

Indication for Cesarean Section as per Robson's Criteria: An Analysis of 5000 Consecutive Cesarean Cases

Anshu Baser¹, Sunil Sharma², Sushil Kumar³, Annabelle Sabu⁴, Akriti Gupta⁵, Sadaf S Shaikh⁶

ABSTRACT

Background: The increasing incidence of cesarean section around the world is becoming a matter of concern. Many obstetricians consider it to be the easier option as opposed to vaginal delivery. However, we must not forget that cesarean section is associated with increased morbidity to the patient. World Health Organization (WHO) in 2015 introduced Robson's criteria as a standardized method to determine the rate and indications of cesarean section within a healthcare facility. We here present a retrospective analysis of 5000 cesarean sections by Robson's criteria.

Aim and objective: This study aims to analyze the indications for cesarean section at a tertiary care center. We also aim to determine whether Robson's classification can be used as an effective auditing tool to classify and collect data regarding cesarean sections.

Materials and methods: A retrospective analysis of a total of 5000 lower segment cesarean section (LSCS) as per Robson criteria was carried out at MGM Hospital, Kalamboli from January 1, 2015 to December 30, 2019. The indications for LSCS and the maternal and fetal complications were noted.

Results: The overall cesarean section rate during the study period was 28%. Out of the 5000 study population, 32.7% comprised of group 5 (previous cesarean section) of Robson's classification followed by 23.04% in group 2 (labor induced or LSCS before labor starts).

Conclusion: Robson criteria can be used as an auditing tool for the increasing number of cesarean sections being performed around the world. As per Robson's criteria, group 5 (previous LSCS) remains the main indication for cesarean section (33%) followed by group 2 (nulliparous not in spontaneous labor) (23%), and group 1 (nulliparous in spontaneous labor) (17%), respectively. Groups 1 and 2 indicate cesarean sections in nulliparous women. Therefore, it is clear that increasing rates of primary cesarean sections, mainly in nullipara are responsible for the increase in cesarean section rates. Unless we reduce the rate of primary cesarean section, it may not be possible to reduce the cesarean section rate.

Clinical significance: Cesarean sections are increasing worldwide. WHO recommends an ideal rate of 10–15%. If we can determine the indications of the cesarean section we can aim to reduce the cesarean section rate by reducing the primary indication itself. This in turn can help in reducing the morbidity and mortality associated with cesarean sections. Robson's criteria can be used as an effective tool due to its simplicity to classify these indications.

Keywords: Cesarean section, Cesarean section rates, Robson's criteria.

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INTRODUCTION

Cesarean section is one of the most commonly performed obstetric surgeries worldwide. In a study conducted by Oliphant et al., it was found that the cesarean section rate had doubled over 27 years.¹ The first written record of cesarean section was in the 1500s. Since then, there have been multiple refinements in this surgical procedure, suture material, and anesthesia techniques.²

Earlier it was unlikely for women to survive this procedure, however, the maternal mortality related to cesarean section had dropped to 5–10% by the end of the year 1800 and 0.1% by 1950.³ Currently, maternal mortality after cesarean section is estimated to be between 0.00581% and 0.0061% (i.e., 5.81–6.1 per 100,000 procedures),⁴ so much so that some obstetricians now consider cesarean sections to be the "easier option".⁵ Cesarean sections are life-saving when needed, however with the advancements in the surgical procedure these are often performed in clinical gray areas in which they may not be mandatory or on maternal request. However, cesarean section is associated with an increased risk of maternal morbidity, including postpartum hemorrhage, blood transfusion, hysterectomy, and even death; also, a uterine scar can increase the risk of uterine rupture, placenta previa, or placenta accreta in subsequent pregnancies. WHO in 2015 came out with Robson's criteria to determine the cause of the alarming increase in the rate of this procedure.⁶ Robson's criteria include 10 categories for classifying indications of cesarean sections.

