

UDC 618.5-089.888.61:614.253.83

DOI 10.54229/2226-2008-2021-6-4

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# ON PATIENT SAFETY: IMPLEMENTATION OF THE M. ROBSON CLASSIFICATION AS A POSSIBILITY TO CONTROL THE FREQUENCY OF CESAREAN SECTION

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ПРО ПЕРСПЕКТИВИ ІМПЛЕМЕНТАЦІЇ КЛАСИФІКАЦІЇ РОБСОНА НА ПРИКЛАДІ МІСЬКОГО СПЕЦІАЛІЗОВАНОГО ПОЛОГОВОГО БУДИНКУ В ОБЛАСНОМУ ЦЕНТРІ В УКРАЇНІ

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**Завдання.** Розродження операцією кесаревого розтину (КР) сьогодні набуває характеру «епідемії» — у деяких країнах досягає 50 % і більше; найчастіше виконання операції здійснюється на вимогу або за найменшого сумніву жінки. Зростання частоти КР не завжди супроводжується прогнозованим поліпшенням перинатальної смертності.

**Мета:** вироблення стратегії отримання жінками позитивного досвіду вагітності на підставі аналізу частоти кесаревого розтину за базою даних пологового будинку з використанням класифікації Робсона.

**Матеріали та методи.** Ретроспективний аналіз історій пологів міського пологового будинку зі спеціалізацією щодо ведення передчасних пологів за 2015–2019 рр.

**Результати досліджень.** При аналізі 10 345 пологів встановлено, що шляхом операції КР розроджено 3598 (34,78 %) жінок. Частота КР у 1-й групі становить у середньому (15,71±2,34) % (12,93–20,03 %). Найбільш часто первинний КР проводиться у 2-й ((84,45±1,62) %), 4-й ((68,97±4,93) %) і 6-й ((97,08±1,7) %) групах, і ці групи в подальшому є найбільшими з повторного КР. Традиційно висока частота КР зазначається в 7-й ((96,69±2,05) %), 8-й ((86,66±7,02) %) і 10-й групах ((40,02±5,14) %). Найбільш частими показаннями для первинного КР були дистрес плода, тазове передлежання, багатоплідна вагітність, обструктивні пологи, екстрагенітальні причини. Необхідно відзначити і такі соціально-етичні чинники, як настійна вимога пацієнтки.

**Висновки.** Використання класифікації Робсона дозволило визначити основні напрями щодо поліпшення організації медичної допомоги роділлям з метою забезпечення безпечних пологів: вироблення єдиних стандартів і активне їхнє впровадження в групі вагітних, які потребують передіндукції та індукції пологів, активне використання імітаційних методів навчання медичного персоналу при веденні пологів у тазовому передлежанні та при багатоплідній вагітності, профілактика передчасних пологів, психопрофілактична робота з жінками і членами родини.

**Ключові слова:** кесарів розтин, класифікація Робсона.

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ON PATIENT SAFETY: IMPLEMENTATION OF THE M. ROBSON CLASSIFICATION AS A POSSIBILITY TO CONTROL THE FREQUENCY OF CESAREAN SECTION

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**Purpose.** Delivery by caesarean section (CS) is now becoming an “epidemic” — in some countries it reaches 50% or more; often the operation is carried out at the request or the slightest doubt of the woman. An increase in CS frequency is not always accompanied by a predicted improvement in perinatal mortality.

**Objective:** To develop a strategy for women to gain a positive pregnancy experience based on the analysis of the frequency of caesarean section in the database of a linear maternity hospital using the Robson classification.

**Materials and methods.** Retrospective analysis of childbirth histories of an urban maternity hospital with a specialization in preterm birth management in 2015–2019.

**Research results.** When analyzing 10,345 births, it was found that 3598 or 34.78% of women were delivered by CS surgery. The frequency of CS in group 1 averages (15.71±2.34)% (12.93–20.03)%.



Most often, primary CS is performed in the 2nd (84.45±1.62)%, 4th (68.97±4.93)% and 6th (97.08±1.7)% groups, and these groups are subsequently the largest in terms of repeated CS. Traditionally, a high frequency of CS is noted in the 7th (96.69±2.05)%, 8th (86.66±7.02)% and 10 groups (40.02±5.14)%. The most common indications for primary CS were fetal distress, breech presentation, multiple pregnancies, obstructive labor, and extragenital indications. It is necessary to note the socio-ethical indications as an urgent requirement of the patient.

