1.7	1.8	1.5–2.1	7.8	6.1–9.5	5.0	4.4–5.6	8.2	7.5–8.9	14.2	13.4–15
Group 5	8.0	7.3–8.8	13.6	12.8–14.4	46.3	43.1–49.5	37.5	36.2–38.8	98.9	98.6–99.2	88.9	88.2–89.7
Group 6	0.9	0.7–1.2	1.6	1.3–1.9	5.4	3.9–6.8	4.6	4–5.2	98.1	97.7–98.4	96.6	96.2–97.1
Group 7	0.9	0.7–1.2	1.8	1.5–2.1	5.3	3.8–6.7	5.0	4.4–5.6	87.7	86.8–88.6	94.0	93.5–94.6
Group 8	0.2	0.1–0.3	2.5	2.1–2.9	0.9	0.3–1.6	7.0	6.3–7.7	90.0	89.2–90.8	90.3	89.5–91
Group 9	0.3	0.2–0.5	0.7	0.5–0.9	1.9	1–2.8	2.1	1.7–2.5	100.0	-	91.4	90.7–92.1
Group 10	0.5	0.3–0.7	4.1	3.6–4.6	2.8	1.8–3.9	11.4	10.5–12.2	36.5	35.2–37.8	75.9	74.9–77
Total	17.3	16.3–18.3	36.1	34.9–37.3	1,00.0	-	100.0	-	17.3	16.3–18.3	36.1	35–37.3

(13% and 12.6%), burdened obstetric and gynecological anamnesis + infertility (11.8% and 4.8%), etc.

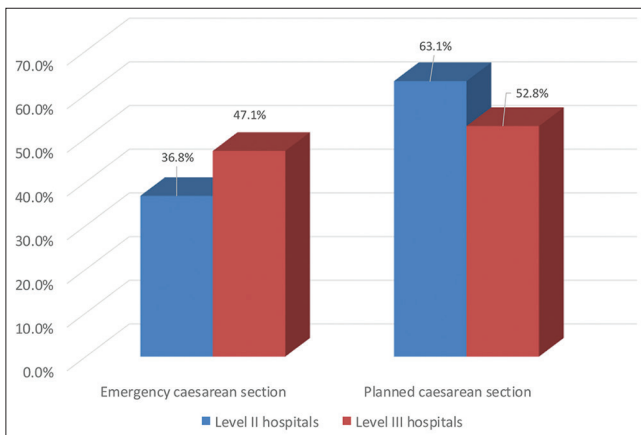


Figure 2: The frequency of planned and emergency cesarean section at the Level II and III hospitals in 2019–2020

At both hospitals, the main contributor to the overall cesarean section frequency was Group 5 – 8.02% (17.3%) for the Level II hospital and 13.6% (36.1%) for the Level III hospital. The cesarean section frequency was 98.8% and 89%. At the Level II hospital, 77% were women with a single uterine scar; at the Level III hospital, the value was 69%. At the Level II hospital, 91.3% of the cases were planned and 8.6% of the cases were urgent. At the Level III hospital, 84.6% of the cases were planned and 15.3% of the cases were urgent. The women with natural delivery with a single uterine scar accounted for 11% at the Level III hospital; at the Level II hospital, this Figure 4 was only 1%.

In Groups 1 and 2 at both hospitals, the cesarean section frequency was high. It should be noted that recently, an increase has been observed in the operative delivery in nulliparous women. Women with uterine scar are the most likely to be subjected to cesarean section in the future and, accordingly, the number of multiparous

women with uterine scar will increase. The authors analyzed the clinical indications for operative delivery. The main indications were threatening fetal condition, 2<sup>nd</sup> stage of labor + incorrect asynclitism, maternal cause, clinically narrow pelvis + large fetus, premature detachment of normally situated placenta, preeclampsia, and placental presentation (Figure 5).