^{1–6}Department of Obstetrics and Gynaecology, Mahatma Gandhi Missions Medical College, Navi Mumbai, Maharashtra, India

Corresponding Author: Sunil Sharma, Department of Obstetrics and Gynaecology, Mahatma Gandhi Missions Medical College, Navi Mumbai, Maharashtra, India, Phone: +91 9009719379, e-mail: sunilsharma2860@yahoo.com

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MATERIALS AND METHODS

A retrospective analysis of 5000 consecutive cesarean sections conducted at MGM Women's and Children's Hospital, Kalamboli from January 1, 2015 to December 25, 2019 was carried out. Patient's demographic data including age parity were collected. The indications for cesarean section were grouped as standard indications (Table 1) and as per Robson's criteria (Table 2).

Table 1: Indication for cesarean section in conventional terms

Indication	n	%
Previous LSCS	1472	29.44
Prolong labor	647	12.94
PROM	82	1.64
CPD	270	5.4
Breech/transverse lie	325	6.5
Multiple pregnancies	155	3.1
Placenta previa/abruptio/accreta	216	4.32
Cord prolapse	14	0.28
Fetal distress	1057	21.14
Preeclampsia/eclampsia	324	6.48
Diabetes	35	0.7
Oligohydramnios/IUGR	277	5.54
Second stage arrest/DTA/obstructed labor	61	1.22
Face/brow/malpresentation	22	0.44
Heart disease	16	0.32
Anomalous uterus (didelphys/bicornuate/septate)	4	0.08
Maternal request	23	0.46

LSCS, lower segment cesarean section; PROM, prelabor rupture of membranes; CPD, cephalopelvic disproportion; IUGR, intrauterine growth restriction; DTA, deep transverse arrest

Data Collection and Statistical Analysis

The entire data were collected from the labor room and operation theatre registers that were meticulously maintained by the staff and resident doctors with monthly and annual census conducted regularly. All the variables necessary for calculation according to Robson's criteria were included in the data collection. Analysis was carried out with the help of a certified statistician and no funding was obtained for the same. Demographics of the study population were grouped in separate tables (Table 1 and Table 3). Neonatal outcomes were grouped separately.

The indications for cesarean sections were calculated according to Robson's criteria (Table 2) and according to standard criteria were grouped separately (Table 1).

Calculations were carried out using standard statistical formulas.

Patient Involvement

No patients were involved in the research process and their information was kept confidential.

RESULTS

The overall cesarean section rate during this study period was 28%, 5000 consecutive cesarean sections were analyzed from a total of 17,851 deliveries. Our center is a tertiary care center and has taken many of the nearby primary health care (PHC) under its wing. We also conduct many outreach activities, therefore, the maximum number of patients (79.74%) had some form of antenatal registration.

Primiparas comprised 47.58% of cases and 99.66% of cesarean sections were carried out under spinal anesthesia.

Table 3 and Table 4 show the characteristics of the study population. The patients were in the age group of 15–40 years with a mean age of 25.73 years. Maximum patients had a primary education 47.86% or were illiterate 35.74% and only a few had some

Table 2: Distribution of cesarean section as per Robson's criteria

Sl. No.	Robson's 10 group classification	No.	Percentage of total study population
1	Nulliparous women with single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labor	866	17.32
2	Nulliparous women with single cephalic pregnancy, ≥ 37 weeks gestation who either had labor induced or were delivered by cesarean section before labor	1152	23.04
3	Multiparous women without a previous uterine scar, with single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labor	146	2.92
4	Multiparous women without a previous uterine scar, with single cephalic pregnancy, ≥ 37 weeks gestation who either had labor induced or were delivered by cesarean section before labor	566	11.32
5	All multiparous women with at least one previous uterine scar, with single cephalic pregnancy, ≥ 37 weeks gestation	1638	32.76
6	All nulliparous women with a single breech pregnancy	163	3.26
7	All multiparous women with a single breech pregnancy, including women with previous uterine scars	101	2.02
8	All women with multiple pregnancies, including women with previous uterine scars	154	3.08
9	All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars	147	2.94
10	All women with a single cephalic pregnancy < 37 weeks of gestation including previous scars	67	1.34

Table 3: Distribution of patients as per age, educational level, and economic status

