

# Analysis of the Caesarean Section Rate in Armenia for the Period 2016-2021 Based on the Results of a Single Center Study

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## Abstract

**Background:** The caesarean section rate is an important factor that characterizes the effectiveness of the obstetric service. The large variability of the initial state of women in labor and the variety of indications for surgery does not allow us to identify the main determinants. We attempted to determine and analyzed the first data on the structure and frequency of caesarean section in Armenia in the hospital of the Ereboundi multidisciplinary clinic before the introduction of the M. Robson scale. **Methodology:** We conducted a retrospective study of the history of childbirth in 38,111 patients registered at the Ereboundi Medical Center for the period 2016-2021. The materials of the study were case histories, hospitalization materials and annual reports. **Results:** According to the obtained data, 80.5% of caesarean section operations were performed as planned. Only 14% of pregnant women were delivered by caesarean section according to absolute indications, the frequency of that in this maternity hospital increased from 36.77% to 44.95% over the analyzed period. **Conclusion:** Thorough psychoprophylactic preparation of pregnant women for childbirth, including those with a scar on the uterus after a previous caesarean section, can ensure a steady desire of women in labor for vaginal delivery, full mobilization of their own capabilities, and more trusting cooperation with medical staff.

## Keywords

Caesarean Section Rates, Armenia

## 1. Introduction

Caesarean section (CS) is currently the most frequently performed operation in the world, and the trend is steadily increasing. In particular, in Armenia there is

an upward trend in the CS increased from 7.2% in 2000 to 31.0% in 2017 [Tadevosyan M., Ghazaryan A., *et al.*, 2019]. According to the latest data, every fifth woman gives birth by surgery [1]. However, the percentage of abdominal delivery is an important global indicator for measuring access to obstetric services [2].

According to the literature data [1]-[10], an increase in the frequency of CS significantly reduced perinatal morbidity and mortality, but negative consequences are also possible. They are connected with the fact that subsequent pregnancy and childbirth in women with a scar on the uterus are associated with a high risk. In these patients, such complications of pregnancy as the threat of miscarriage, placental insufficiency, placenta previa and ingrowth, antenatal fetal death are more common. At the same time, vaginal delivery in patients with a uterine scar is extremely risky due to the high probability of uterine rupture, bleeding, intrapartum fetal death, and even death of the patient herself [1].

The aim of this work was to analyze the frequency of CS operations in Armenia in the dynamics of 2016-2021 using the data of the Erebouni Medical Center and to identify the main reserves for reducing the frequency of abdominal delivery in IIIA level institutions.

## 2. Material and Methods

### 2.1. Study Setting

This study was conducted at the Maternity house of Erebouni Medical center, a referral and teaching public health facility in Armenia. It is one of the largest hospitals in Armenia and offers a wide range of outpatient and inpatient comprehensive services. Being a teaching and referral hospital, it receives many high-risk pregnancies and their outcomes. The Maternity House is one of the busiest wards in the hospital, rendering service under critical newborn care unit and kangaroo mother care. It is staffed with trained nurses, general practitioners, pediatricians, and neonatologists.

### 2.2. Study Design, Sampling Method, and Respondents

A prospective cross-sectional study was conducted a retrospective study of the history of childbirth in 38,111 patients registered at the Maternity House of Erebouni Medical Center for the period 2016-2021.

A systematic random sampling method was used to select the study participants. The inclusion criteria were a live birth, a gestational age of at least 28 weeks of amenorrhea (AW) or a birth weight of at least 1000 g. The data were extracted from the women's medical records or birth room registers according to the media, and annual reports used by this health facility. They covered parity, number of fetuses, past history of cesarean section, term of pregnancy, presentation of the fetus, mode of entry into labour. A pregnancy was said to be at term for a gestational age > 36AW6 days or, if there was no gestational age, for a fetal weight > 2500 g. The data thus collected were transferred and compiled for

processing.

### 2.3. Ethical Consideration

Ethical approval to conduct the study was obtained from Erebouni Medical center of Armenian Ethical Review Committee. Consent was obtained from the study participants before data collection after an explanation of the study objectives.

### 2.4. Data Analyses

Statistical analyses were performed using the statistical package for the Social Sciences (SPSS: version 22). The chi-square test of independence and binary logistic regression was employed to determine associations between the dependent and independent variables. Maternal and neonatal continuous variables were compared using Student's t-tests. Two binary logistic regression models (infant and maternal variables) with backward conditional were used to determine the variables independently contributed to preterm neonatal mortality. A p-value of less than 0.05 was considered to be significant.

## 3. Results

According to the obtained data, in recent years there has been a significant (by 15%) increase in the number of pregnant women in the Erebouni Medical Center (**Figure 1**), mainly due to an increase in the number of pregnant women from the regions.

