

# Analysis of Cesarean Section Rate using Robson's Ten Group Classification System and comparing the Trend at a Tertiary Hospital for 2 Years

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## ABSTRACT

**Aims and objectives:** To classify the cesarean section (CS) in different groups of Robson's ten-group classification system (TGCS) and comparing the rate and relative size of groups with that of previous year at the tertiary hospital.

**Materials and methods:** This retrospective study was conducted in Cheluvamba Hospital, which is a tertiary hospital attached to Mysore Medical College & Research Institute, Mysuru, between January 1, 2014 and December 31, 2014. The data collected was compared with the previous year data between January 1, 2013 and December 31, 2013. The data collected included parity, mode of previous delivery, gestational age, onset of labor-spontaneous or induced, delivery notes of labor ward, and operative notes of CS. This data was then applied to the Robson's TGCS for the year 2014 and compared with that of 2013.

**Results:** The total deliveries during 2014 were 12,930 and in 2013 were 15,182. The number of CSs during 2014 was 3,793 and in 2013 it was 3,917. Cesarean section rate in 2014 was 29.33% while in 2013 it was 25.8%.

The CS rate has come down to half in group I (nulliparous, single, cephalic  $\geq 37$  weeks, in spontaneous labor) and to one-fourth in group III [multiparous (excluding previous CS) single, cephalic  $\geq 37$  weeks, in spontaneous labor] in 2014.

**Conclusion:** Robson's TGCS is easy to classify.

**Clinical significance:** The study showed reduction in CS rate by half in group I and by one-third in group III in 2014 in our institution. This was probably due to the increased awareness among the staff of the institute by the previous year study about higher CS rate.

**Keywords:** Cesarean section, Classification, Robson's TGCS.

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## INTRODUCTION

Cesarean section (CS) rate is increasing worldwide. Better understanding of CS rates, their consequences, and benefits will improve care and enable learning between delivery units nationally and internationally. There is no justification for any region to have a CS rate higher than 10 to 15%.<sup>1</sup> Despite the lack of scientific evidence indicating any substantial maternal and perinatal benefits from increasing CS rates, some studies show that higher rates could be linked to negative consequences in maternal and child health.<sup>2-4</sup> Increase in CS rate particularly in middle- and high-income countries is a major and controversial public health concern.<sup>5,6</sup>

The lack of a standardized internationally accepted classification system to monitor and compare CS rates in a consistent and action-oriented manner is one of the factors preventing a better understanding of this trend and underlying causes.<sup>7</sup> In 2011, a systematic review and critical appraisal of available classifications for CS concluded that women-based classifications in general and Robson's ten-group classification system (TGCS) in particular, would be in the best position to fulfill current international and local needs.<sup>8</sup>

Robson's TGCS is a woman-based classification. It is conceptually easy, and has clearly defined categories that are totally inclusive, mutually exclusive; there is little room for misunderstanding or misclassification. All information is easily available from medical records. It is easy to implement in both high and low-resource settings. Prospective classification allows for changes in clinical management.<sup>7</sup> However, it does not specify reason for CS. Strategies to reduce the frequency of the procedure should include avoidance of medically unnecessary primary CS.

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We wanted to classify CS in our referral hospital for 1-year period and also wanted to know the impact on CS rate in different groups due to awareness of our staff after previous year's classification.

## MATERIALS AND METHODS

This is a retrospective study done at Cheluvamba Hospital, Mysore Medical College & Research Institute at Mysuru. Data was collected from hospital records. It included all women who delivered from January 1, 2014 to December 31, 2014 and compared with the records collected from the previous year, i.e., January 1, 2013 to December 31, 2013 by the same author.<sup>9</sup> Details about the delivery are taken from the labor ward records and operative notes from the operation theatres. Details like age, gestational age, parity, onset of labor, spontaneous or induced, previous delivery details were taken into consideration, and then classified according to Robson's TGCS for the year 2014.

## RESULTS

The total number of deliveries during the study period was 12,930. Cesarean sections were 3,793. These women were categorized according to Robson's TGCS and were analyzed as per Table 1.