1	Age of patient	Number (n)	Percentage
	15–20	522	10.44
	21–30	3943	78.86
	31–40	535	10.7
2	Educational status		
	Illiterate	1787	35.74
	Primary education	2393	47.86
	Secondary education	544	10.88
	Graduate and above	276	5.52
3	Economic status		
	Housewife (non-self earner)	4606	92.12
	Salaried (fixed income)	378	7.56
	Student	16	0.32

Table 4: Distribution of patients as per parity, antenatal care (ANC) registration, and type of cesarean section

	1 Parity	<i>n</i>	%
	Primi	2379	47.58
	1–2	2121	42.42
	More than 3	500	10.0
	2 ANC registration		
	Registered	3987	79.74
	Unregistered	1013	20.26
	3 Patient evacuated from other centers for delivery/OUTSIDE	422	8.44
	4 Type of cesarean		
	Emergency	2200	44
	Elective	2800	56
	5 Type of anesthesia		
	Spinal	4983	99.66
	General	17	0.34

form of secondary education or were graduate and above 10.88% and 5.52%, respectively. A total of 92.19% of patients did not earn their living expenses and were dependent on family members.

On analyzing the indication for cesarean section when separately grouped as per conventional indication, previous cesarean section in labor occupied the highest position 29.44% and fetal distress was second with 21.12%. This was followed by prolonged labor (12.94%) and pre-eclampsia/eclampsia (6.48%) (Fig. 1).

When analyzed as per Robson's criteria, out of the 5000 study population 87.36% could be grouped into groups 1–5. Primiparas comprised 47.58% of the study population, 36.40% of them had gone into spontaneous labor and were classified under group 1. About 63.5% of primipara had been induced due to various obstetric indications, such as postdates, pre-eclampsia, etc., and were classified under group 2 occupying the second most common (23.04%) indication of the total population. Of the multiparas (1–2 previous births) who occupied 42.42% of the entire study population, 30.59% of patients had one or two previous uterine scars.

The maximum study population was therefore grouped under group 5 (previous LSCS) comprising 32.76% of the entire study population, which was the most common indication for cesarean section in this particular case study.

DISCUSSION

The incidence of cesareans section has been steadily increasing over the past decade. Several classification systems have been proposed to standardize the analysis of the increasing trends. Robson's classification proposed by the WHO in 2015 was one such classification (Fig. 2).⁷

A total of 17,851 deliveries were conducted during the study period out of which 5000 consecutive cesarean sections were analyzed. The overall cesarean section rate during the 5 years of the study was 28%. Our data showed that the maximum number of patients were under group 5 (previous LSCS) of Robson's criteria is 32.76% of the overall study population. This was consistent with various studies conducted which report "previous cesarean section" as the most common indication of cesarean section worldwide.⁸

The second most common indication of cesarean sections according to Robson's criteria in this particular study was

