## Original Research Article

# A retrospective study to analyse the rate of caesarean section according to Robson's 10 group classification in a peripheral hospital in a metropolitan city

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**ABSTRACT**

**Background:** In the past several decades, a pattern of rapid increases in Caesarean section (CS) delivery rates has been observed worldwide, as also in India. It is important to identify the reason behind the rising rates of CS since they can pose unnecessary risks to the mother and the neonate. The aim of the study was to analyse the CS rate in the ten groups as per Robson's ten group classification, in a peripheral hospital in a metropolitan city. By this study we have tried to identify specific groups of women to be targeted to reduce CS rates.
**Methods:** This is a retrospective study carried out at a peripheral hospital in Mumbai, India. It included all women who had delivered in the hospital from January, 2019 to December, 2019. The sample size was 2603.
**Results:** Under this study, we found out that the rate of CS delivery is higher than what is recommended by WHO in Robson's group 2, 5 and 6.
**Conclusions:** This study will help us carry out targeted interventions so as to reduce the CS rates in these groups.

**Keywords:** Birth, Caesarean section, 10-group classification, Labor

## INTRODUCTION

In the past several decades, a pattern of rapid increases in Caesarean section (CS) delivery rates has been observed worldwide, and this increase has varied across regions.[1] The rate of births by CS is increasing in India as well, and has already crossed the World Health Organization (WHO) threshold of 15 per cent. In 2018-19, India conducted 20 per cent of the total institutional deliveries through CS, against 18.7 per cent in the previous year.[2]

It is important to identify the reason behind the rising rates of CS since they can pose unnecessary risks to the mother and the neonate and are associated with higher rates of both short term and long term morbidity as also with mortality.[3,4] Since the study subjects will differ as per various obstetric characteristics, it is crucial that we categorize them appropriately before carrying out this analysis.[5] The ten group classification system proposed by Robson, is one of the most appropriate system to classify pregnancies.[6] Robson's system classifies all deliveries into one of ten groups based on five parameters. They are obstetric history (parity and previous CS), onset of labor (spontaneous, induced, or CS before onset of labor), fetal presentation or lie (cephalic, breech, or transverse), number of neonates, and gestational age.[7,8] The ten Robson categories are mutually exclusive, totally inclusive.[7]

*Aims and objectives*

The aim of the study was to analyse the CS rate in the ten groups as per Robson's ten group classification, in a peripheral hospital in a metropolitan city. By this study we have tried to identify specific groups of women to be targeted to reduce CS rates.

**METHODS**

This study was a retrospective study carried out at Pandit Madan Mohan Malviya Shatabdi Municipal General Hospital which is a peripheral hospital in the metropolitan city of Mumbai, India. The sample size was 2603. The sample included all women who had delivered in the hospital from January, 2019 to December, 2019. The data was collected using the medical records from the hospital. A case record form that included confinement number, age, gravida, parity, gestational age, maternal complications and type of delivery was used to collect the data.

*Statistical analysis*

The data was compiled and a master-chart was created in Microsoft Excel 2019. The statistical analysis was done using Statistical package for social sciences (SPSS) 20

software. The number and percentages of women who delivered by CS delivery (Emergency and Elective) were calculated. Among the women delivered by CS proportions in various groups according to Robson's ten group classification were calculated.

**RESULTS**

As shown in Table 1, a total of 2603 deliveries were conducted in the hospital from January 2019 to December 2019. Out of these 537 were CS deliveries.

**Table 1: Incidence of CS delivery in the study.**

| Delivery mode | Number of women | Percentage | P value |
|---|---|---|---|
| **Vaginal** | 2066 | 79.37 | 0.358 |
| **CS** | 537 | 20.63 | |
| **Total** | 2603 | 100 | |

In Table 2, each of the women who had undergone delivery were classified into the respective Robson's classification group that they fit in. The relative size of each group was then calculated.

**Table 2: Relative size of each group according to Robson's ten-group classification system.**

| S. No. | Groups | No. of CS | Total no. of women in each group | CS rate on each group (%) | Relative Contribution made by each group to Overall CS rate (%) |
|---|---|---|---|---|---|
| 1 | Nulliparous, single cephalic, >37 weeks in spontaneous labor | 62 | 603 | 10.28 | 11.55 |
| 2 | Nulliparous, single cephalic, >37 weeks, induced or CS before labor | 123 | 164 | 75.00 | 22.91 |
| 3 | Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labor | 36 | 1350 | 2.67 | 6.70 |
| 4 | Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labor | 34 | 106 | 32.08 | 6.33 |
| 5 | Previous CS, single cephalic, >37 weeks | 212 | 227 | 93.39 | 39.48 |
| 6 | All nulliparous breeches | 35 | 38 | 92.11 | 6.52 |
| 7 | All multiparous breeches (including previous CS) | 20 | 38 | 52.63 | 3.72 |
| 8 | All multiple pregnancies (including previous CS) | 1 | 3 | 33.33 | 0.19 |
| 9 | All abnormal lies (including previous CS), >37 weeks | 9 | 9 | 100.00 | 1.68 |
| 10 | All single cephalic, <36 weeks (including previous CS) | 5 | 65 | 7.69 | 0.93 |

The CS rates among women according to Robson's 10 group classification were found and have been shown in Table 3. It was found that Group 3 contributed to the maximum percentage of all deliveries (51.8%) followed by Group 1 (23.14%). Group 8 which included all the multiple pregnancies contributed to the minimum share of all

deliveries (0.35%). Remaining groups constituted 31.32% of all pregnancies

The CS rate was found to be the highest in Group 9 of the classification, which included pregnancies where the lie of the fetus was abnormal. In this group, all the women

underwent CS delivery (100% rate). This was followed by Group 5 and Group 6 which included women who had undergone CS in the previous pregnancy/pregnancies and nulliparous women with breech presentation fetus respectively. The CS rates in them were 93.39% and 92.11% respectively. The lowest rate of CS was found in Group 3 that comprised of multiparous women with cephalic presentation (single pregnancy) who had gone in spontaneous labor. Group 5 makes the highest relative contribution to the overall CS rate (39.48%).

