

# A New Way of Evaluating Cesarean Section Birth: The Robson's Ten Group Classification System

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## ABSTRACT

**Introduction:** Cesarean section (CS) is the most common obstetric surgery and one of the most rewarding surgeries performed. The number of CSs has been growing rapidly, and concern has been expressed at the growing rate in some countries, with some referring to it as an emerging "global epidemic."

**Aim:** The purpose of this study was to study the incidence and analyze different indications of CS in our institution and to compare the frequency of CS in Robson's ten group classification system (TGCS).

**Materials and methods:** A prospective hospital-based study for a duration of 3 months (January 2012 to March 2012) was conducted in the Department of Obstetrics and Gynecology, Umaid Hospital, Jodhpur. All patients admitted beyond 20 weeks gestation were included in the study, and record of all births during this period was evaluated. Each delivery was then classified into one of ten mutually exclusive categories according to obstetric characteristics. The information was used to identify the group that accounted for largest proportion of women or group that contributed most to CS and identify the areas for potential modification.

**Results:** We found cesarean rate of 28.6% during our study period, which is well above the World Health Organization guidelines. Group V (single, term, cephalic, previous CS) was the largest contributor to CS rates (30.4%). Groups I and II were the 2nd and 3rd largest contributors, i.e., 27.5 and 17.5% respectively. Maximum CS rate of 100% was found in group IX (abnormal lie), which was within the expected range. Group 2 had CS rate more than that of group I, and IV had a rate more than that of group I, which indicates that induction and cesarean before labor increases cesarean rate in both multiparous and nulliparous women. In our study, Robson's TGCS demonstrated the need to focus on groups I, II, III, and V because the contribution of these groups to overall cesarean rate was 82%.

**Clinical significance:** Ten group classification system was found to be a useful framework for auditing and analyzing different CS rates and their reasons. This will help in not only identifying the priority areas for the changes in clinical practice but also reducing cesarean rate.

**Keywords:** Cesarean section, Robson's ten group classification system, Vaginal birth after cesarean.

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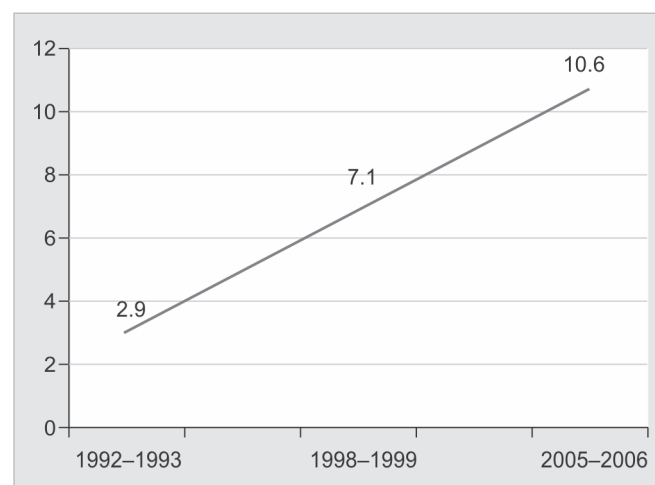
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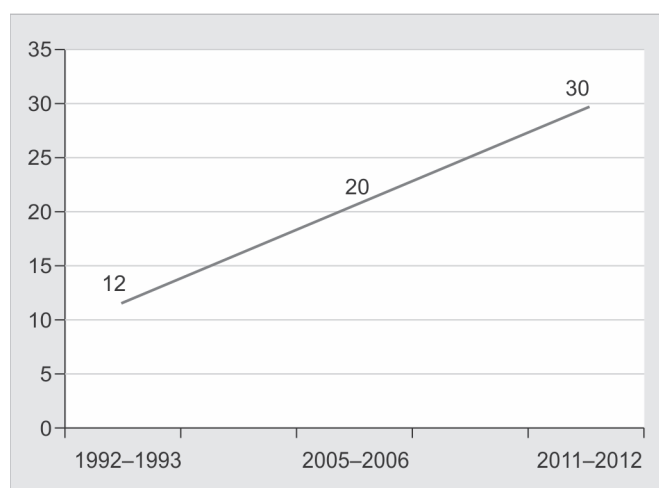
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## INTRODUCTION