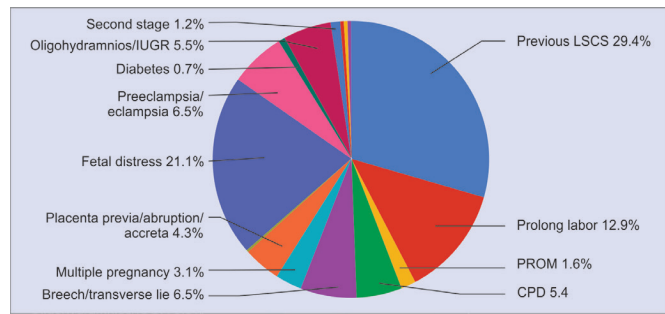


Fig. 1: LSCS as per standard indications

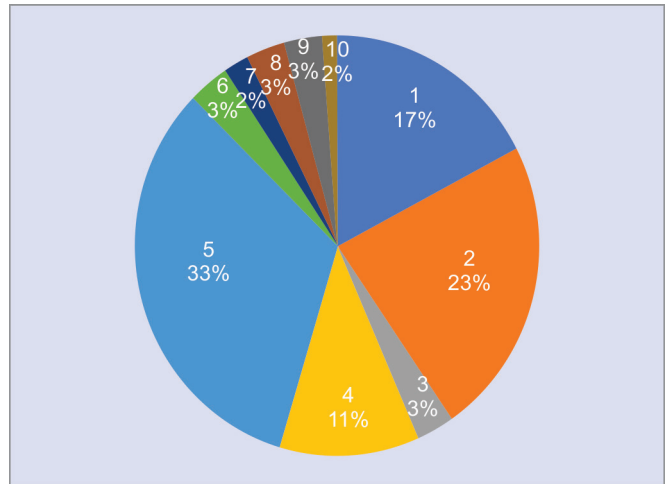


Fig. 2: Indications of LSCS as per Robson's criteria

group 2 (nullipara in induced labor) comprising 23.04% of the study population. WHO in 2011 came up with recommendations for Induction of labor which states that induction of labor should be performed only when there is a clear medical indication for it and the expected benefits outweigh its potential harms.⁹ Over the past 2 decades, the induction of labor has doubled and 1 out of 4 women undergo induction of labor.¹⁰ There is an increased chance of failed induction if the Bishop's score is low 0–3. However, a failed induction can be repeated does not necessitate cesarean delivery if there is no immediate indication.¹¹ Therefore, a probable cause for an increase in the rate of the cesarean section could be obstetricians inducing labor for unjustified indications and resorting to cesarean section if the induction fails.

This was subsequently followed by group 1 (nulliparas in spontaneous labor), that is, 17.32%. One must think twice before doing a cesarean section in primipara who has gone into spontaneous labor.⁶ Fetal distress which forms the bulk of cesarean section in this group must be assessed by an experienced obstetrician. A similar situation is there in group 4 (multiparas with induced labor), 11.32% of cesarean sections performed in this group. We must critically evaluate why a multipara delivered normally before the required cesarean section.¹²

The neonatal and perinatal outcome is given in Table 5. The overall perinatal mortality was 1.24%; 13.04% of them required NICU stay for <6 h, and 7.36% required prolonged NICU admission. The number of neonates requiring prolonged NICU admission was high in groups 4, 8, and 9; group 8 due to multiple pregnancies combined with preterm delivery, group 9 could be due to intrauterine

Table 5: Neonatal outcomes post-cesarean

Robson's criteria	Babies mother side (%)	Babies requiring observation (%)	Babies requiring NICU stay (>6 h) (%)	Fetal death/IUD/stillbirth (%)
1	80.12	11.13	8.75	0.00
2	78.29	13.16	7.89	0.66
3	61.25	18.75	6.25	13.75
4	71.43	7.14	21.43	0.00
5	83.63	11.70	3.51	1.17
6	100.00	0.00	0.00	0.00
7	73.33	26.67	0.00	0.00
8	44.44	22.22	27.78	5.56
9	25.00	50.00	25.00	0.00
10	23.3	12.1	50	14.6

manipulation because of transverse or oblique lie, and group 4 probably due to delayed decision for cesarean section. The patients in group 4 were multigravida, no uterine scar, a single fetus of >37 weeks gestation, cephalic presentation; with induced labor; in this situation, the obstetrician will try their best to deliver the patient normally, and therefore the decision for a cesarean section could be delayed in a majority of cases.

The stillbirth rates were higher in group 3. Most of the patients in this group were referred from peripheral centers in prolonged labor with intrauterine fetal death. Therefore, cesarean section in these cases could have been an optimum choice.

Group 10 which represents preterm LSCS also had high morbidity and mortality suggesting the need for reducing preterm births as a whole by appropriate antenatal care.

CONCLUSION

Many obstetricians and at times the patients themselves consider the cesarean section to be the easier option as opposed to vaginal delivery. However, we must not forget that the morbidity associated with a cesarean section is four times higher than vaginal delivery.¹³ As per Robson's criteria, group 5 (previous LSCS) remains the main indication for cesarean section (33%)

followed by group 2 (nulliparas with induced labor) (23%), and group 1 (nulliparas in spontaneous labor) (17%), respectively. Judicious use of cesarean section in nullipara is the need of the hour. We conclude that Robson's criteria can be used as an auditing tool to control the increasing number of cesarean sections being performed around the world.

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