The analysis of Groups 2 and 4 showed that the reasons for cesarean section were the growing number of women with extragenital pathology, women with burdened obstetric and gynecological history, nulliparous women who had used *in vitro* fertilization, pregnant women with hypertensive disorders, pregnancy diabetes, ophthalmological diseases, and other high-risk states. The clinical indications in Group 2 at Level II and III obstetric facilities are shown in Figure 6.

According to the data of the authors, Level III obstetric facility showed a high increase in operative delivery in Group 10. The cesarean section frequency amounted to 76% (284 women out of 374). The indications for operative delivery in Group 10 were threatening fetal condition (41.2%), maternal reasons (14.7%), severe preeclampsia (11.6%), premature detachment of normally situated placenta (8.5%), placental presentation (7.4%), pre-delivery ROM + uterine scar (5.6%), ineffective labor induction (5.3%), uterine rupture threat (3.5%), and the 1<sup>st</sup> stage of labor (2.1%) (Figure 7).

In Groups 6 and 7 (nulliparous and multiparous women with pelvic fetus presentation), there will always be high cesarean sections frequency, despite the small number of women in them. In these groups, it is possible to reduce the number of operative deliveries with pelvic fetus presentation by increasing the number of natural deliveries, especially in the group of multiparous patients.

The analysis of Group 8 (all women with multifetal pregnancies) shows that the growing number of

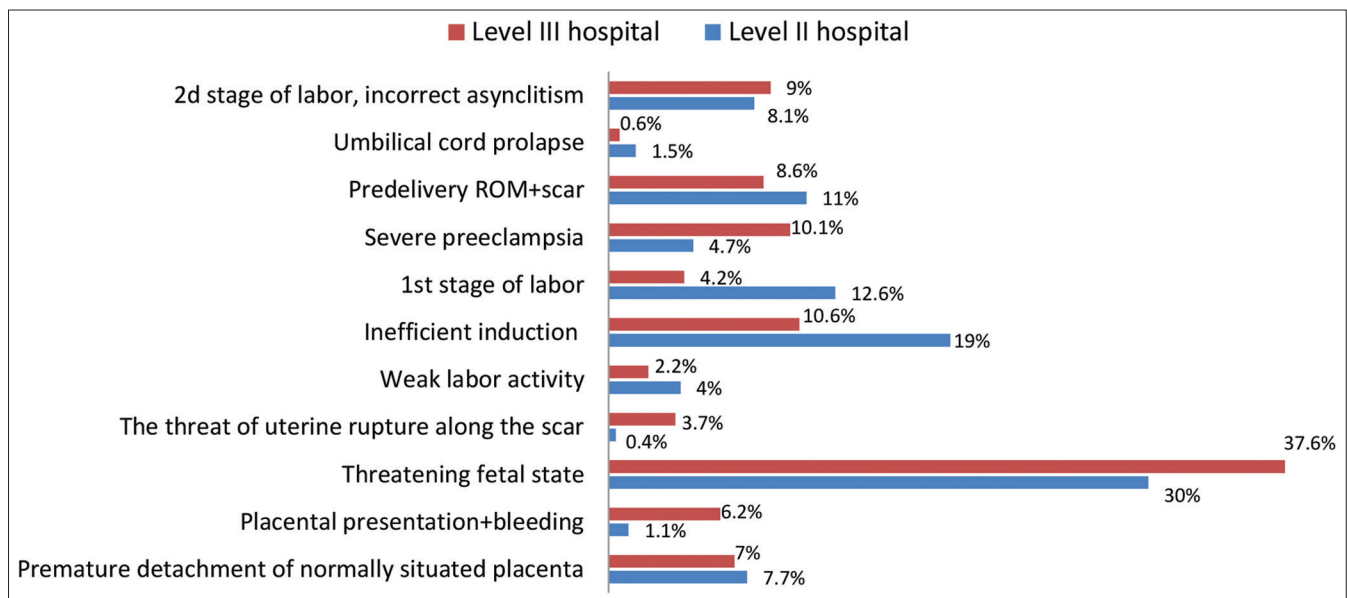


Figure 3: Indications for emergency cesarean section at Level II and III hospitals