**Conclusions.** The use of Robson's classification made it possible to determine the main directions for improving the organization of medical care for women in labor in order to ensure safe childbirth: the development of uniform standards and their active implementation in the group of pregnant women in need of pre-induction and induction of labor, training and active use of simulation methods of training medical personnel in the management of childbirth. in breech presentation and multiple pregnancies, prevention of premature birth, psychoprophylactic work with women and family members.

**Key words:** cesarean section, Robson's classification.

According to a new study by the World Health Organization (WHO), delivery by caesarean section (CS) is now becoming an "epidemic": one in five to six women (21%) gives birth abdominal, but the expected improvement in perinatal outcomes is not celebrated. A further increase in this indicator is predicted to 29% of all births by 2030 [1]. A characteristic feature of the increase in the proportion of CS is a significant difference in frequency depending on the level of development of the country: in the least developed countries of Africa, CS accounts for only 5–8% of all births, while in Latin America and the Caribbean, this indicator reaches 43%. and in Brazil, Egypt, Turkey, Cyprus and the Dominican Republic, the number of cases of CS exceeds the number of births through the birth canal.

Unfortunately, the frequency of operations at the urgent request of the mother (cesarean delivery on maternal request, CDMR) is increasing and the proportion of this indicator cannot be accurately determined, since in most cases it is masked by medical indications that are available in the International Classification of Diseases [2]. In a 2011 study, it was noted that in the United States, CDMR was performed in 4% of women in labor. This practice is more common in Brazil, Taiwan, Chile. In these countries, the frequency of CS in private clinics exceeds 40%, in municipalities it exceeds 20%.

CS is an important life-saving surgery, with various health effects for women and children, ranging from short-term benefits in certain situations to increased morbidity and mortality, and long-term effects that are not fully understood, especially if performed without medical indications [3, 4].

The share of caesarean sections in Ukraine increased from 16% in 2009 to 24% in 2019 [5].

In 2015, WHO, and then FIGO (The International Federation of Gynecology and Obstetrics) in 2016, proposed to use the M. Robson classification [6] based on the distribution of all women who gave birth in 10 groups with subsequent analysis of the frequency of CS in each group, the ability to compare these data between different hospitals

and determine the effectiveness of CS depending on perinatal outcomes [7, 8].

**Purpose:** based on the classification of M. Robson, to identify the groups of women that make the greatest contribution to the overall rate of CS and to determine the directions that will ensure the safety of childbirth and improve perinatal outcomes.

### Materials and Methods

According to the "Maternity Hospital No. 5" of the Odesa City Council, which is a level 2 institution and specializes in providing medical care to women with miscarriage and the management of premature birth, a retrospective cross-sectional study of 10 345 birth histories for the period 2016–2020 was carried out.

The average number of births per year in this institution is from 2,000 to 2,400, the share of premature births accounts for 8 to 10% of all births, while the city average in Odessa is (4.2±1.7)% per year.

To analyze the histories of childbirth and form a database, a google form was created with the subsequent reflection of all data in google tables, which allows for statistical analysis of the data. Statistical calculations were carried out on a personal computer using Microsoft Excel 2007 and Biostat, Statistica 6.0 software from Install Shield Software Corporation for Windows (USA).

Based on the classification of M. Robson, each woman (history of childbirth) was assigned to one of the groups (Table 1).