## DISCUSSION

Groups were interpreted according to M. Robson's et al/ Best Practice & Research Clinical Obstetrics and Gynaecology.<sup>10</sup> All groups were analyzed clinically according

to Current Progress in Obstetrics & Gynecology by John Studd.<sup>10</sup> In our study in 2014, all numerators and denominators in Table 1 added to total numerator and denominator. In group IX, the CS rate is 100%, indicating good data collection. These two factors imply the validity of our study.

The results are also compared with the records of the previous year of the same institute as shown in Table 2.

## Cesarean Section Rate

Cesarean section rate in this study for 2014 was 29.33%. It was higher than the stipulated WHO criteria of 15%. In the year 2013, the CS rate was 25.83%. The CS rate has increased in the year 2014.

The major contribution has been in group V (previous CS, single, cephalic,  $\geq 37$  weeks) with 11.12% and in group II (nulliparous, single, cephalic,  $\geq 37$  weeks induced or CS before labor) 10.13% of the total 29.33% as shown in Graph 1. In 2013, the highest rate was contributed by group V where it was 8.45%, and by group I (nulliparous, single, cephalic,  $\geq 37$  weeks, in spontaneous labor) was 5.05%.

## Clinical Analysis of Each Group

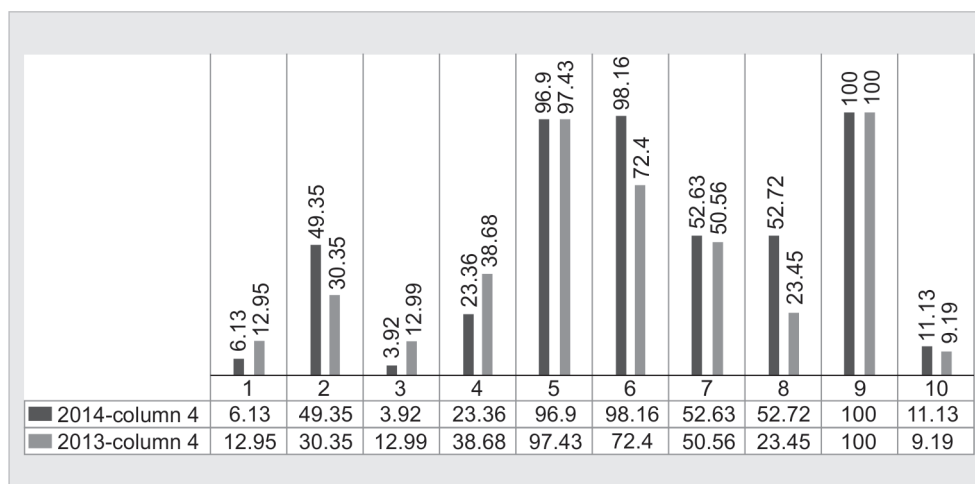
*Group I:* It is the most important group of the entire obstetric population. It is one of the groups that not only vary most in the methods of management, but also in terms of outcome, especially the CS rate. The relative size of this group is 27.47% in 2014, while it is 39% in 2013. There is decrease in the size of this group in 2014.

