

# An Analysis of Caesarean Section Rate by Robson's Ten Group Classification System to Understand Which Groups to be Targeted- A District Level Hospital Based Study

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## ABSTRACT

**Introduction:** The Caesarean section (CS) rate has been increasing throughout the world and it has become a major public health issue. There is no universally acceptable classification system to monitor and compare the CS rate between the hospitals, countries and regions. WHO has proposed Robson's Ten Group Classification System to be used. This study was done to analyse the CS rate and to understand which groups to be targeted to reduce CS rates.

**Material and Methods:** This is a retrospective study done from September 2014 to September 2015 (13 months). Data was collected from the case sheets for all the women who underwent Caesarean section during the study period. Data was analysed using Microsoft Excel 2007. A Pareto chart was constructed to understand which groups were contributing to 80% of Caesarean sections.

**Results:** The total number of Caesarean sections was 542 and total deliveries were 1451 during the study period giving an overall CS rate of 37.3%. Group 1, 2 and 5 together contributed to 81.6% of total CS. Group 5 was the largest contributor with 47%, Group 2 accounting 23% and Group 1 with 11.6% of total CS rate. Conclusion: Robson's classification system for Caesarean sections is very useful to analyse the rates in different groups and specific interventions can be targeted to those groups. This helps us to allocate resources wisely and optimise Caesarean section rate without increasing the maternal and neonatal morbidity and mortality.

**Keywords:** Caesarean section, Robson's classification system, maternal morbidity, neonatal morbidity and mortality.

## INTRODUCTION

The world has witnessed the trend of changing Caesarean section rates from a time when it was rarely performed to the one most commonly performed.<sup>1</sup> This change has been facilitated by improved anaesthesia technique, usage of antibiotics, blood transfusion facilities making the procedure relatively safe. This increase in the rate of Caesarean section (CS) has become a major public health issue. Caesarean section is a major procedure associated with short and long term morbidity. The rising CS rates also add significantly to the financial burden of the communities and the public health system. The Caesarean section rates vary throughout the world and vary within countries.

In the absence of a universally accepted standardized classification system to analyse the CS rates, it is difficult to direct specific interventions to particular groups.<sup>2</sup> The Ten Group Classification System (TGCS) proposed by Robson in 2001 overcomes this barrier as it is based on women characteristics.<sup>3</sup> It has been shown to be promising in terms of ease of applicability, reproducibility, robustness and flexibility.

WHO proposes adopting the Robson's classification as an internationally applicable Caesarean section classification system.<sup>4</sup> The other advantages are it can be applied prospectively and allow for uniform grouping of women. This classification has become very popular over the last few years in many countries.<sup>5</sup> This study was done to analyse Caesarean section rates in different groups and to identify which groups to be targeted to reduce the Caesarean section rates.

## MATERIAL AND METHOD

This is a retrospective study done from September 2014 to September 2015 (13 months). Ethical clearance was obtained from the IRB. Case sheets were retrieved, analysed and relevant data was entered into data collection forms and then transferred to Microsoft Excel (2007) spreadsheets and percentages were calculated. A Pareto chart has been constructed after calculating the cumulative percentages to analyse which groups are contributing to 80% of Caesarean sections.

## RESULTS

The total number of Caesarean sections was 542 and total deliveries were 1451 during the study period. The overall CS rate was 37.3% which is high compared to similar studies in other parts of India. The percentage contribution to the overall CS rates by each group is shown in Table 1. The contribution by major groups is, Group 1-11.6%, Group 2- 23% and Group 5-47% and these three groups accounted for 81.6% of total CS. The CS rate in Group 2 is twice that of Group 1. All CS for breech presentations contributed 4% combining both nullipara and multi para. CS for multiple pregnancies constituted 1.7% and all abnormal lies were 1.3%. Preterm CS  $\leq 36$  weeks contributed 8.3%. The primary CS rate, contributed by groups 1,2,3,4 including both nullipara and multipara in our study is 37.7% and repeat CS accounted for 47% to the overall CS rates. (Figure 1 and 2)

## DISCUSSION

Caesarean section rates vary throughout the world, within the regions and between the countries within the region. In