The effectiveness of cesarean section (CECS) M. Robson was proposed to be evaluated using the formula proposed below, according to which the optimal coefficient is equal to 2 or more (1).

$$CECS = \frac{\text{CS rate of a base region} \cdot \text{PM of a base region}}{\text{CS rate of a region of interest} \cdot (\text{PM of a region of interest})^2} \cdot 10 \quad (1)$$

where CS — cesarean section, (%); PM — perinatal mortality (%); base region — a region within



## Robson's Classification

Groups	Clinical characteristics
1	Nulliparous, singleton, cephalic, $\geq 37$ weeks, spontaneous labor
2	Nulliparous, singleton, cephalic, $\geq 37$ weeks, induced labor or cesarean section before labor
3	Multiparous without previous cesarean section, singleton, cephalic, $\geq 37$ weeks, spontaneous labor
4	Multiparous without previous cesarean section, singleton, cephalic, $\geq 37$ weeks, induced labor or cesarean section before labor
5	Multiparous with prior cesarean section, singleton, cephalic, $\geq 37$ weeks
6	All nulliparous breeches
7	All multiparous breeches (including previous cesarean section)
8	All multiple pregnancies (including previous cesarean section)
9	All pregnancies with transverse or oblique lie (including those previous cesarean section)
10	Singleton, cephalic, $\leq 36$ weeks (including previous cesarean section)

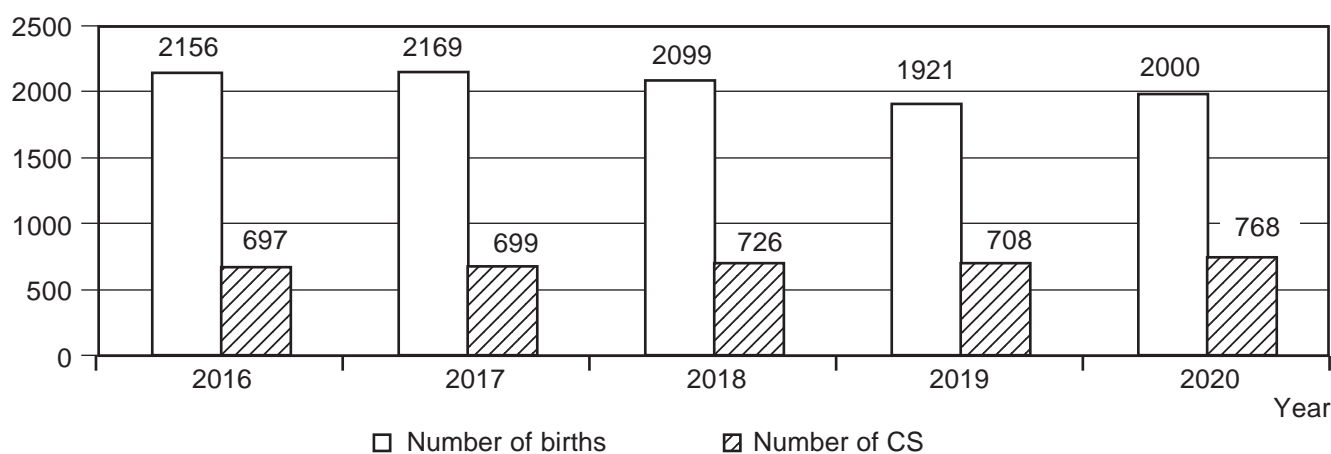


Fig. 1. The number of births and the number of caesarean sections according to the data of the KNP "Maternity hospital N 5" of the Odesa City Council

which calculations are made; region of interest — the region / institution where the research is carried out.

A coefficient equal to 2.0 and above is considered excellent, 1.5–2 — good, 1–1.5 — satisfactory, below 1 — bad.

**Results.** The results obtained generally indicate a decrease in the total number of births from 2156 in 2016 to 2000 in 2020, with the existing trend towards an increase in the frequency of births by caesarean section (Fig. 1). Of the total number of 10,345 deliveries by the abdominal route, 3598 women were delivered, which amounted to 34.78%, i. e. every 3–4 women were operated on.

As already noted, against the background of a decreasing number of births, there is an increase in women delivered by the abdominal route (Table 2).

The presented data show that the growth rate of the frequency of caesarean section in this insti-

Table 2

The Proportion of Women Who Were Delivered by Caesarean Section

Parameter	Years				
	2016	2017	2018	2019	2020
Frequency indicator of CS	32.33	32.23	34.59	36.86	38.4
Absolute increase (decrease)	—	-0.1	2.4	2.3	1.5
Indicator of visibility, %	100.0	99.7	107.0	114.0	118.8
Growth (decline) rate, %	—	99.7	107.3	106.6	104.2
Growth rate (decrease), %	—	-0.3	7.3	6.6	4.2
Value of 1% increase	—	0.3	0.3	0.3	0.4

tution over 5 years increased by 4.2%, but this growth is not statistically significant (when comparing the data of 2016 and 2020, the critical value of Student's t-test = 1.972 and the significance level  $\alpha = 0.05$ ). But such an indicator as the coefficient of visibility, the value of which increased by 18%, indicates an increase in the proportion of CS in the total indicator of methods of delivery in this institution.

