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Original Research Article

Trends of caesarean section deliveries in a tertiary hospital of North India using Robson classification

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Abstract

Background: Caesarean section**s** without clinical indication have warranted the World Health Organization (WHO) and Government authority to develop measures concerning the regulation of caesarean section in the absence of a clinical indication. Robson Ten Group classification is one of them which classify CSs in ten groups based on various pregnancy classifications.
Aims: To assess the trends in caesarean section rates in women attending mother and child hospital using Robson's classification.
Methodology: A record-based study was conducted for a duration of 12 months where the data of 2560 females who delivered during the study period was used to assess trends in caesarean section rates by classifying them into ten groups by Robson classification. Calculations were done as per Robson's classification manual. The rates of Caesarean Section were calculated by using Robson manual.
Results: Group 1 had the highest number of deliveries (31.7%), followed by Group 3 (25.5%) and Group 5 (17.5%). Group 9 (100%), Group 5 (97%) and Group 2 (90%) were the main contributors of caesarean section.
Conclusions: Higher rates in our study emphasized the need to screen women properly for sections.

Keywords: Robson's ten group classification, Caesarean section, Absolute contribution, Group size.

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1. Introduction

Growing rates of Caesarean sections (CS) are a significant public health problem and are the subject of discussions around the globe because of the possible hazards to expectant mothers and babies, unequal access, and financial concerns.[1-5]

The question of CS rates should now be whether they are appropriate rather than excessively high or low. Additionally, it is inappropriate to consider the deliveries through caesarean section as achievable aim at health centers, rather the approach should be to provide access only to those women who require it.[6] To suggest and carry out efficient steps to lower or raise rates when appropriate it is necessary to have categories to track and equate the rates in a given environment considering time period and diverse background. A thorough assessment carried out in 2011 by the World Health Organisation (WHO) revealed 27 distinct systems to classify caesarean section.

To reason and actualize compelling measures to decrease or increment CS rates where required it is essential to have an instrument to screen and compare CS rates in a same setting over time and between distinctive settings. In 2011, the World Health Organization (WHO) performed a systematic review that distinguished 27 distinctive orders to categorize caesarean section. These classifications looked at "who" (woman-based), "why" (indication-based), "when" (urgency-based), as well as "where", "how" and "by whom" a Caesarean Section was performed.[7] One of the few

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classifications that provides explicit hierarchical choice rules and was validated on actual patients was the indication-based classification introduced by Anderson & Lomas in 1984.[8] Only Indian classification included in 27 different systems to classify caesarean section on indication basis was given by Kushtagi 2008.9 It was easy to use and straightforward, concentrating on conceptual differences to try to identify the factors that lead to caesarean sections, but it wasn't tested on actual patients.

The 10-Groups classification, also referred to as the "Robson Classification" or the "TGCS-Ten Groups Classification System," was developed in order to prospectively recognize distinct, medically significant groups of women who were admitted for delivery and to look into variations in the Caesarean Section rates among these comparatively homogeneous groups of women.[10] The World Health Organization (WHO) gathered a group of specialists in October 2014 and suggested the Robson Classification system as a worldwide benchmark for determining, tracking, and contrasting the Caesarean sections rates both inside and between healthcare facilities.[1,2]

Jammu and Kashmir is one among those states of India having high proportions of caesarean section.[11] Taking all this into consideration, the current study was conceived to assess the trends in Caesarean Section rates in women attending tertiary care hospital with the help of Robson Classification.

2. Methodology

A prospective record-based study was done for the duration of 12 months, from November 2020 to October 2021 in Obstetrics and Gynaecology Department of Sri Maharaja Gulab Singh Hospital (SMGS), which is a tertiary care teaching and training hospital in Jammu region, after seeking approval from Institutional Ethical Committee, (Vide No.C-542) Government Medical College, Jammu. As per previous data received from Medical Record Section of Obstetrics and Gynaecology SMGS Jammu, on an average 60-65 deliveries were taking place per day in this tertiary care centre and 20-30 women were undergoing Caesarean section per day.

At the outset, two sessions, one week apart were conducted with the staff of the Medical Records Department and the details of the study were shared with them. The secondary data of all the women who delivered at this maternity Hospital during the study period was classified into Robson's ten group classification system (RTGS) as suggested by the WHO. Robson Ten Group Classification can be used for "all women" who are attending maternity hospital for birth of their babies vaginally as well as through surgery. It is a thorough perinatal classification that is simple, dependable, reproducible, useful in therapeutic contexts, and prospective (**Table 1**).[10] Initially two visits were made in a week to gather required information in record section. After few months in order to achieve desired size the visits were increased to four times a week.

