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## Original Research Article

# Analysis of caesarean section using Robson's ten group classification in a tertiary care centre

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## ABSTRACT

**Background:** Caesarean section is the most common obstetric operation that saves lives of countless mother and babies. In the past few decades, caesarean section rates have been continuously increasing worldwide. WHO declared that there is no justification for any region to have a caesarean section rate higher than 10-15% and added that CS rates higher than 10% is not associated with reduction in newborn and maternal mortality rates. In 2015, WHO proposed Robson classification as a global standard of assessing, monitoring comparing and auditing the determinants of caesarean sections rates.

**Methods:** This Retrospective study was done in the department of Obstetrics and Gynecology, Heritage institute of medical Sciences, Varanasi. The study duration was from July 2021 to June 2022.

**Results:** A total of 2039 cases underwent delivery during the study duration. The caesarean rate calculated was 46.3%. Group 5 (previous CS, single, cephalic, >37weeks) made the greatest contributor to total CS rate followed by Group 1 (nulliparous, single, cephalic, >37 weeks in spontaneous labor). 100% of women with abnormal lie (group 9) and 87.9% women with breech presentation underwent CS.

**Conclusions:** The overall rate of Caesarean sections is on an increasing trend. Robson's Group 5 and 1 were the major contributors to caesarean section in this study. RTGCS is a simple useful tool which is a starting point for meaningful analysis of CS both at facility level and across different facilities.

**Keywords:** Caesarean section, Delivery, Robson ten group classification system

## INTRODUCTION

WHO issued a statement in 1985 that there is no justification for any region to have a caesarean section (CS) rate higher than 10-15% regardless of the level of care.<sup>1</sup> The rate of C-section is in rising trend during the past few years both in developed as well as developing countries. Caesarean section is definitely a lifesaving procedure if done for clear indications. However, its inappropriate usage may also be a reason for circumstantial increase in maternal and perinatal

morbidity and mortalities. Caesarean section rates in a center have been defined as an important indicator for measuring efficacy of obstetric services in that particular set up. Therefore constant audits of cesarean section performed in a healthcare facility are of at most importance.<sup>2</sup> The World Health Organization (WHO) and the International Federation of Gynecology and Obstetrics (FIGO) recommend the Robson classification as a global standard for assessing, monitoring and comparing CS rates within health care facilities, over time and between facilities.<sup>3,4</sup> The Robson classification system uses basic obstetric characteristics to categorize all women admitted

for delivery into one of ten mutually exclusive and totally inclusive groups. A recent systematic review of 27 different classifications suggested that the ten-group Robson classification of caesarean sections might allow us to look at CS rates in specific groups to help identify possible reasons for this variation.<sup>5,6</sup>

**METHODS**

This is a retrospective observational study conducted in Heritage Institute of medical sciences, Varanasi over a period of 1 year from July 2021 to June 2022. HIMS is a teaching hospital with annual delivery rate of 2,000-3,000. The data of all deliveries including vaginal deliveries and cesarean section done after 28weeks of gestation were retrieved from the hospital registers in labor room, operation theatres, HDUs, and the data was compared and verified with data from medical record section. All the deliveries were classified as per RTGCS into ten groups according to Robson implementation manual by the WHO. The variables which are necessary for classification include parity, gestational age, presentation, previous CS, onset of labor, and number of fetuses

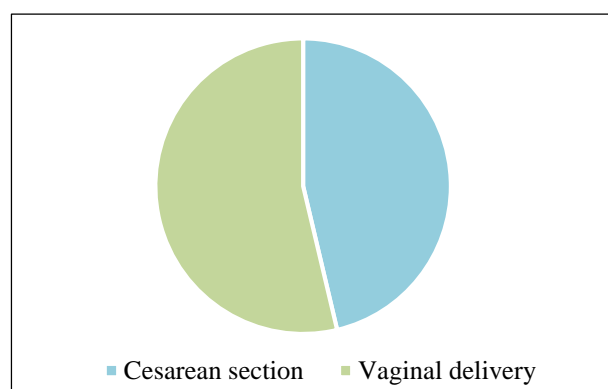
All the data was entered in the Microsoft excel spreadsheet 2010 and was analyzed by using SPSS version 16.0 software. Among the women delivered by CS proportions in various groups according to Robson’s ten group classification were calculated.