As for the distribution of women who have given birth by groups in accordance with the classification of M. Robson, the following data were obtained (Fig. 2).

The frequency of CS in group 1 (primiparous,  $\geq 37$  weeks, one fetus, cephalic presentation, spontaneous labor) averages  $(15.7 \pm 2.3)\%$ . The highest incidence of primary CS is observed in the second group  $(84.5 \pm 1.6)\%$  — these are primiparous women, gestational age  $\geq 37$  weeks, one fetus, cephalic presentation of the fetus, induced labor or planned CS; in the fourth  $(68.9 \pm 4.9)\%$  — multiparous, without a scar on the uterus, period  $\geq 37$  weeks, one fetus, cephalic presentation, induced labor or planned CS; in the sixth —  $(97.1 \pm 1.7)\%$ ; primiparous, one fetus, breech presentation) groups.

The most common indications for primary cesarean section were fetal distress during labor and pregnancy, breech presentation of the fetus, mul-

multiple pregnancies with abnormal position of 1 fetus, obstructive labor. It should be noted that social and ethical factors were also noted as a categorical requirement of the patient for abdominal delivery.

Traditionally, a high frequency of CS is characteristic of the 7th  $(96.7 \pm 2.05)\%$ ; multiparous, one fetus, breech presentation, including with a scar on the uterus), 8th  $(86.6 \pm 7.1)\%$ ; all women with multiple pregnancies, including those with a scar on the uterus) and 10th groups  $(40.02 \pm 5.1)\%$ ; all women with singleton pregnancies, head presentation, term  $\leq 36$  weeks — premature birth, including with a scar on the uterus).

The largest proportion of caesarean section is noted in the 9th group (transverse, oblique position of the fetus — 100%); in the fifth, these are women with a scar on the uterus — 97.9%; in groups 6 and 7 (breech presentation of the fetus, forthcoming first or repeated births) — 97.1% and 96.6%, respectively; and also in group 8 (multiple pregnancy) — 86.6%.

According to our data, in 2016, 2018, 2019 and 2020. CECS corresponded to satisfactory (1–1.5), good (1.5–2) or excellent (more than 2.0) grade. An unsatisfactory indicator of the coefficient of efficiency (less than 1) was observed in 2017.