The cesarean section (CS) rates have been increasing worldwide, with most of the countries exceeding the World Health Organization's recommended rate of 15% of all deliveries.<sup>1</sup> India is also experiencing a rapid increase in CS delivery along with an increase in institutional deliveries. The rate has increased from 2.9% of CS deliveries in 1992–1993 to 7.1% in 1998–1999 and further to 10.6% in 2005–2006 (Graph 1). Our hospital records also show this rising trend. The cesarean rate was 12% in 1992–1993, 20% in 2005–2006, and increased to 30% in 2011 (Graph 2). Recent temporal trends in maternal characteristics that have contributed to increase in this rate include increasing maternal age<sup>2</sup> and higher rates of hypertension, diabetes, obesity, and multiple gestation. However, many other factors have contributed to the increasing rate of CS in recent years, including improved surgical techniques, providers' and patients'



Graph 1: Trend of cesarean section in India



**Graph 2:** Trend of cesarean section at Umaid Hospital

perception of the safety of the procedure, patient demand,<sup>3</sup> and physician practice patterns.<sup>4</sup> Although cesarean deliveries can be a valuable intervention to mothers and infants, unnecessary cesarean deliveries are costly and potentially life threatening.<sup>5</sup> Cesarean section is associated with both immediate and later risk of maternal and neonatal complications.

In order to propose and implement effective measures to reduce CS rates where unnecessary, it is first essential to identify which groups of women are undergoing CS and investigate the underlying reasons for trends in different settings. This requires the use of a classification system that can best monitor and compare CS rates in a standardized, reliable, consistent, and action-oriented manner. The Robson ten group classification system (TGCS),<sup>6</sup> first published in 1997, aims to prospectively identify well-defined clinically relevant groups of women so that differences in CS rates within relatively homogeneous groups can be investigated. The groups were designed to be simple, mutually exclusive but completely inclusive, clinically relevant, and based on obstetric characteristics. The Robson classification system groups women in the obstetric population according to plurality, fetal presentation, parity, obstetric history (i.e., previous CS), course of labor and delivery, and gestational age, providing clinically relevant categories for analyzing and reporting the rates of CS. In the Robson system, the overall rate of CS is presented as a composite of individual rates from 10 groups. Four aspects of each group should be examined: The number of cesareans and total deliveries, relative group size (number of deliveries in the group/total number of deliveries), cesarean rate, and contribution of the total cesarean rate size (number of cesarean deliveries in the group/total number of cesarean deliveries). The size and CS rate of a group must be considered together—a

low cesarean rate in a large group contributes more to the total cesarean rate than a high cesarean rate in a very small group. This not only permits examination of group-specific rates to determine their appropriateness, but also demonstrates how the overall rate of CS is affected by both the magnitude of the group-specific rates and the relative size of each group, thus identifying groups that make the greatest contribution to the overall rate of CS.

## MATERIALS AND METHODS

This was a prospective hospital-based study. All patients beyond 20 weeks gestation admitted in the Department of Obstetrics and Gynecology, Umaid Hospital, Dr. Sampurnanand Medical College, Jodhpur, from January 2012 to March 2012 were included in this study. Hospital birth register was used as source of data. Record of all births during this period was evaluated. Each delivery was classified into one of ten mutually exclusive categories according to obstetric characteristics. Three steps were undertaken for interpreting the information presented in Robson TGCS template:

1. To identify the group that accounted for the largest proportion of women.
2. To identify the group that contributed most to cesarean rate (relative contribution).
3. To undertake statistical analysis of the relevant group to understand the factors that contributed to the CS rates and identify areas of potential modification.