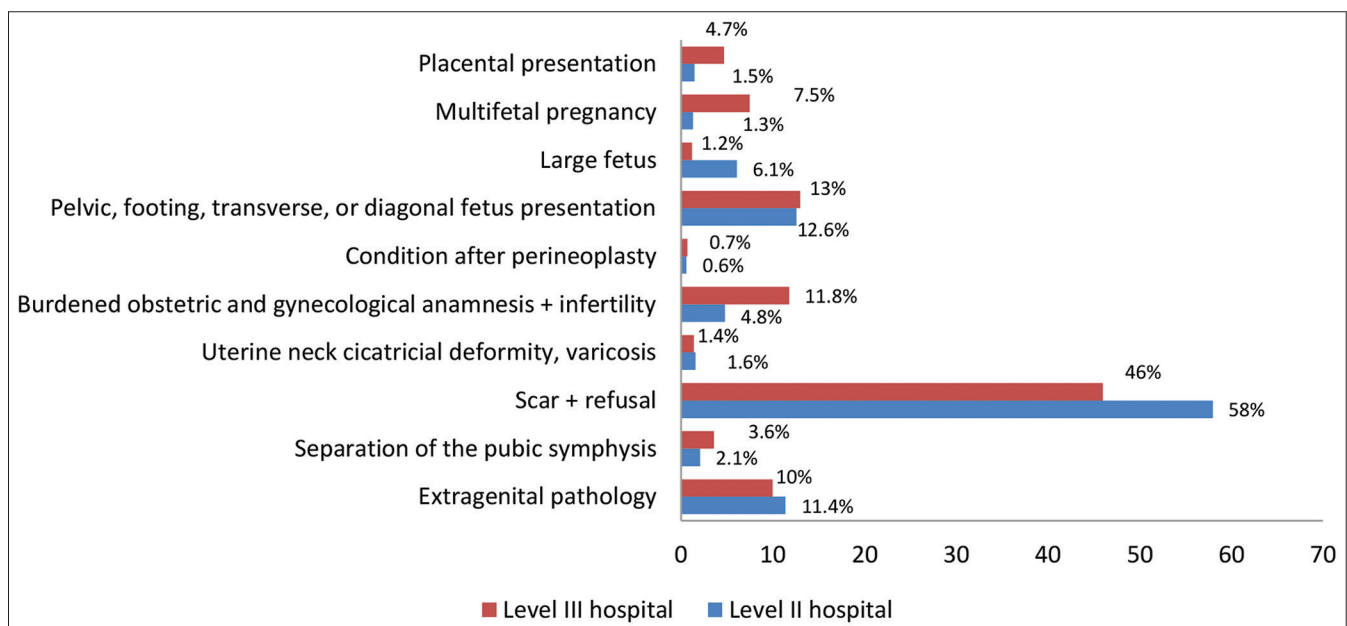


Figure 4: Indications for planned cesarean section at Level II and III hospitals

assisted reproductive technologies, treatment of women infertility, and the large number of multifetal pregnancies will lead to the highest likelihood of cesarean section.

In Group 9 (all women with a singleton pregnancy, with transverse or diagonal fetus presentation, including women with uterine scars), the cesarean section frequency will always be 100%.

## Discussion

The authors' analysis showed that the use of the Robson international classification was an

easy-to-implement tool that allowed standardizing comparison of the cesarean section frequency and identifying groups of women that contributed to increasing the cesarean section frequency.

