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Research Article

Analysis of Caesarean Section Rates Using Robson's Group Classification

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HIGHLIGHTS

- Rising global caesarean trends.
- Robson system ensures comparability.
- Majority belonged to Groups 1-2.
- Group 5 highest CS contributor.
- Reduce primary CS, promote VBAC.

ABSTRACT

Introduction: The Caesarean section (CS) rate is steadily increasing worldwide, including in India. The overall CS rates are reported, but the women are classified. According to WHO, Robson ten ten-group classification is useful as a global standard for assessing, monitoring, and comparing caesarean section rates. Our objective was to classify women delivering in our hospital according to various categories as per the 10-group classification (Robson's classification) and to analyze the CS rate in each group. **Material & Methods:** This was a cross-sectional study conducted at Vitthal Rao Vikhe Patil Pravara Rural Hospital, Pravara Institute of Medical Sciences. The data was collected for all women delivering in the hospital from February 2023 to April 2023, and the women were classified according to Robson's 10-group classification. The proportion of women delivering in each group, the CS rate of each group, and the relative contribution to the CS rate from each group were calculated. **Results:** Among a total of 1506 women delivering during the study period, 37.9% of women were delivered by CS. The maximum no of pregnant women belonged to the primigravida group (groups 1 and 2), 40 %. Major contributors to the CS rate were Group 5 at 33.9%. The next contributors were group 2 and group 1 at 22.2% and 17.8% respectively. Overall, the three groups 1, 2, and 5 contributed 73.9 % of the CS rate, while the other group contributed to only 26.1% of the CS rate. **Conclusions:** Applying Robson's criteria to classify pregnant women allowed for easy classification to identify the category of women most likely to have CS. Reducing the primary CS rate and increasing VBAC rates will help to reduce the CS rate.

INTRODUCTION

Although the World Health Organization (WHO) recommends that cesarean section rates should not exceed 15%, recent years have seen a marked increase globally. In India, the CS rate has risen significantly from 21.8% in 1993–94 to 28.1%, raising concerns due to the associated rise in maternal morbidity and mortality [1]. Understanding the underlying causes of this trend is critical, especially as not all women undergoing cesarean sections fall into the same clinical category [2].

To better analyze these increasing rates, in 2001, Robson introduced the Ten-Group Classification System, which categorizes women based on obstetric characteristics [3]. These include factors such as whether the pregnancy is single or multiple, the woman's parity and previous CS history, fetal presentation (cephalic, breech, or other), onset of labor (spontaneous or induced), and whether the birth is term or preterm. This standardized approach enables healthcare providers to evaluate and monitor CS trends more effectively and promote evidence-based interventions [4].

It was proposed that using this classification system could facilitate the implementation of targeted and effective strategies to reduce cesarean rates [5]. A systematic review conducted by WHO in 2011 of various classification systems found that those based on women's characteristics, particularly the Robson classification, were most effective for auditing, analyzing, and comparing CS rates across different settings [6]. The goal of the present study is to analyze cesarean section rates by categorizing all deliveries in our institution according to Robson's Ten-Group Classification. This will help identify specific groups of women who could be targeted with interventions aimed at optimizing cesarean section rates.

The study aims to analyze the caesarean section rates in a tertiary care center using the Robson Ten Group Classification System. All women delivering during the study period will be categorized according to this system to ensure standardized assessment of obstetric populations. The analysis will help identify which specific Robson groups contribute most significantly to the overall caesarean section rate, enabling targeted interventions and strategies to optimize clinical decision-making and reduce unnecessary caesarean deliveries.

MATERIAL & METHODS

This retrospective study was conducted at VVP Pravara Rural Hospital, a tertiary care teaching hospital located in Loni, Maharashtra. All women who delivered during the three months from February 2023 to April 2023 were included. The women were then classified according to Robson's Ten-Group Classification System. For each group, the proportion of total deliveries, the rate of cesarean sections, and the contribution of each group to the overall CS rate were calculated.

Data was extracted from institutional medical and delivery records using a customized case report form, which captured rel-

evant variables including parity, mode of previous deliveries, history and indications of prior CS, gestational age, and onset of labor (spontaneous or induced). A total of 1506 women delivered during this period, out of which 572 underwent cesarean section, resulting in a CS rate of 37.9%. This high rate highlights the importance of structured evaluation using classification systems like Robson's to guide quality improvement initiatives and promote safer, evidence-based obstetric care.

Robson's 10-group Classification [6]

Based on these characteristics, all women delivering in the hospital were divided into 10 groups

1. Nulliparous, single, cephalic, >37 weeks in spontaneous labour.
2. Nulliparous, single cephalic, >37 weeks, induced or CS before labour.
3. Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labour.
4. Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labour.
5. Previous CS, single cephalic, >37 weeks.
6. All nulliparous breeches.
7. All multiparous breeches (including previous CS).
8. All multiple pregnancies (including previous CS).
9. All abnormal lies (including previous CS).
10. All single cephalic, <36 weeks (including previous CS).

RESULTS

The table presents the distribution of cesarean section (CS) cases classified according to Robson's Ten-Group Classification System. This system categorizes women based on obstetric characteristics such as parity, gestational age, fetal presentation, and mode of labor onset. In this study of 572 CS cases, the largest contributing group was Group 5, comprising women with previous cesarean sections and a term, singleton, cephalic pregnancy (33.9%). This finding highlights the critical need to evaluate repeat CS practices and promote safe vaginal birth after cesarean (VBAC) where feasible.

Groups 1 and 2 together represent nulliparous women with term, singleton, cephalic pregnancies-Group 1 had spontaneous labor (17.8%), while Group 2 included induced labor or pre-labor CS (22.2%). Combined, they contributed 40% of all CS cases, indicating that primary cesarean deliveries among first-time mothers significantly impact overall CS rates. Addressing labor induction protocols and promoting supportive labor management for nulliparous women could help reduce unnecessary CS in these groups.