## RESULTS

During this study period, incidence of CS rates was found to be 28.6%. Maximum numbers of CS were found in the age group of 21 to 25 years (49.66%) and minimum CS rate in the age group of 35 to 40 years (1.18%) (Table 1 and Graph 3). Relative group size (number of deliveries in the group/total number of deliveries) was calculated. Maximum number of deliveries were found in group I, which had relative size of 34.05% followed by group III, which had relative size of 28.1%. Group II was smaller than group I, and IV was smaller than group III. Group V had a relative size of 10.8%. Relative group size of groups VI to X was found to be 2.5% or less, indicating small number of deliveries in these groups.

Cesarean rates in each group were calculated (Table 2 and Graph 4). Maximum CS rate was found in group IX (100%) followed by group VI (85.1%) and group V (80.1%). Cesarean section rate was more in group II than in group I (35.9 and 23.6% respectively). Minimum CS rate was found in group 3 (7.1%).

Relative contribution of each group was estimated (Table 3 and Graph 5). Largest contributor to overall

**Table 1:** Age Distribution of Cesareans

Age groups	No. of cesareans	Percentage
15–20years	336	22.19
21–25years	752	49.66
26–30years	337	22.25
31–35years	71	4.68
35–40years	18	1.18

**Table 2:** Cesarean rate- number of cesarean in each group/ number of deliveries in each group

Robson group	No. of Cesarean	No. of deliveries	Cesarean rate (%)
1	417	1800	23.6
2	266	740	35.9
3	106	1487	7.1
4	51	260	19.6
5	461	575	80.1
6	115	135	85.1
7	37	127	29.1
8	13	51	25.4
9	27	27	100
10	21	83	25.3

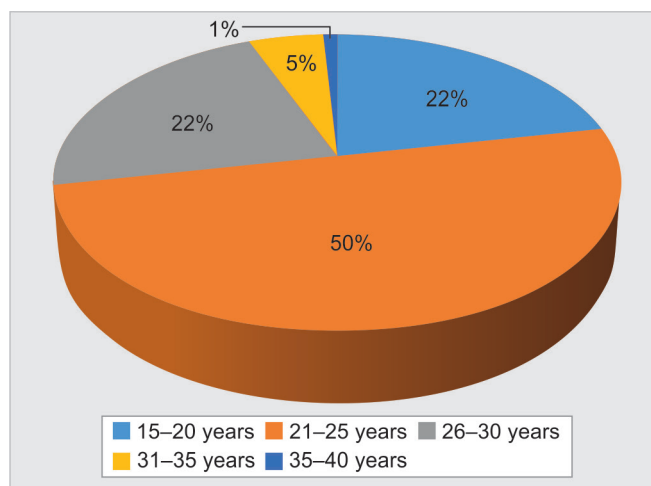
**Table 3:** Relative contribution-number of cesarean in the group/ total number of cesareans

Robson group	No. of cesarean	Total no. of Cesarean	Contribution made by each group to overall cesarean rate
1	417	1514	27.5%
2	266	1514	17.5%
3	106	1514	7%
4	51	1514	3.3%
5	461	1514	30.4%
6	115	1514	7.5%
7	37	1514	2.4%
8	13	1514	0.85%
9	27	1514	1.7%
10	21	1514	1.38%

