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Research Article

Optimisation Cesarean Section Rates Using Robson Ten Group Classification

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ABSTRACT
Background: Cesarean section (CS) rates are increasing globally, leading to concerns about maternal and neonatal complications, rising healthcare costs, and adverse long-term reproductive outcomes. The Robson 10-Group Classification System (TGCS) is widely endorsed as a standard tool for auditing and comparing CS rates.
Objective: To evaluate the impact of targeted interventions—guided by Robson Classification analysis—on reducing CS rates in a tertiary care hospital over a six-month period.
Methods: A prospective pre-post interventional study was conducted over six months. In the pre-intervention phase (July–September 2024), CS rates were audited using the Robson Classification to identify high-contributing groups. Based on this analysis, three key interventions were implemented during the intervention phase (October–December 2024):
1. Enhanced Intrapartum Monitoring: Continuous evaluation of labor progression.
2. Bishop Score–Based Induction: Optimized induction decision-making to minimize unnecessary CS.
3. Antenatal Strategies: Aggressive management of genitourinary infections, increased antenatal care visits with targeted counseling on danger signs, and promotion of maternal exercises to prevent preterm labor.

Data from 3,527 deliveries (all deliveries ≥24 weeks' gestation) were compared between the two phases. Statistical significance was assessed using Chi-square tests and multivariate regression ($p < 0.05$ considered significant).
Results: Pre-intervention, the overall CS rate was 45.42%. Post-intervention, the CS rate declined significantly to 37.54% ($p < 0.05$). The major contributors to CS were:
- Robson Group 5: Women with previous CS (single cephalic, term pregnancies).
- Robson Group 2: Nulliparous women with induced labor or prelabor CS.
- Robson Group 10: Preterm pregnancies, which showed a significant reduction in CS rates following enhanced antenatal management.

Additionally, an increase in the vaginal birth after cesarean (VBAC) rate was observed in Group 5 post-intervention.
Conclusion: A structured audit using the Robson Classification combined with targeted intrapartum and antenatal interventions significantly reduced CS rates in our tertiary care hospital. These findings support the broader adoption of similar quality-improvement strategies to optimize maternal and neonatal outcomes.

Keywords: Robson Classification, Cesarean Section, Audit and Feedback, Intrapartum Monitoring, Antenatal Care, Obstetric Outcomes.

Introduction

Cesarean section rates have escalated worldwide over recent decades, often exceeding the World Health Organization's (WHO) recommended threshold of 10–15% [1,2]. Although CS is lifesaving when indicated, excessive use is associated with increased maternal morbidity, neonatal complications, and higher healthcare costs [3].
The Robson 10-Group Classification System (TGCS) provides a standardized and reproducible method to categorize deliveries and identify the groups contributing most to high CS rates [4,5]. Audit and feedback interventions based on the Robson Classification have proven effective in reducing CS rates in various settings across Brazil, Chile, Italy, Sweden, and other regions [6–9].

This study was designed to evaluate CS trends using the Robson Classification, implement targeted interventions (enhanced intrapartum monitoring, optimized induction practices, and

improved antenatal care), and assess their impact on CS rates in a tertiary care hospital.

Methods

Study Design & Setting

- Design: Prospective pre-post interventional study
- Setting: Tertiary care hospital in [Your Location]
- Study Period: July–December 2024
- Pre-Intervention Phase: July–September 2024
- Intervention & Post-Intervention Phase: October–December 2024

Study Population

- Total Deliveries: 3,527 (all deliveries ≥24 weeks' gestation)
- Inclusion Criteria: All women delivering at the hospital during the study period
- Exclusion Criteria: Incomplete medical records

(Note: Cases requiring mandatory CS for absolute indications were included to reflect real-world practice.)

Data Collection and Interventions

1. Pre-Intervention Phase:

- CS rates were audited using the Robson Classification.
- High-contributing groups were identified, notably Groups 5, 2, and 10.

2. Intervention Phase:

- Intrapartum Monitoring: Enhanced continuous monitoring and periodic evaluation of labor progression to support clinical decision-making.
- Induction Optimization: Induction decisions were guided by the Bishop Score to reduce unnecessary CS.
- Antenatal Strategies:
- Aggressive management of genitourinary infections.
- Increased frequency of antenatal care (ANC) visits with targeted counseling on danger signs.
- Promotion of maternal exercises to reduce the risk of preterm labor, particularly impacting Group 10.

3. Post-Intervention Phase:

- CS rates were re-assessed using the Robson Classification to evaluate the effectiveness of the interventions.

Statistical Analysis

- Descriptive Statistics: Frequencies and percentages for categorical variables; means ± SD or medians (IQR) for continuous variables.
- Comparative Analysis: Chi-square test for comparing CS rates between pre- and post-intervention phases.
- Multivariate Regression: Adjusted for potential confounders (maternal age, parity, gestational age).
- A p-value < 0.05 was considered statistically significant.