Robson's Ten-Group Classification with relative size and percentage of each group based on 572 cesarean sections, followed by an explanation in three paragraphs:

The remaining groups contributed smaller proportions to the total CS count. Groups 3 and 4 (multiparous women without prior CS at term) showed low CS rates (3.3 % and 1.9 % respect-

ively), suggesting a lower likelihood of cesarean in women with a prior successful vaginal delivery. Groups 6 and 7 (breech presentations), Group 8 (multiple pregnancies), Group 9 (abnormal lies), and Group 10 (preterm cephalic) collectively accounted for a smaller but important share, emphasizing that specific maternal or fetal conditions often necessitate CS for safety reasons. These findings support the use of Robson's classification as a valuable tool in identifying target areas to safely reduce cesarean rates.

Table 1: Robson's Ten-Group Classification with relative size and percentage of each group based on 572 cesarean sections

Group No.	Group Description	No. of CS Cases	% of Total CS (N=572)
1.	Nulliparous, single cephalic, >37 weeks, spontaneous labour	102	17.8 %
2.	Nulliparous, single cephalic, >37 weeks, induced or CS before labour	127	22.2 %
3.	Multiparous (no previous CS), single cephalic, >37 weeks, spontaneous labour	19	3.3 %
4.	Multiparous (no previous CS), single cephalic, >37 weeks, induced or CS before labour	11	1.9 %
5.	Previous CS, single cephalic, >37 weeks	194	33.9 %
6.	All nulliparous breech	31	5.4 %
7.	All multiparous breeches (including previous CS)	8	1.3 %
8.	All multiple pregnancies (including previous CS)	12	2.0 %
9.	All abnormal lies (including previous CS)	6	1.0 %
10.	All single cephalic, <36 weeks (including previous CS)	62	10.8 %

DISCUSSION

The cesarean section (CS) rate in our study was 37.9%, aligning with findings from other Indian studies but significantly exceeding the WHO's recommended threshold for optimal care. Without classification, all 572 women who underwent CS would require equal attention to reduce the rate. However, by applying Robson's Ten-Group Classification System, we were able to stratify the cases and identify target groups for intervention. Notably, the maximum contribution to the CS rate came from the nulliparous women in Groups 1 and 2, accounting for 40% of all cesarean deliveries, underscoring the need to focus on improving labor management and reducing primary cesarean sections in first-time mothers.

In the present study, Group 5 (previous CS, single cephalic, >37 weeks) contributed 33.9% to the total cesarean rate, primarily due to a very low rate of vaginal birth after cesarean (VBAC), with 99% of these women undergoing repeat CS. While Groups 6 to 10 also showed high CS rates, these were largely attributed to unavoidable obstetric indications such as breech presentations, multiple pregnancies, abnormal lies, and preterm delieries. By applying Robson's classification, we were able to identify three key areas for potential intervention to reduce CS rates: **(1)** nulliparous term cephalic pregnancies with induction or CS before labor (Group 2), **(2)** women with previous cesarean deliveries (Group 5), and **(3)** nulliparous term cephalic women undergoing CS during labor (Group 1), which were the major contributors to the high overall CS rate [7-10].

Group 10 is the main contributor to the CS rate, highlighting the need for further analysis of low-risk groups and tailored interventions to reduce CS rates [11]. As per Robson's Ten-Group Classification, Group-10 and Group-5 were found to be the most contributing among deliveries done. Previous cesarean section and fetal distress were the most common indications of cesarean section [12]. In a study by Sah S et al. [13], Groups V, I, and II were major contributors to the overall cesarean section rates, with improving successful induction of labor being a key modifiable factor to reduce primary cesarean rates and subsequent repeat sections. The study by Prameela et al. [14] showed a significant reduction in cesarean section rates, with a 50% decrease in Group I and a 33% decrease in Group III in 2014, likely due to increased staff awareness following the previous year's study [15].

CONCLUSION

Robson's 10-group classification offers an effective method for collecting and analyzing information on cesarean section rates, helping to identify broad categories of women who can be targeted for interventions to reduce rising CS rates. By further analyzing the causes of CS in major contributing groups (1, 2, and 5) and implementing specific protocols such as a strict Vaginal Birth After Cesarean (VBAC) policy and strategies to reduce primary cesareans, we can significantly lower the overall CS rate. This approach not only enhances patient care but also promotes evidence-based practices for safer obstetric outcomes.

LIMITATIONS & FUTURE PERSPECTIVES

The study's limitations include a single-centre setting, a relatively small sample size, and a short study duration, which may limit the broader applicability of the results. Future studies should incorporate multicentre designs with larger populations to enhance validity, assess long-term outcomes, and investigate advanced diagnostic and management approaches. Such efforts will improve overall patient care and help minimize complications.

CLINICAL SIGNIFICANCE

The clinical significance of this study lies in its potential to bridge the gap between research findings and practical healthcare applications. It emphasizes the importance of translating scientific observations into meaningful improvements in patient care, diagnosis, and treatment outcomes. By highlighting real-world relevance, the study contributes to evidence-based medical practice and supports informed clinical decision-making. Ultimately, the findings aim to enhance patient quality of life, optimize therapeutic strategies, and promote better disease management in clinical settings.

ABBREVIATIONS

CS: Caesarean Section
WHO: World Health Organization
VBAC: Vaginal Birth After Caesarean
TGCS: Ten Group Classification System

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AUTHOR CONTRIBUTIONS

All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of International Committee of Medical Journal Editors (ICMJE) guidelines.

CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

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The authors confirm that no AI & LLM tools were used in the writing or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

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