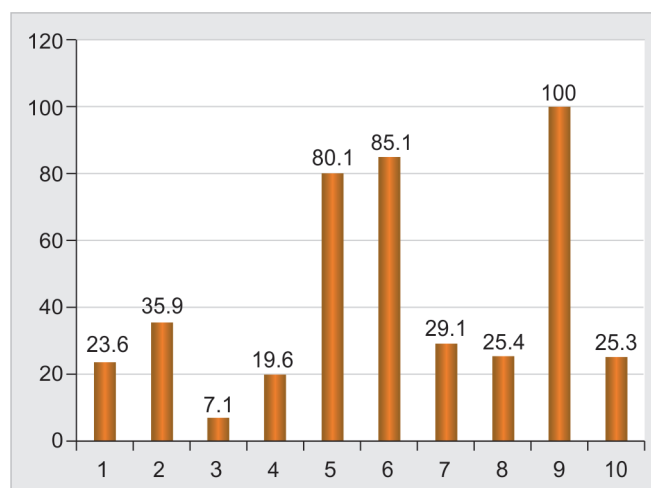
cesarean rate was group V (30.4%) followed by group I (27.5%), group II (17.5%), group VI (7.5%), and group III (7%). Groups VII to X contributed very less (<2.5%).

The relative size of groups I and II [nulliparous women at term with a singleton pregnancy in spontaneous labor (group I) or induced labor or CS without labor (group II)] combined was 48%, which is above the expected range of 35 to 40%. We found that the cesarean rate of 23.6 to 35.9% in groups I and II respectively, contributed 27.5 to 17.5% to overall cesarean rate. Group I was larger than group II, but cesarean rate in group II was more than in group I. Recent research has demonstrated that 97 to 99% of the variation in the total cesarean rate can be explained by the cesarean rate in groups I and II.

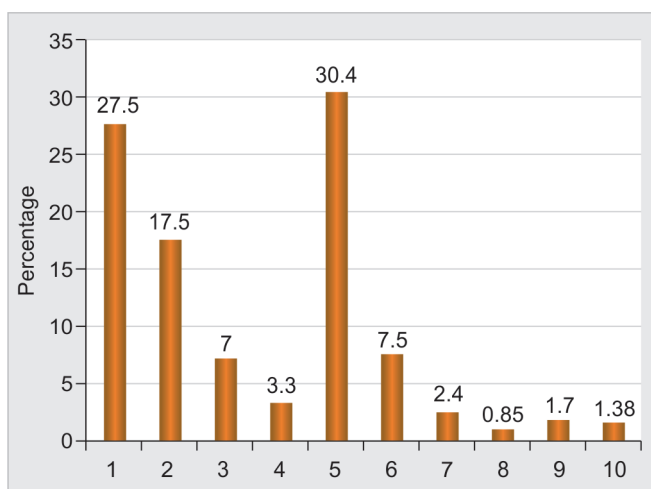
Groups III and IV multiparous women at term with a singleton, vertex pregnancy in spontaneous (group III) or



**Graph 3:** Age distribution of cesareans



**Graph 4:** Cesarean rate in each Robson's group



**Graph 5:** Contribution of each group to overall cesarean rate

induced labor (group IV) included 33% of deliveries, which was within an expected range of 30 to 40%. As anticipated, group III was much larger than group IV. We found a CS rate of 7.1 and 19.6% in group III and group IV respectively, indicating group IV had more CS rate than group III.

The contribution made by group V (multiparous women at term with a singleton vertex pregnancy and a previous scar) to CS rate was found to be 30.3%, which was largest of all groups. Cesarean rate was 80.1%, with a relative size of 10.8%. According to Robson, with good perinatal outcomes, a cesarean rate of 50 to 60% in group V is excellent. But above this range, there is need to focus on this group to reduce CS rate.

Group VI (nulliparous single breech pregnancy) accounted for 4.9% of all deliveries, and cesarean rate of 85.1% was reported in this group. Group VII (multiparous with single breech pregnancy) had a cesarean rate of 29.1%, which contributed 2.4% to overall cesarean rate. Robson indicates that the contribution of these groups to the overall cesarean rate is highly correlated with the total number of breech pregnancies and the success rate of external cephalic version.

All multiple gestations (group VIII) had a high cesarean rate (25.4%) with a small size of the group (0.96%). Thus, this group contributes only a small proportion of all cesareans.