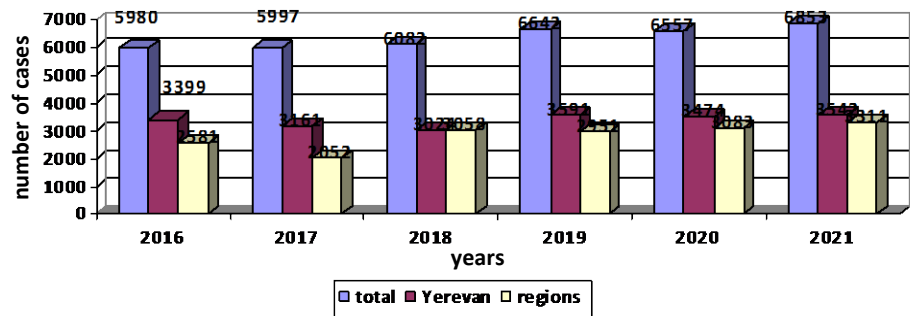
The frequency of CS in this maternity hospital increased from 36.77% to 44.95% over the analyzed period. This number includes both operations performed for the first time, and repeated ones due to a previously transferred one (**Table 1**).

According to the results of our study, 80.5% of CS operations were performed as planned. Only 14% of pregnant women were delivered by caesarean section according to absolute indications (fetal distress, placenta previa, eclampsia, premature detachment of a normally located placenta). In other cases, caesarean section was performed according to the sum of relative indications.

The main indications for operative delivery were fetal hypoxia (16.7%), labor anomalies (15.8%), extragenital pathology (32.9%), aggravated obstetric and gynecological history/repeated pregnancy scar/(12.74%), breech presentation of the fetus (10.3%), preeclampsia (6.2%) and premature pregnancy (5.86%) (**Table 2**).

In 74.5% of cases, caesarean section passed without complications. In the postpartum period, 0.8% of women noted thrombosis, 0.2%—mastitis, 3.8%—an increase in body temperature of unknown origin.

Despite the fact that patterns of natural childbirth are common among the women surveyed, among the indications for repeated caesarean section, there is a refusal of the woman herself to give birth through the natural birth canal.



**Figure 1.** Comparison of patient group sizes in percentage terms for the period 2016-2021.

**Table 1.** Frequency of CS in % for 2016-2021 at Erebouni medical center.

	2016	2017	2018	2019	2020	2021	M
<b>Number of births</b>	4579	4589	4445	4812	5115	5281	4804
premature	477 (10.4%)	503 (10.96%)	510 (11.47%)	577 (11.99%)	626 (12.2%)	701 (13.27%)	566 (11.7%)
multiple	108	100	108	103	97	119	106
twins	104	94	104	101	96	116	103
triplets	4	5	4	2	1	3	3
five	-	1	-	-	-	-	-
preeclampsia	65.8	116	122	181	164	149	146
<b>C-section</b>	1684 (36.77%)	1786 (38.9%)	1849 (41.6%)	2048 (42.56%)	2282 (44.6%)	2374 (44.95%)	2003 (41.6%)
planned	1316 (78.1%)	1438 (80.5%)	1443 (78%)		1876 (82.2%)	1994 (84%)	1613.4 (80.5%)
urgent	368	348	406		406	380	382
<b>Termination of pregnancy</b>	609	802	741	746	694	842	739
artificial	385	595	593	584	502	656	553
miscarriage	114	63	17	8	20	29	42
for medical reasons	110	144	131	154	172	157	144 (19.5%)

**Table 2.** Analysis of the incidence of postpartum complications and maternal and perinatal mortality.

		2016	2017	2018	2019	2020	2021
Postpartum infections	Endometritis	-	6	2	11	5	1
	Lochiometra	67	73	98	111	60	52
	Bleeding	23	29	42	24	44	82
<b>Maternal mortality</b>		-	-	2	2	-	1
<b>Number of newborns</b>		4691	4697	4557	4917	5213	5403
	live birth	4593	4600	4451	4802	5120	5296
	stillbirth	93	96	100	109	92	106
	newborn death	8	10	7	4	13	12

## 4. Discussion

In the present study, the odds of neonatal and infant death associated with childbirth were assessed. In general, there were no changes in the percentage of women, as well as in the characteristics of these women, including age, educational level and origin. Advances in obstetrics and changes in practice, and perhaps also changes in women, are some of the driving forces behind this discovery, meaning that neonatal mortality rates are currently not significantly different over time. We did not find an increase in the likelihood of late neonatal or infant death.

There are benefits and harms associated with each mode of birth, and the evidence for this comes from observational (non-randomized) studies, which may be biased. Any results and conclusions should be interpreted with caution, although large population-based studies, including the present one, offer the best method for risk assessment in women with a single prior CS.

## 5. Conclusion

Thorough psychoprophylactic preparation of pregnant women for childbirth, including those with a scar on the uterus after a previous cesarean section, can ensure a steady desire of women in labor for vaginal delivery, full mobilization of their own capabilities, and more trusting cooperation with medical staff. This is seen as a reserve for reducing obstetric aggression in childbirth and reducing the number of maternal and perinatal complications.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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