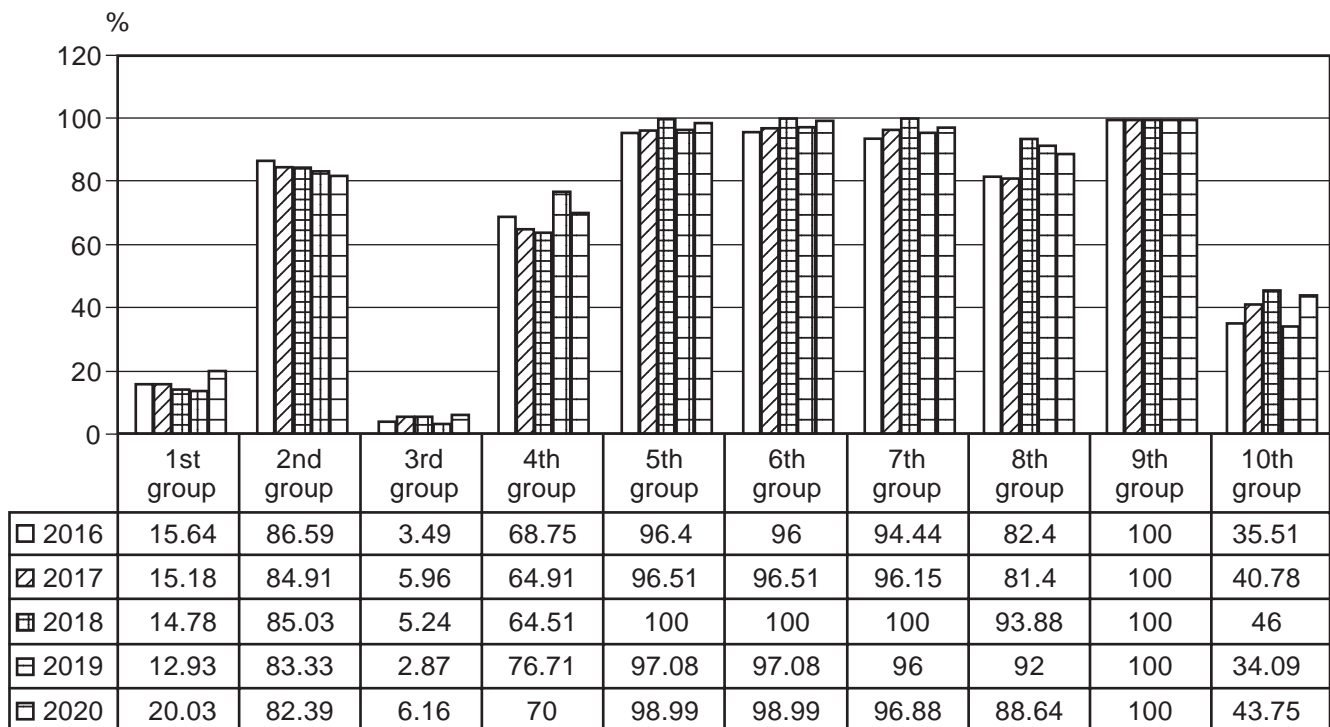


Fig. 2. Distribution of births into groups in accordance with the classification of M. Robson: 1st group — nullpar, without scaring; 2nd group — nullpar on time inducor elec CS; 3rd group — multipar without scar head spont labor; 4th group — multipar head 37 induc or elec CS; 5th group — multipar with scar head CS 37 weeks; 6th group — nullpar breech; 7th group — multipar breech incl with scar; 8th group — all women with multiple incl with scar; 9th group — all women with transv incl scar; 10th group — up to 36 week single cephalic incl with scar

## Discussion

The continuing increase in the proportion of CS around the world has global consequences not only for the correct organization of obstetric and gynecological care, but also has an important socio-ethical and economic significance. The influence of the frequency of CS on the planning and distribution of financial flows, including the costs of reproductive education for both medical personnel and patients, cannot be underestimated. The creation of a patient-oriented, socio-economic, medical and educational infrastructure would make it possible to form the necessary strategic and investment directions.

The implementation of M. Robson's classification for analyzing the frequency of CS in one of the "linear" maternity hospitals of a large regional center in Ukraine showed that, in general, there is a tendency towards a decrease in the number of births during 2016–2020, which is consistent with the demographic indicators in the country. According to the State Statistics Committee of Ukraine, the population as of February 1, 2021 was 41,554.8; February 1, 2020 — 41879.9; January 1, 2019 — 42153.2; January 1, 2018 — 42386.4; January 1, 2017 — 42584.5; January 1, 2016 — 42760.5 [9], ie there is a steady downward trend in the number of the population due to a combination of various reasons. In 2018, the death rate almost doubled the birth rate. According to Open data bot, in the first half of 2021, 5% fewer children were born in Ukraine than in the first half of 2020 and 11.5% less than in the same time period of 2019 compared to 2010, decreased by 40% and, according to the worst forecasts of demographers, in 2030 in Ukraine one woman will give birth to one child during her life [10].

It should also be noted the negative impact of COVID-19 on the decline in fertility: researchers explain this not only by the crisis in family planning, in the economy and falling incomes, but also by the direct impact of coronavirus infection on health, on the fertility of the population, on the effectiveness of assisted reproductive technologies, on the course of pregnancy, reproductive loss and perinatal outcomes [11].