In the study, Group 5 (multiparous women with uterine scar) was the largest contributor to the total cesarean section frequency of 8.02% for the Level II hospital and 13.6% for the Level III hospital. The data of the authors were consistent with the data of the WHO studies in many countries, which had also confirmed that cesarean section had been most often made to the women with uterine scars [18]. The analysis of the indications in this group showed that scar (scar + refusal of the woman) was the main reason for operative delivery in 58% of the cases for the Level II hospital and in 46% of the cases for the Level III hospital. Cesarean

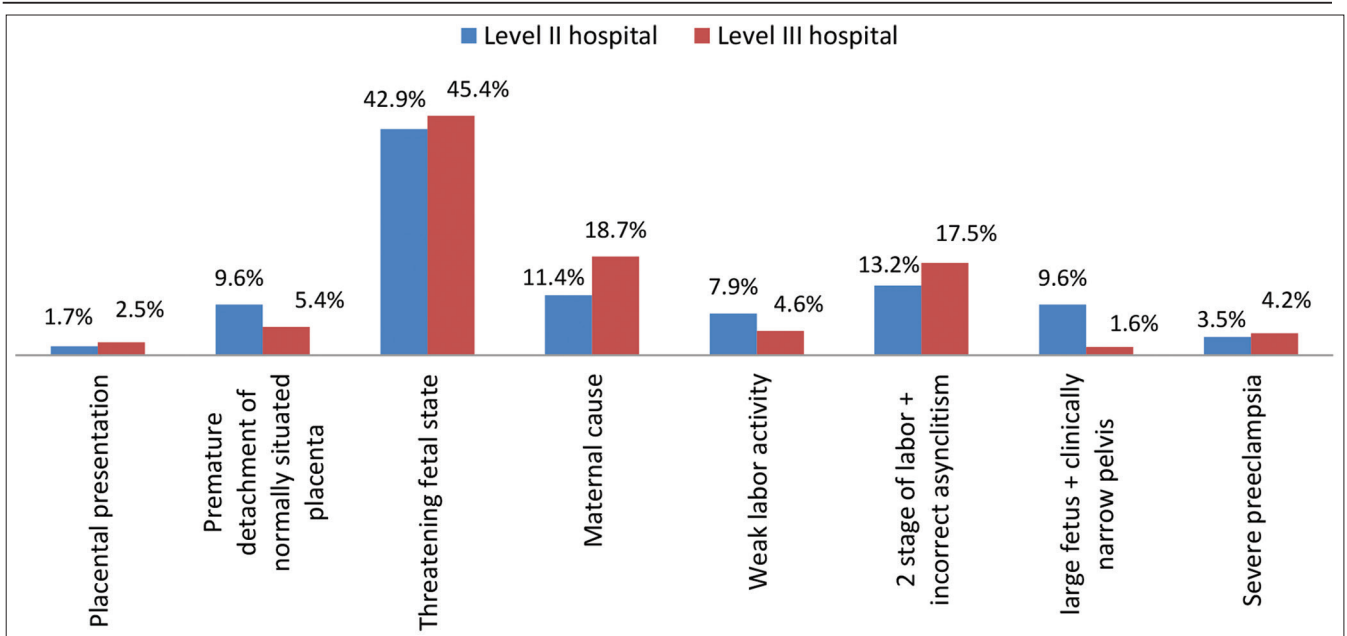


Figure 5: Analysis of the indications for cesarean section in Group 1 (%)