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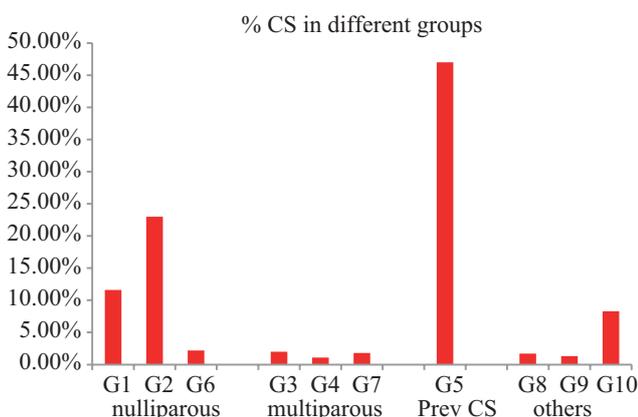
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| Groups  | Overall CS Rate (%) September 2014- September 2015<br>542/1451 (37.3%) |                                      |  |
|---|--|--------------------------------------|--|
|   | Number of CS   | % contribution to the total CS (542) | % contribution of CS in the group to total births (1451) |
| 1. Nulliparous, single cephalic, ≥37weeks, in spontaneous labour                              | 63/542   | 11.6                                 | 4.34   |
| 2. Nulliparous, single cephalic, ≥37weeks, induced or CS before labour                        | 125/542  | 23                                   | 8.61   |
| 3. Multiparous(excluding previous CS), single cephalic, ≥37weeks, in spontaneous labour       | 11/542   | 2                                    | 0.75   |
| 4. Multiparous(excluding previous CS), single cephalic, ≥37weeks, induced or CS before labour | 6/542  | 1.1                                  | 0.41   |
| 5. Previous CS, single cephalic, ≥37weeks   | 254/542  | 47                                   | 17.5   |
| 6. All nulliparous breeches   | 12/542   | 2.2                                  | 0.82   |
| 7. All multiparous breeches (including previous CS)   | 10/542   | 1.8                                  | 0.68   |
| 8. All multiple pregnancies(including previous CS)  | 9/542  | 1.7                                  | 0.62   |
| 9. All abnormal lies (including previous CS)  | 7/542  | 1.3                                  | 0.48   |
| 10. All single cephalic, ≤36weeks (including previous CS)                                     | 45/542   | 8.3                                  | 3  |

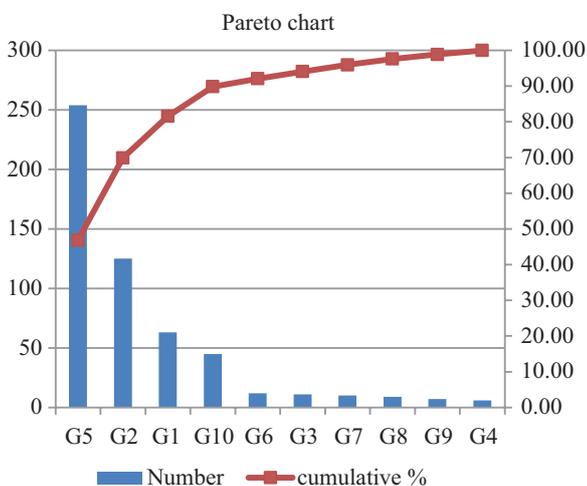
**Table-1: Caesarean section rates according to Robson's Ten group classification system**

| % of CS            | Present study | Dhodapkar et al (2015) | Prameela R.C et al (2015) | Shisrath A. Et al (2014) | Kansara V et al (2014) |
|--------------------|---------------|------------------------|---------------------------|--------------------------|------------------------|
| Over all CS rate % | 37.3          | 32.6                   | 25.8                      | 29                       | 25                     |
| Group 1            | 11.6          | 24                     | 19.5                      | 21                       | 18                     |
| Group 2            | 23            | 14.2                   | 17.3                      | 9.1                      | 12.4                   |
| Group 5            | 47            | 40.1                   | 32.8                      | 54.5                     | 46                     |

**Table-2: Comparison of CS rates in predominant groups with other studies/hospitals.**



**Figure-1: Column bar chart of CS rates in different groups.**



**Figure-2: Pareto chart showing G5, 2, 1 contributing to 81% of CS.**

Africa the rates are reported as 3.5%, 25-30% in Asia, 20-25% in UK, 30-35% in USA, 40% in China.<sup>6,7</sup> In India the Caesarean section rate has increased from 20% to 30% over the last 20 years and in some facilities it is upto 35-40%.<sup>8</sup> WHO's statement on Caesarean section rates proposes that 10-15% is the ideal rate at the population level and these rates are associated with decreases in maternal, neonatal and infant mortality. There is no evidence that mortality rates decrease further when the rates increase beyond this level.<sup>4</sup> It is very important to understand the difference between Caesarean Section rates at population level and health care facility level. Healthcare facility rates of caesarean births vary widely depending on differences in the obstetric populations, infrastructure, blood bank, ICU, level of NICU facility and other demographic factors like economic status, level of education, income level and employment, cultural factors and medicolegal considerations. So it is not surprising that the CS rates are high in many health care facilities. Therefore, a population-based recommended caesarean section rate cannot be applied as the ideal rate at the hospital level because of these very differences. This is more relevant in India where private sector plays significant role in health care services. In 2014, WHO concluded that Robson's classification is the most appropriate system to compare the rates and to monitor maternal and perinatal outcomes, locally and internationally. This system classifies women into 10 groups based on five Obstetric parameters which are parity, onset of labour, gestational age, foetal presentation and number of foetuses. These groups are clinically relevant, mutually exclusive and easy to apply. Robson's classification allows an analysis of size of each group, caesarean section rates within the group and