Table 1: Robson ten group classification

Group No	Name of Robson's ten group classification
1	Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour
2	Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation who had labour induced or were delivered by CS before labour
2a	Labour induced
2b	Pre-labour CS
3	Multiparous women without a previous CS, with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour
4	Multiparous women without a previous CS, with a single cephalic pregnancy, ≥37 weeks gestation who had labour induced or were delivered by CS before labour
4a	Labour induced
4b	Pre-labour CS
5	All multiparous women with at least one previous CS, with a single cephalic pregnancy, ≥37 weeks gestation
5.1	With one previous CS
5.2	With two or more previous CSs
6	All nulliparous women with a single breech pregnancy
7	All multiparous women with a single breech pregnancy including women with previous CS(s)
8	All women with multiple pregnancies including women with previous CS(s)
9	All women with a single pregnancy with a transverse or oblique lie, including women with previous CS(s)
10	All women with a single cephalic pregnancy < 37 weeks gestation, including women with previous CS(s)

The women were manually divided into one of the ten groups by going over the information using the key obstetric variables listed in the Robson classification. The following factors are taken into account when applying Robson's Ten Group Classification: parity, prior LSCS, labour onset, number of foetuses, gestational age, foetal lie, and presentation. Following the woman's classification, the delivery room log book's newly established column and her record were both updated to reflect her particular group. This labelling made it easier to calculate how many women were in each group on a regular basis (such as a monthly basis). To make analyses of these situations easier, a case with missing data that was labelled as "Unclassifiable" and the missing variable were noted. Calculations were done as per Robson's classification manual. The percentage of total caesarean deliveries was calculated against vaginal deliveries. The core variables were defined as per Robson's classification manual (**Figure 1**).