**RESULTS**

The total number of deliveries during the study period was 2039. The CS rate was 46.3% (Figure 1). The mean age of

study participants was 26.39±4.49 years and the mean gestational age at CS was 38±3.11 weeks.

Of the total deliveries, 53.7% were vaginal deliveries and 46.3% were cesarean section (Figure 1). Most of the women belonged to group 1, (28.2%) followed by 20.9% women in group 3. In group 2 and 4 there were 14.3% and 11.5% women respectively whereas group 5 comprised of 11.9% women with previous LSCS. Of all the women with breech presentations 3.2% were in group 6 who were nulliparous and 2.1% women were multiparous (group 7). Group 8, women with multiple pregnancies had 1.4% women. The smallest group was group 9, with 24 women having abnormal lies. Group 10 included 5.3% women with singleton pregnancy with cephalic presentation at <37 weeks of gestation.

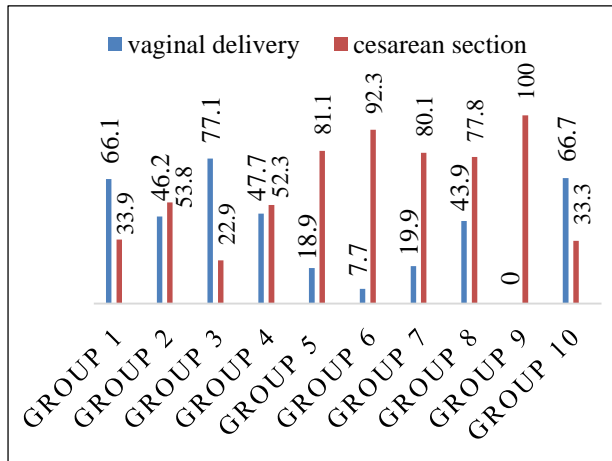


**Figure 1: Cumulative cesarean section and vaginal delivery rates.**

**Table 1: Distribution of participants in various groups according to RTGCS.**

Group	Description	Group size	Group size (in %)	No. of CS	Group CS rate	Absolut contribution to overall CS	Relative contribution to overall CS
1	Nulliparous, single cephalic, ≥37 weeks, spontaneous labor onset	575	28.2	194	33.9	9.5	20.7
2	Nulliparous, single cephalic, ≥37weeks, labor induced or CS before labor	292	14.3	157	53.8	7.7	16.6
3	Multiparous, single cephalic, ≥37 weeks, spontaneous labor onset	428	20.9	98	22.9	4.8	10.4
4	Multiparous, single cephalic, ≥37weeks, labor induced or CS before labor	235	11.5	123	52.3	6.1	13.1
5	All previous CS, single cephalic, ≥37 weeks	243	11.9	197	81.1	9.6	20.9
6	Nulliparous breech	65	3.2	60	92.3	2.9	6.3
7	Multiparous breech	42	2.1	34	80.1	1.6	3.5
8	Multiple pregnancy	27	1.4	21	77.8	1.1	2.2
9	All abnormal lies	24	1.2	24	100	1.2	2.5
10	All single cephalic, <37 weeks	108	5.3	36	33.3	1.8	3.8
	Total	2039	100	944		46.3	100

Table 1 shows the distribution of participants in various groups, the group CS rate and absolute and relative contribution of each group to the overall caesarean section and Figure 2 shows the cumulative vaginal delivery vs. caesarean section in different Robson groups.



**Figure 2: Cumulative vaginal delivery Vs. caesarean section in different Robson groups.**

Among various groups, group CS rate was 100% in women with abnormal lie (group 9). Out of the remaining groups CS rate was highest in groups 6 (92.3%) followed by group 5 (81.1%) and group 7 (80.1%). 74.9% of the study population belonged to the group 1 to 4 and the absolute contribution to the overall CS of these groups put together was 28.1%. The most common indication in all four groups (1-4) was fetal distress followed by labor abnormalities and failed induction. The largest contributor to the overall CS rate was women with previous CS, group 5 (9.6%). The most common indication for CS in group 5 was doubtful scar integrity followed by fetal distress. The smallest group was group 9, with only 24 women having abnormal lie and it was the group with the highest CS rate (100%).