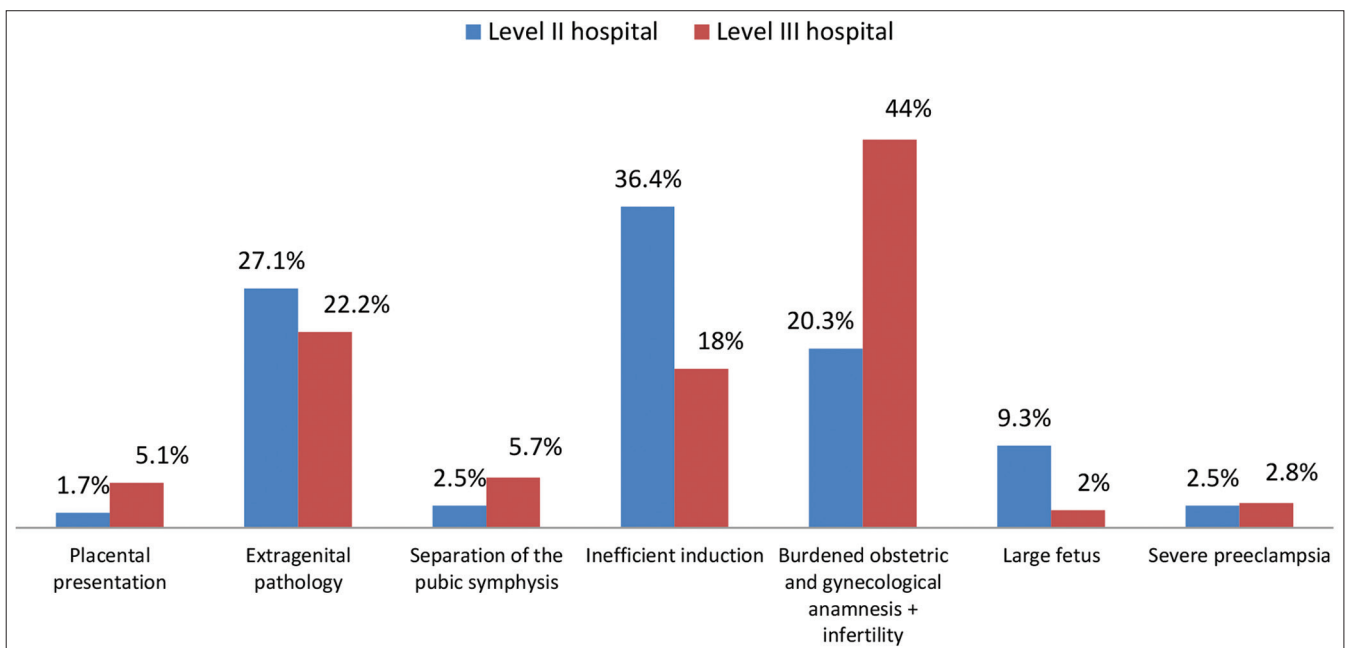


Figure 6: Analysis of the indications for cesarean section in Group 2 (%)

section at the request of the woman has been the most frequently cited reason for the increased cesarean section frequency in the recent years. The reason for operative delivery on the part of the woman is most often the fear of pain during delivery (tocophobia), the fear of future sexual dysfunction, stress urinary incontinence, and prolapse of the pelvic organs. In this group, women with a single uterine scar without contraindications should be advised natural delivery.

In Group 1 (nulliparous women with spontaneous labor onset and cephalic presentation), the main indications were the threatening state of the fetus, premature detachment of normally situated placenta, placental presentation, and weak labor activity. The

largest reason for cesarean section in this group was the threatening state of the fetus, which indicated possible incorrect interpretation of cardiotocograms. There is evidence that the pregnant women with cardiotocography prescribed during hospitalization had, on average, higher probability of increasing the cesarean section frequency by 20% than the women with intermittent auscultation prescribed [19].

The analysis showed that the group sizes were similar to those in other studies. Typically, the ratio of the relative size in Groups 3 and 4 was higher, compared to Groups 1 and 2. In this study, the ratio of Groups "3 and 4" (62.6%) was higher than the ratio of Groups "1 and 2" (25.4%) at the Level II hospital, the same was seen