**Table 1:** Classification of CS according to Robson's TGCS in 2014

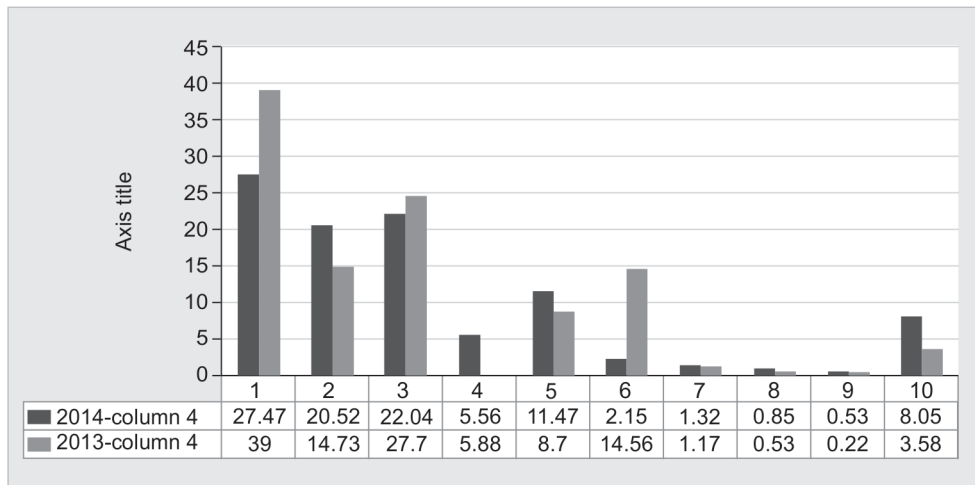
Groups	Number of CS over total number of women in each group	Relative size of groups (%)	CS rate in each group (%)	Contribution made by each group to the overall CS rate (%)
1 Nulliparous, single, cephalic, $\geq 37$ weeks, in spontaneous labor	218/3552	27.47 3552/12930	6.13 218/3552	1.68 218/12930
2 Nulliparous, single, cephalic, $\geq 37$ weeks induced or CS before labor	1310/2654	20.52 2654/12930	49.35 1310/2654	10.13 1310/12930
3 Multiparous (excluding previous CS), single, cephalic, $\geq 37$ weeks, in spontaneous labor	112/2851	22.04 2851/12930	3.92 112/2851	0.86 112/12930
4 Multiparous (excluding previous CS), single, cephalic, $\geq 37$ weeks induced or CS before labor	168/719	5.56 719/12930	23.36 168/719	1.29 168/12930
5 Previous CS, single, cephalic, $\geq 37$ weeks	1438/1484	11.47 1484/12930	96.9 1438/1484	11.12 1438/12930
6 All nulliparous breeches	214/278	2.15 278/12930	98.16 214/278	1.65 214/12930
7 All multiparous breeches (including previous CS)	90/171	1.32 171/12930	52.63 90/171	0.69 90/12930
8 All multiple pregnancies (including previous CS)	58/110	0.85 110/12930	52.72 58/110	0.44 58/12930
9 All abnormal lies (including previous CS)	69/69	0.53 69/12930	100 69/69	1.81 69/12930
10 All single, cephalic, $< 36$ weeks (including previous CS)	116/1042	8.05 1042/12930	11.13 116/1042	0.89 116/12930