## DISCUSSION

The present study included women from a single center over a period of 1 year, and the overall CS rate was 46.3% which is higher than the national average according to the National Family Health Survey 5 (2019-21). There is a huge disparity between the public and private sectors within any country.<sup>7,8</sup> The validity of threshold of 10-15% CS rate as stated by WHO has been questioned, especially in tertiary referral hospitals, where most of the laboring women are complicated and referred for further management. As reinforced in the WHO statement on CS, there is a need for universal classification of CS in all the hospitals for the meaningful analysis of CS in different groups. By presenting our data we encourage other teaching hospitals to adopt RTGCS as it is a very helpful tool to analyze CS rates in different groups in a particular center and helps in identifying groups that contribute most to the CS rate and thus guide in adopting various steps that

could be initiated to optimize the CS rate in a particular group. It also helps us to compare CS across different hospitals. If implemented on a continuous basis, it would allow the critical assessment of perinatal care leading to change if thought necessary.<sup>9</sup>

Almost three-fourth of the women in our study belonged to groups 1-4 (74.9%) and the CS rate was 28.1% in those women. Women in group 1-4 are women who had either spontaneous or induction of labor at term. The most common indication in all four groups (1-4) was fetal distress (15.6%), followed by labor abnormalities (8.5%) and failed induction (4%). RTGCS does not lay down the guidelines for optimizing CS rates in each groups, however, it is a starting point to do so. To avoid over diagnosis of failed induction, non-reassuring NST and labor dystocia, there should be corresponding set labor induction protocols, judicious and correct usage of NST and adopting newer WHO partogram along with patient's counseling and painless labor management protocols, these will definitely encourage more of the vaginal deliveries, automatically reducing the C section rate. Any reduction in CS in group 1 would affect the CS rate in the total group of nulliparous women with a potential for vaginal birth and would also reduce number of women in group 5 in the years to come.<sup>10</sup> In general the ultimate focus should be on reducing primary CS.

Group 5 should comprise no more than 10% of women. In our study group 5 comprised of 11.5% of women. Group 5 was the major contributor to overall CS in this study (20.9%). Similar finding was observed in many studies across the world ranging from 15.4 to as high as 67.7%.<sup>11-13</sup> Out of total 243 women, 197 (81.1%) underwent CS and 46 (18.9%) women had vaginal birth after caesarean (VBAC). Even though vaginal birth after one CS has been advocated as a safe option, the number of women who attempt VBAC has declined over recent years due to fear of uterine rupture.<sup>14-18</sup> Most common indication for CS in group 5 was doubtful scar integrity followed by cephalopelvic disproportion and fetal distress. The CS rate in group 5 (81.1%) is higher than Robson reference rate (60%).

The Group CS rate was highest in group 9 (100%) followed by the group 6 (92.3%) and group 5 (80.1%). Increasing CS rate in breech presentation both in nulliparous as well as in multiparous women is a common observation. Groups 6 and 7 consist of women with breech presentation, in Group 6, the group CS rate was 92.3%. Despite the criticisms of the term breech trial, many hospitals are not offering vaginal breech birth.<sup>19-21</sup> Although these groups are relatively small, consider offering vaginal breech delivery with clear guidelines to suitable women.

In our study, groups 1 and 5 (65.6%) were the main contributors to caesarean section. Universal implementation of steps to reduce CS may not be applicable at all levels and the actions have to be specific

to the group. This highlights the importance of RTGCS in analyzing CS both at the institutional and national level. However, reducing CS rate at the cost of increased perinatal morbidity and mortality is not meaningful. Hence, analysis of CS by incorporating the details on maternal and perinatal outcome onto RTGCS system will make it as better auditing system. Although simplicity, reliability, and flexibility are considered as positive aspects of RTGCS, problems such as misclassification, missing data and lack of definition on core variables have been identified as difficult areas. Training of health care workers in collecting the data and its systematic way of analysis are essential for successful and meaningful implementation of RTGCS.

## CONCLUSION

RTGCS is a simple useful tool which not only is a starting point for meaningful analysis of CS but can also compare the trends over a period of time both at facility level and across different facilities by its virtue of analysis of different independent groups.

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