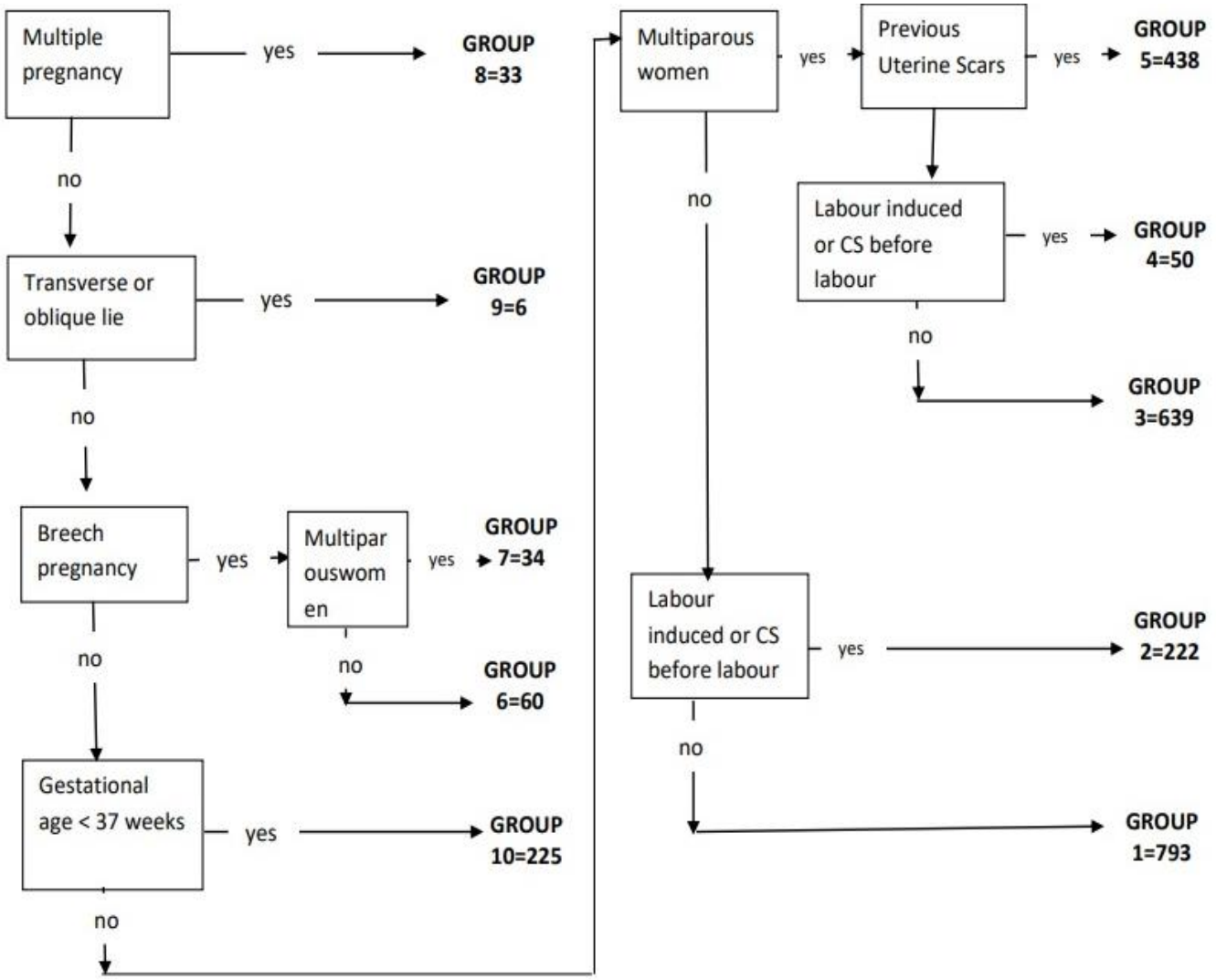

Figure 1: The following flow chart was used to categorize all eligible women who delivered by caesarean section as per Robson classification

2.1. Statistical analysis

The information collected was entered and analyzed using MS Excel spreadsheet. Formulas used in the study for calculation of different CS rates were according to Robson's classification. The data of 2560 women was recorded out of which 60 remained unclassified as per Robson's Ten Group Classification System. Out of 2500, 1379 delivered vaginally and 1121 women had caesarean section.

3. Results

As per Robson's classification maximum numbers of deliveries were conducted among group 1, group 3 and group 5 women. Almost all the caesarean section rates was observed in Groups 9 (100%), 5 (97%) and 2 (90%). Relative contribution to overall Caesarean section rates was highest among Group 5 (37.9%) and Group 1(19.8%) women as evident in **Table 2**.

Table 2: Caesarean section rates in different groups according to Robson classification

Group Number	Number of CS in group	Number of Women in group	Group Size (%)	Group CS rate (%)	Absolute Contribution to Overall CS rate (%)	Relative Contribution of group to overall CS rate (%)
1	222	793	31.7	27.9	8.8	19.8
2	200	222	8.9	90	8	17.9
3	64	639	25.6	10	2.5	5.8
4	33	50	2	66	1.3	2.9
5	425	438	17.6	97	17	37.9
6	51	60	2.4	85	2	4.6
7	24	34	1.3	70.5	0.9	2.1
8	18	33	1.3	54.5	0.7	1.6
9	6	6	0.2	100	0.2	0.5
10	78	225	9	34.6	3.1	6.9
Total	1121	2500	100	44.8	44.5	100

Percentages could not be calculated as 100 percent
Group size (%) = number of women in the group / total Number women delivered in the setting x 100

Absolute contribution to overall CS rate (%) = number of CS in the group / total Number of women delivered in the setting x 100.

Relative Group contribution to overall CS rate (%) = number of CS in the group / total Number of CS in the setting x 100.

Table 3: Unclassified cases as per Robson's classification

Reasons for Unclassified cases	Number of cases
No information on labor onset	19
No information on presentation	30
No information on parity	4
No information on previous CS (multiparous)	5
No information on gestational age	2
Total	**60**

4. Discussion

If a caesarean section is performed unnecessary, it may endanger the lives and health of the mothers and their unborn children in the short and long terms. The global medical experts in a assembly called by the World Health Organization, arranged at Brazil, endorsed 10% -15% as a desirable CS rate.[12]

Our study observed 44.8% CS rate which is far above the upper norm of WHO i.e. 15%. Various authors in their studies have found the average CS rate between 27.3%-31.1%.[3,13] The child survival rate (CS rate) in India has risen steadily from 2.9% of live births in 1992–1993 to 7.1 percent in 1998–1999, 10.6% in 2005–06, 17.2% in 2015–16, and most recently 21.5 percent.[14] Numerous regions of the nation have seen an increase in the numbers, notably the state of Jammu and Kashmir, where the public health facility's case-mix percentage increased from 35.5% to 42.7% (7.2% increase).