contribution of each group to the overall Caesarean sections and it will enable learning within the facility and between the facilities. Analysis of the groups also helps us to direct specific interventions to reduce Caesarean section rates to particular groups and study the outcomes.<sup>9</sup> This is particularly relevant in developing countries where resources can be allocated wisely to achieve maximum results without increasing maternal, neonatal morbidity and mortality.

We have attempted to compare our CS rates with similar studies done in various parts of India.<sup>10-13</sup> (Table 2). The limitations of our study are the size of each group, CS rate within the group and main indications for CS within major groups were not analysed. Group 1: This group is very important that the caesarean section rate in this group has been suggested by Robson to be the gold standard measure of a maternity service.<sup>14</sup> The Caesarean section rate of 11.6% is lower compared to other studies.

The strategies which would lead to further reduction in Caesarean section rates in this group, which are not followed uniformly are—implementation of guidelines, standardization of definitions for the terms foetal distress, failure to progress, cephalo pelvic disproportion, using partograms, oxytocin infusion protocols, continuous support to the woman in labour.<sup>9</sup>

Apprehension, nonallowance of partner/companion into the delivery room, lack of antenatal counselling, adequate pain relief are other factors to be considered to reduce Caesarean section rates in this group.<sup>15</sup> These strategies would also apply to Group 3 (multipara, single cephalic, >37wks in spontaneous labour, excluding previous CS). Group 2 (Nullipara, single cephalic, ≥37wks, induced or CS before labour): This group consists of women whose pregnancies were interrupted ≥ 37 wks due to maternal, foetal indications or both such as Intra Uterine Growth Restriction, Antepartum Haemorrhage, Severe preeclampsia/Eclampsia, Premature rupture of membranes etc. Caesarean section rate is variable in this group and depends on the location, infrastructure of the hospital and clinical guidelines on induction of labour. It is expected that CS rate in this group may be higher than Group 1 in a tertiary level hospital. The strategies to reduce CS rates in this group are clear identification of indication for induction and CS and review of the decision with another colleague. These strategies also apply to Group 4 (Multipara, excluding previous CS, ≥37wks, single cephalic, induced or CS before labour).

Group 5 (Previous CS, single cephalic, ≥37weeks): This is the largest contributor to the overall caesarean section rates consistently in all the studies. It is suggested that Trial Of Labour After Caesarean (TOLAC) should be offered to all eligible women after counselling to reduce the Caesarean section rate. A consensus about the role of induction and indication for induction of labour, is necessary between the care givers within the facility. If TOLAC is successful it will significantly reduce repeat Caesarean section rates.

Group 6 (All nulliparous breeches): External Cephalic Version (ECV) is a procedure which can reduce primary Caesarean section for breech. When it is done by an experienced Obstetrician it is successful in upto 60% of cases. However, many Obstetricians are not skilled in this procedure.

Group 7 (All multiparous breeches, including previous CS): ECV can be offered to women without previous Caesarean section or a planned vaginal breech delivery in selected cases is a strategy to be adopted. Studies have shown that neonatal morbidity and mortality are similar to those born by Caesarean section in a well planned vaginal breech delivery with strict selection criteria, intrapartum guidelines and with an experienced Obstetrician especially in a multipara the success of vaginal breech delivery is high.<sup>16</sup>

Group 10 ( All single cephalic, ≤36weeks, including previous CS): Caesarean section rate in this group in a tertiary hospital can be high and a decision to deliver ≤36wks for foetal, maternal or both indications should be reviewed with another colleague/senior colleague.

## CONCLUSION

Caesarean section is associated with short term and long term morbidity such as haemorrhage, infection, Thromboembolism, prolonged hospitalization, uterine rupture. In the absence of clear evidence of improved maternal and neonatal morbidity with increasing Caesarean sections, which adds to economic burden, all efforts should be made to optimise the Caesarean section rates. Robson's women characteristics based classification helps us to identify specific obstetric population groups to target the interventions to reduce the Caesarean section rates. It is also useful to analyse the CS rates over time within the groups and to understand whether the targeted interventions are effective in reducing the Caesarean section rates.

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