**Table 2:** Comparison of Robson's TGCS of CSs in 2013 and 2014

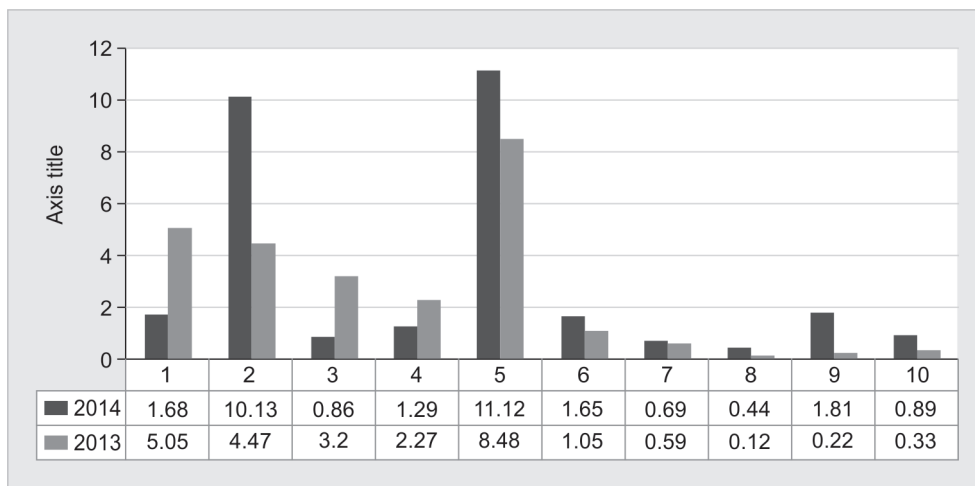
Groups		Year	Number of CS over total number of women in each group		Relative size of groups (%)	CS rate in each group (%)	Contribution made by each group to the overall CS rate (%)
			2014	2013			
1	Nulliparous, single, cephalic, ≥37 weeks, in spontaneous labor	2014	218/3552	27.47	3552/12930	6.13	1.68
		2013	766/5924	39	5924/15182	12.95	5.05
2	Nulliparous, single, cephalic, ≥37 weeks induced or CS before labour	2014	1310/2654	20.52	2654/12930	49.35	10.13
		2013	679/2237	14.73	2237/15182	30.35	4.47
3	Multiparous (excluding previous CS) single, cephalic, ≥37 weeks, in spontaneous labor	2014	112/2851	22.04	2851/12930	3.92	0.86
		2013	487/3750	24.70	3750/15182	12.99	3.20
4	Multiparous (excluding previous CS), single, cephalic, ≥37 weeks induced or CS before labor	2014	168/719	5.56	719/12930	23.36	1.29
		2013	345/892	5.8	892/15182	38.68	2.27
5	Previous CS, single, cephalic, ≥37 weeks	2014	1438/1484	11.47	1484/12930	96.9	11.12
		2013	1287/1321	8.7	1321/15182	97.43	8.48
6	All nulliparous breeches	2014	214/278	2.15	278/12930	98.16	1.65
		2013	160/221	14.56	221/15182	72.40	1.05
7	All multiparous breeches (including previous CS)	2014	90/171	1.32	171/12930	52.63	0.69
		2013	90/178	1.17	178/15182	50.56	0.59
8	All multiple pregnancies (including previous CS)	2014	58/110	0.85	110/12930	52.72	0.44
		2013	19/81	0.53	81/15182	23.45	0.12
9	All abnormal lies (including previous CS)	2014	69/69	0.53	69/12930	100	1.81
		2013	34/34	0.22	34/15182	100	0.22
10	All single, cephalic, <36 weeks (including previous CS)	2014	116/1042	8.05	1042/12930	11.13	0.89
		2013	50/544	3.58	544/15182	9.19	0.33



**Graph 1:** Lower segment cesarean sections rate in each group – column 4



Graph 2: Relative size of the group – column 3



Graph 3: Contribution made by each group to overall CS rate – column 5

The CS rate in this group was 6.13%, and it was 12.95% in 2013. There was 50% reduction in CS rate in this group in the study period. We subclassified them to analyze the significant reduction of CS rate in this group.

In 2014, the total number of women was 3,552. Women who underwent CS were 218. Among them, 106 women had previous abortions accounting for 48.62%, 54 had cephalo pelvic disproportion accounting for 24.77%, and the remaining had fetal distress accounting for 26.60%.

It is necessary to manage labor efficiently to reduce the CS rate in this group. Achieving a good uterine contraction, proper usage of oxytocin, diagnosis, and treatment of dystocia by the use of partogram, fetal monitoring in labor helped in reducing the CS rate in this group during the study period.

*Group II:* The relative size of this group is 20.52% in 2014, while it is 14.73% in 2013. In 2014, the relative size of this group has increased as shown in Graph 2. The CS rate increased in this group to 20.52 from 14.73% of the previous year contributing to 10.13% of the total CSs.

Groups I and II should be analyzed together as well as individually. The larger the relative size of groups II to I, the higher the CS rate will be in groups I and II together. Groups I and II together become the driving force for the increasing primary CS rate. Though it was less in group I in our study, still, because of the increased rate in group II, the contribution of group I + II is 55.3%. In a similar study done by RC Prameela et al in 2013, the contribution of groups I and II is 53.73%.

*Group III:* The CS rate in this group is 3.92%, as shown in Graph 3. It should be <3% as a constant. In our study in 2014, it is slightly higher while it was 12.99% in 2013. This three-fold high in the previous year may be attributed to increased number of high-risk cases in the group.