Similarly, in Southern states of India: Maharashtra, Telangana, Karnataka, births by CS in Private health care facilities saw a jump from baseline of (2015-2016) 20% to 25.4%, 74.5% to 81.5%, 23.6% to 31.5% respectively. In Himachal Pradesh, the rise was from 44.4% to 51.4 per cent. North Eastern states like Meghalaya, Manipur and Sikkim also experienced rise in CS rate which were from 40.8%, 53.2% and 55.4% in (2019-2020). The union territory of Ladakh saw a rise in the number of births via C-sections, from 16.1 per cent in 2015-16 to 37.6 per cent in 2019-20.

The ten-group classification has provided guidelines to assess the obstetric population size and ratios of pregnant women within the groups attending the hospital.[15] Size of group 1 and Size of group 2 when added should be between 35-42% and Ratio should be higher than 2.1. Group 3 and 4 together should be 30%, and ratio should be higher than ratio of group 1 and group 2. Size of group 5 should be half of the total CS rate and size of group 6 and 7 should be between 3-4%, and ratio should be 2:1. Group 8 should be between 1.5-2%, group 9 not more than 1% and group 10 less than 5%. In our study sizes of group 1 & 2 (40.6%) group 3 & 4 (27.5%), group 6 & 7 (3.7%), group 8 and Group 9 (1.3%, 0.5%) were within the range of Robson guidelines. Size of group 5 was 17.5% in our study lower than expected range, but according to TCGS in settings with inflated CS rates, the size can exceed more than 15%.

In our study, with the help of Robson's TGCS we assessed the proportion of each group in the obstetric population, the contribution of CS in each group to the overall CS rate and the CS rate within each group. More than half of study participants (57.2%) who attended the hospital for delivery were from Group 1 (Nulliparous women with a single cephalic pregnancy, ≥37 week's gestation in spontaneous labour) and Group 3 (Multiparous women without a previous caesarean section, with a single cephalic

pregnancy, ≥37 weeks gestation in spontaneous labour). Many authors have reported similar results.[16-19]

The overall CS rate observed in group 5 was in accordance with the findings of study done by Kansara V *et al.,* 2014 and Shirsath A *et al.,* 2014 (98.3% and 87.2%) respectively.[20,21] Abdel-Aleem H *et al.,* 2013 in a study conducted at Egypt also observed 30% CS rates observed that repeat CS accounted for 32.8% of all CS.[22,23] Kansara V *et al.,* 2014 & Shirsath A *et al.,* 2014 and observed higher rates (54.5%, 46.1%) of casearean section as compared to our study.[20,21] Another recent study done by Roberts *et al.,* 2012, in Australia has concluded that rising first-birth Caesarean rate had driven the overall increase in Caesarean Sections.[24] The Group 5 is further subdivided into two groups 5.1(Women with 1 CS) and 5.2(Women with two or more CS). In both the groups CS rate is very high (94.9% & 100%). Due to the nonavailability of records related to previous caesarean section at the time of present delivery the concerned doctors could not take decision on giving trial of labour. This could have resulted in high rates in group 5 in our study.

Group 2 was the third contributor in our study with 90% (**Figure 2**) of overall CS Rate. Group 2 have two subdivisions 2a (Induced) and 2b (Pre labour CS). The higher CS rate in this group can be attributed to poor success rates for induction of labour (68% CS rate) and elective (100% CS rate).

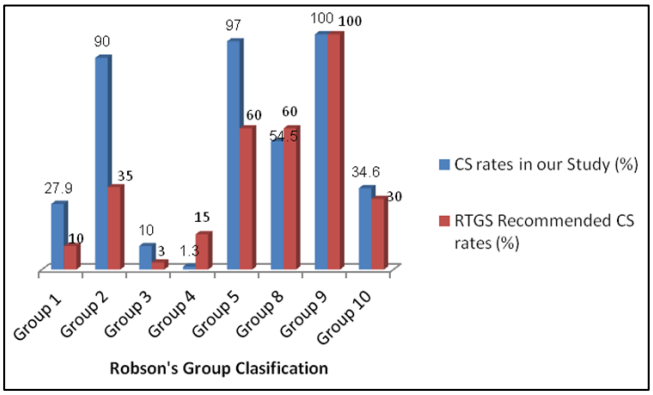

Figure 2: Caesarean section rates across different groups according to RGTC

5. Conclusion

Our findings are suggestive of high rate of overall caesarean section and it is high time that individualization of indication and careful evaluation of the pregnant women should be done so as to reduce the high caesarean section rates in hospitals. The use of Robson ten group classification systems routinely will help us to re-evaluate our practices to develop better blue prints. Therefore, we suggest that screening of all pregnant women attending the health facility should be done by using the standardized tools like the one used in our study.

6. Source of Funding

None.

7. Conflict of Interest

None.

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