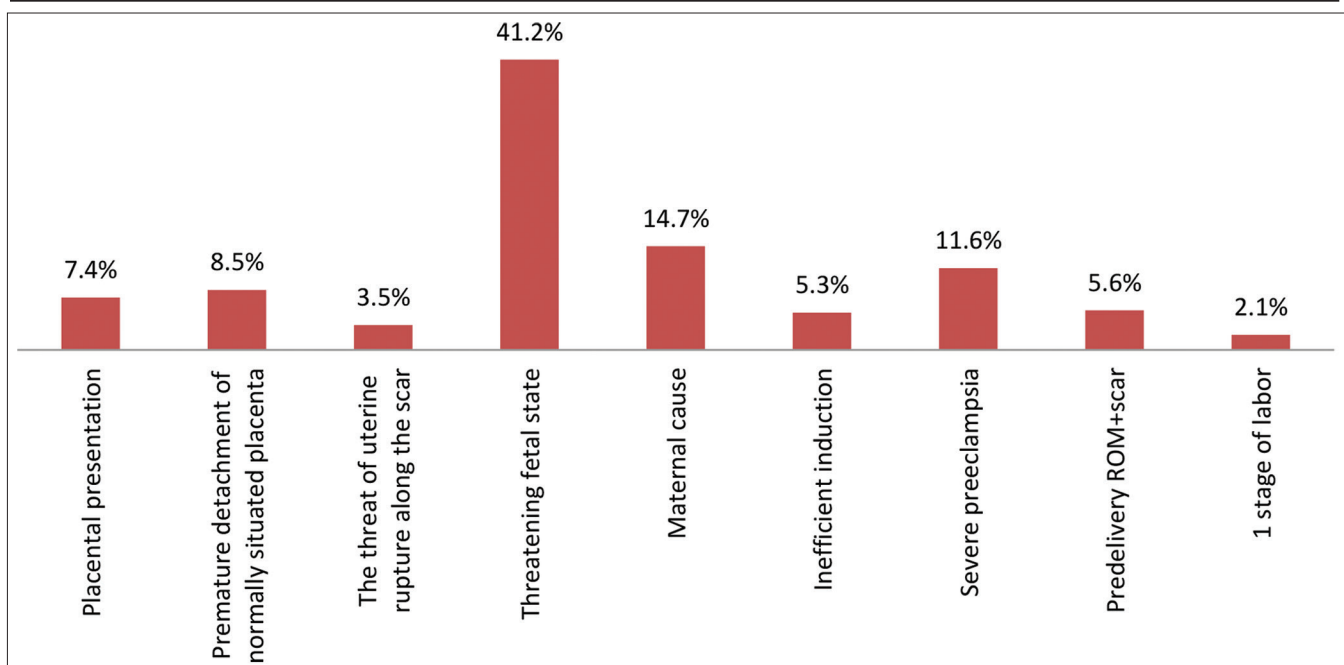


Figure 7: Analysis of the indications for cesarean section in Group 10 at the Level III hospital

at the Level III hospital where the ratio of Groups “3 and 4” was higher (42% vs. 30.1%).

The size of Groups “6 and 7” was 1.94% at the Level II hospital and 3.6% at the Level III hospital, the data of the authors were below 4%, as should have been expected from the results of foreign studies [18], [19].

In Group 8, the absolute contribution was 0.2% (the Level II hospital) and 2.5% (the Level III hospital). The cesarean section frequency in this group will increase worldwide, and it coincides with the results of this study.

In Group 9, the cesarean section frequency was within the expected result of 100%.

In the Level III hospital, the cesarean section frequency was very high in Group 10, amounting to 76%, while at the Level II hospital, the cesarean section frequency was 36.5%. The group sizes were 1.4 and 5.4, respectively.

## Conclusion

Based on the analysis performed, the authors have come to a conclusion that the Robson classification is an acceptable and easy-to-implement tool for identifying the obstetric groups of women that contribute to increasing the cesarean section frequency. The use of this system would allow for a comparative analysis of the cesarean section frequency both at individual facilities and between various obstetric institutions, as well as between countries and regions.

This has been the first study in Kazakhstan with the use of the Robson classification, which has allowed to analyze the cesarean section frequency in groups and to determine the ways of reducing them. The authors plan to report the results of the study that contributes to reducing the cesarean section frequency.

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