Groups I and III, being the spontaneous labor group, are half of the total laboring women, implying more number of women going for spontaneous labor and less number of induction and prelabor. Ideally, it should have included one-third of the total number of women.



*Group IV:* The CS rate in this group is 5.56% in 2014 and 5.88% in 2013. The rate in this group should be 5 to 8% and is relatively consistent. It is all within normal range.

*Group V:* It is a heterogeneous group which contributes the maximum to CS rate. In our study, the relative size of this group is 11.47% in 2014 while it is 8.7% in 2013, which shows that there had been high CS rates in previous years mainly from groups I and II. This group contributed highest to CS in our study at 11.12%.

We subclassified these women: There were 1,412 women who had a history of previous 1 cesarean section, 71 women had a history of previous 2 cesarean sections, and 1 woman had a history of previous 3 cesarean sections. There were three cases of ruptured uterus in this group that underwent peripartum hysterectomy as a consequence of scar rupture.

In groups VI to X, the CS rate is high but these contributed less to the overall CS rate.

*Group VI:* The CS rate in this group is 98.16%; its overall contribution is less, accounting to 1.65% in 2014. In 2013, the CS rate is 72.4% and its overall contribution is 1.05%. Most nulliparous breeches are now delivered by CS.

*Group VII:* The relative size of this group in 2014 is 1.32% and the overall contribution to CS is 0.69% while in 2013, it is 1.17 and 0.59% respectively.

The CS rates in these two groups are now close to 100%, but because the groups are not bigger than 3 to 4%, together they will never make a large contribution to the overall CS rate.

*Group VIII:* The size of the group will vary, mainly according to the different types of infertility treatment. In our study, the relative size is 0.85% and its contribution to the overall CS rate is 0.44% in 2014. The relative size is 0.53% and the overall CS rate is 0.12% in 2013. This group has a significantly high perinatal mortality rate.

*Group IX:* The relative size of this group should be 0.4 to 0.8%. In our study, it is 0.53% in 2014 and is 0.22% in 2013. The CS rate in this group is 100% in both the years which is helpful in assessing the quality of data collection which is very good in our study.

*Group X:* Usually the CS rate in this group is < 10%. In our study, it is 11.13% which is slightly higher in 2014 and is 9.19% which is appropriate in 2013. The average size of this group is 5% but in our study it is 8.05% in 2014 and is 3.58% in 2013.

It signifies the incidence of fetal and maternal medical conditions, such as intrauterine growth restriction and preeclampsia. This is one of the reasons for high CS rate in a tertiary hospital. The CS is mainly seen in late preterm between 36 and 37 weeks of gestation.

## SUMMARY

- Relative size of group IX is 0.53% and CS rate is 100%, suggesting good data collection.

- Overall CS rate is 29.33%, which is higher than WHO standard and even higher than the previous year which was 25.83%.
- The CS rate in group I is 6.13% and in the previous year it was 12.95%, so it is reduced by half by careful monitoring.
- The CS rate in group II remained high at 20.52% than the previous 14.73%.
- Relative size of group I + II is 47.99%, more than expected 42%.
- The CS rate in group III became optimum at 3.92% which was three times higher in the previous year at 12.99%.
- The CS rate in group IV is also reduced in 2014, which is 23.36% as compared to 38.68% of the previous year.
- Group V had 96.9% CS rate.
- Relative size of groups VI and VII is less than 4%.
- The CS rate in group X is 11.13%, indicating high preterm cesarean sections.

## CONCLUSION

There are many reasons for CS delivery for pregnant woman. It is the sole decision of the obstetrician to analyze for CS if it is appropriate or not as a concern for the betterment of the mother and baby.

We can classify the CS according to women's group, which is inclusive totally and mutually exclusive. Robson's classification is easy in collecting information about CS rate. This classification system can provide critical assessment of care at delivery and can be used to change practice if used on a continuous basis. However, this classification will not be able to analyze indication for CS.

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