The CS rate is significantly higher in Group 2 (induced/spontaneous CS in nulliparous women) compared to Group 1 (spontaneous labor onset in nulliparous women). Similarly, the CS rates are significantly higher (induced/spontaneous CS in nulliparous women) ($\chi^2$=26.47, p<0.001) in Group 4 (induced/spontaneous CS in multiparous women) than in Group 3 ((induced/spontaneous CS in multiparous women).

**Table 3: CS rates among women groups according to Robson's Ten-group classification system.**

| S. No. | Groups | Total no. of Delivery n=2603 | Percentage |
|---|---|---|---|
| 1 | Nulliparous, single cephalic, >37 weeks in spontaneous labor | 603 | 23.14 |
| 2 | Nulliparous, single cephalic, >37 weeks, induced or CS before labor | 164 | 6.3 |
| 3 | Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labor | 1350 | 51.8 |
| 4 | Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labor | 106 | 4.07 |
| 5 | Previous CS, single cephalic, >37 weeks | 227 | 8.71 |
| 6 | All nulliparous breeches | 38 | 1.46 |
| 7 | All multiparous breeches (including previous CS) | 38 | 1.46 |
| 8 | All multiple pregnancies (including previous CS) | 3 | 0.12 |
| 9 | All abnormal lies (including previous CS), >37 weeks | 9 | 0.35 |
| 10 | All single cephalic, <36 weeks (including previous CS) | 65 | 2.5 |

## DISCUSSION

The CS rate in our study was 20.63% which was a little higher but not significantly greater than the WHO recommended CS rate for optimal care. Had the women not been classified into the 2 Robson categories, it would have seemed that there is no requirement to reduce the CS rates in this hospital. However, dividing the women into ten Robson categories, made it possible for us to target specific groups in which the CS rates needed to be reduced.

The CS rate was found to as high as 24.11% among nulliparous females from Group 1 and 2. The results of similar study from Mysore, India showed a 33.1% rate for the same groups.[9] Though there is a difference in the two values, the difference is statistically insignificant revealing that our findings are consistent with those of other studies elsewhere in India. As per our study, these groups also they constituted 34.45% of the total CS rate. This is highly similar to a French study which states that these 2 categories constitute little over one third (>33.33%) of the total CS rate.[10]

Among nulliparous pregnancies, it is observed that the rate of CS is significantly higher in Group 2 which includes women who are delivered before going into spontaneous labor (75%) as compared to those belonging to Group 1 which includes those who go in spontaneous labor (10.2%). These findings are again consistent with those from the Indian study mentioned above where the rates

were found to be 16.4% and 80.23%.[9] However, the Group 2 women have much higher CS rates when compared to other studies like the one conducted in British Columbia, in which, Group 2 was found to have CS rates falling in the range 34.4 to 44.6%.[11] Similarly, among multiparous women, it is observed that the rate of CS is significantly higher in Group 4 which includes women who are delivered before going into spontaneous labor (32.08) as compared to those belonging to Group 1 which includes those who go in spontaneous labor (2.67%).

In our study, maximum relative contribution to the total CS rate was by Group 5 (39.5%). This is significantly higher than the WHO recommended rate for optimal care and also higher that of the Indian study mentioned above where the rate was 28.9%.[2,9] However, it is similar to the rate found in a study conducted in Ballari, India where the rate was found to be 40.24%.[12] The high rate in this group was most likely due to lower trial of Vaginal Birth after CS (VBAC), though the success of VBAC is found to be as high as 60-80%.[13] Similarly, the rates of CS are very high in Group 6 that includes nulliparous women with fetuses having breech presentation (92.11%). Th This may again be, to avoid the risk of conducting a breech vaginal delivery as there could be several potential complications if it fails.

The rates of CS in Group 7, 8 and 9 are higher it was mostly due to unavoidable obstetric indications. Other studies also show similar high incidence in these

groups.[9,14] Finally, CS rate is significantly lower in Group 10. This is in contrast to most studies since, majority of preterm patients in this hospital are transferred to a tertiary care hospital before delivery, due to absence of a neonatal intensive care unit.[9,12]

Thus, by applying Robson's criteria three potential groups where rates of CS could be possibly reduced were identified. They include women belonging to Group 2, Group 5 and Group 6 in which the rates are extremely high, but the chances of successful vaginal delivery are considerable.

## CONCLUSION

Thus, Robson's classification provides simple way into gather data about CS rate. It helps to identify the CS rates among women belonging to each group. Using this study we found out the significantly higher rates of CS deliveries in 3 groups mainly (Group 2, 5 and 6). This data can help us implement targeted interventions specific to the groups. This may include formulating specific protocols like having a strict Vaginal birth after CS protocol, or about when to conduct a CS in women with fetus having breech presentation and when to opt for a Vaginal delivery. Comparative studies that measure the CS rate before and after the hospitals adopt such approaches must be carried out.

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