CS against the background of a continuing decline in fertility is not always a safe and necessary procedure [1]. According to our data, the highest frequency of CS, characteristic of the group of primiparous (group 2 —  $(84.5 \pm 1.6)\%$ ) and multiparous (group 4 —  $(68.9 \pm 4.9)\%$ ) women with singleton full-term pregnancy, cephalic presentation

fetus and the lack of effect from induction of labor or planned operative delivery reflects a prognostically unfavorable trend, which may indicate the presence of not only a biased assessment of the situation, but also some "gaps" in the organizational arrangements for the provision of medical care. It is these groups, most likely, that are a reserve for reducing the frequency of "unnecessary" CS.

The group of women from the 6th group deserves special attention, where the proportion of CS was  $(97.1 \pm 1.7)\%$  — these are primiparas with full-term pregnancy, one fetus in breech presentation. Breech delivery accounts for 3–4% of their total number and the percentage of such births decreases with increasing gestational age from 22–25% of births to 28 weeks of gestation, to 7–15% of births at 32 weeks of gestation and up to 3–4% in full-term pregnancy. Perinatal mortality in breech presentation, regardless of the mode of delivery, increases 2–4 times [12]. Most international guidelines for the management of breech delivery offer a rigorous individual approach, depending on the gestational age, physician experience, and other factors. In particular, after 37 weeks of gestation, parents should be informed of a significant increase in perinatal mortality and morbidity associated with vaginal breech delivery. In case the doctor leading the birth is not experienced enough, a caesarean section may be the best choice. It should be noted that the number of experienced obstetricians who know the technique of breech delivery and can train young doctors is decreasing — this may lead to the loss of this method of delivery in the future. If in 1970 about 14% of deliveries in breech presentation were carried out by caesarean section, by 1986 this figure had increased to 86%. In 2003, the incidence of cesarean section for all breech presentation was 87.2% [13]. According to our data, in the group of multiparous women (group 7) with a singleton pregnancy and breech presentation, only 3.3% gave birth on their own, the remaining 96.7% were operated on, which also emphasizes the urgency of the problem of training medical personnel in the management of such births.

It should also be emphasized that women from the indicated 2nd, 4th and 6th groups "provide" an increase in the number of candidates for a second cesarean section due to the formation of the syndrome of the operated uterus and the risk of uterine rupture along the existing scar.

As for the 8th (multiple pregnancy, including with a scar on the uterus) and the 10th (singleton pregnancy, cephalic presentation,  $\leq 36$  weeks, including a scar on the uterus) groups — a signifi-



cant contribution to these indicators determine the success of assisted reproductive technologies (ART), and the rate of preterm birth, which, despite efforts, does not decrease [14, 15].

In the 9th group of women with an incorrect (transverse and oblique) position of the fetus, the abdominal method of delivery was selected at 100% for “absolute” indications; in the 5th group (women with a scar on the uterus after a previous cesarean section) 97.9% of patients chose a cesarean section — this group could be considered from the point of view of the possibility of giving birth per vias naturalis, however, a clear individualized approach, qualified personnel with appropriate experience in the management of such births in well-equipped high-tech clinics [16, 17]. Attention is drawn to the high frequency of CS in the groups of women who underwent induction of labor — these are groups 2 (first birth, cephalic presentation — 84.5%) and 4 (repeated birth, cephalic presentation — 68.9%).

As for the CECS indicator, a significant contribution to its formation is made by premature births, which account for every tenth birth in a given institution in accordance with its specialization. It was the high frequency of pre-term births and the birth of a greater number of infants with extremely low birth weight that led to an unsatisfactory CECS in 2017.

### Conclusions

The implementation of M. Robson’s classification for the analysis of caesarean sections into the practice of a second-level obstetric and gynecological care facility allows us to draw some conclusions and determine the main directions for ensuring the safety of women during childbirth. These areas can be, firstly, the development of uniform standards and their active implementation in the practice of working with a group of pregnant women in need of pre-induction and induction of labor; secondly, it is the prevention of premature birth; third, a psycho-preventive work with women and family members. Continuous work is also required to improve the methods and control in the field of continuous postgraduate education of medical personnel, the active use of simulation teaching methods, in particular, in the management of breech delivery and multiple pregnancies.

Authors declare no conflicts of interests.

**Ключові слова:** кесарів розтин, класифікація Робсона.

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Submitted 30.11.2021 p.

Put into print 14.12.2021 p.

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