Relative size of group IX (all singleton, term pregnancies with transverse or abnormal presentation) was found to be 0.51% with a cesarean rate of 100%, which was within expected range.

Group X (all singleton, cephalic, preterm pregnancies) contributed 1.38% to the cesarean rate.

Based on all observations, we identified that groups I to V accounted for the majority of deliveries (91.8%) and that groups I, II, and V accounted for 75.4% of cesareans.

## DISCUSSION

After analyzing our results, we found that group V was the largest contributor to the cesarean rate (80.1%), which is in accordance with other similar studies.<sup>7,8</sup> Promoting vaginal birth after cesarean (VBAC) section would affect the largest number who would otherwise have repeat cesarean deliveries. Repeat cesarean delivery accounts for more than one third of all cesarean deliveries in the United States and is one of the leading indicators for cesarean birth.<sup>9</sup> Neither VBAC nor repeat cesarean is free of risk, but successful VBAC usually entails less morbidity than repeat cesarean. Medical benefits of VBAC include reduced risk of maternal death and surgical and postoperative complications. Physicians should be encouraged to offer women with a previous cesarean delivery an attempt at vaginal birth. It has been estimated that between 60 and 80% of women attempting a trial of labor after cesarean would successfully complete a vaginal delivery.<sup>10</sup>

Groups I and II were the second and third largest contributor to the cesarean rate, that is, 27.5 to 17.5%

respectively. Betrán et al<sup>7</sup> also found similar results in his study. There are many underlying causes for the steady rise in primary CS, including both medical and nonmedical factors. Among the medical factors are increases in mean maternal age and prepregnancy body mass index, as well as changes in obstetric practice, increased use of electronic fetal monitoring, increased labor induction and epidural anesthesia, and reduced use of midpelvis forceps.

Group II had a cesarean rate more than that of group I, i.e., 35.9 to 23.6% respectively. Group IV had a cesarean rate more than that of group III, that is, 19.6 to 7.1% respectively. It indicates that induction and cesarean before labor increases cesarean rate in both multiparous and nulliparous women.

Group VI was found to be the fourth largest contributor to overall cesarean rate (7.5%) and had a cesarean rate of 85.1%. Group VII had a cesarean rate of 29.1%, contributing 2.4% to overall cesarean rate in our study. Although these two groups have high CS rates, they are relatively small contributors to the overall CS rate because of the small number of breech presentations. It has long been thought that vaginal breech birth is associated with more neonatal morbidity and mortality than elective CS. In 2000, a report from the Term Breech Trial<sup>11</sup> implied that CS was safer than vaginal birth for all fetuses with a breech presentation at term and led to a nearly universal practice of CS for breech presentation.<sup>12</sup> However, recent evidence shows that a substantial proportion of breech-presenting fetuses can be safely delivered vaginally in well-supported maternity units.

Cesarean rate was also found to be high in groups VIII, to X, but the relative size of these groups was very small. Therefore, these groups contribute very less to overall cesarean rate and are hence not the areas for modification.

Once the main contributors to CS rates are identified, the next step should be to focus on prevention, where possible.

## CONCLUSION

In our study, Robson's TGCS demonstrated the need to focus on groups I, II, III, and V, particularly if cesarean rate needs to be reduced because the contribution of these groups to overall cesarean rate was 82%.

Thus, TGCS can be a useful framework for auditing and analyzing different CS rates and their reasons. Unit-specific strategies can be made and implemented in an effort to lower the rate. These include increasing VBAC, the uptake of external cephalic version, supporting noninterventional birth environment, and implementing models of care where clinicians are skilled in facilitating vaginal birth. The value of using such a classification is the ability to monitor changes over time as well as



facilitating the comparison of data between units of a similar nature.

We have used Robson's TGCS in our institution and it has helped us tremendously to audit our own records. If TGCS is used uniformly, CS rates can be compared over time and between units, both nationally and internationally.

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