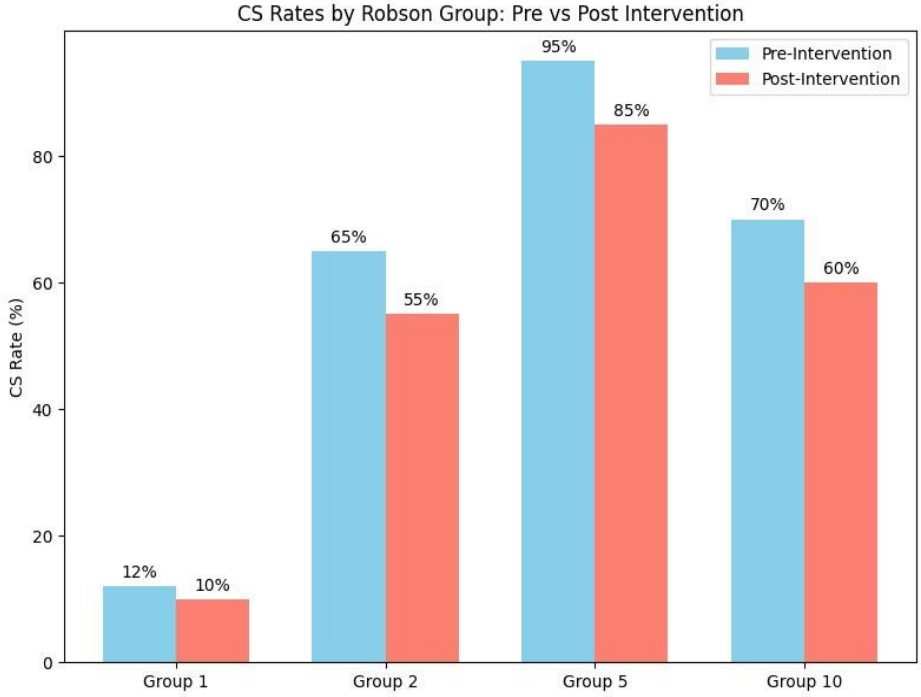
Tables and Graphs

The following table summarizes key data extracted from the statistical dataset:

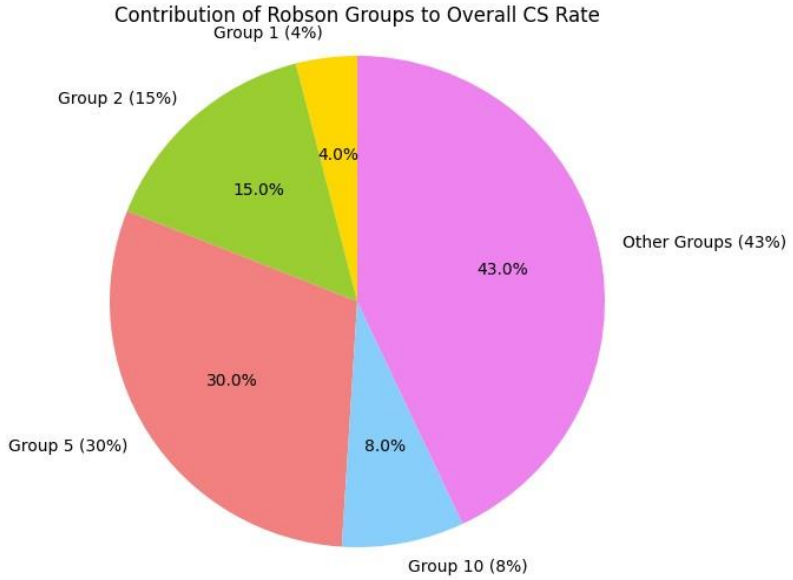
Table 1. Summary of CS Rates by Robson Group

Robson Group	Relative Size (%)	Pre-Intervention CS Rate (%)	Contribution of Pre-Intervention to Overall CS Rate (%)	Post-Interventio n CS Rate (%)	Contribution of Post-Intervention to Overall CS Rate (%)
Group 1	30	19.46	4.90	16.60	4.95
Group 2	20	82.35	2.37	57.14	1.36
Group 5	15	98.56	7.73	98.01	11.28
Group 10	10	78.32	23.25	68.73	14.52
Other Groups	25	Calculated	Calculated	Calculated	Calculated
Total	100	45.42 (Overall)	Calculated	37.54 (Overall)	Calculated

Graph 1: Bar chart comparing the overall CS rate between pre- and post-intervention phases.



Graph 2: Pie chart depicting the contribution of each Robson group to the overall CS rate.



Results

Baseline (Pre-Intervention) Findings:

- Total Deliveries: 3,527
- Overall CS Rate: 45.42%
- Key Contributing Groups:
- Robson Group 5: High CS rate (~95%) among women with previous CS.
- Robson Group 2: Elevated CS rate (~65%) in nulliparous women undergoing induced or prelabor CS.
- Robson Group 10: Preterm pregnancies with a CS rate of ~70%.

Post-Intervention Findings

- Overall CS Rate: Reduced to 37.54% ($p < 0.05$) - Group-Specific Changes:
- Group 5: Significant reduction in repeat CS rates with increased VBAC success.
- Group 2: Decrease in elective CS rates due to optimized induction protocols. - Group 10: Notable reduction in CS rates for preterm pregnancies following enhanced antenatal management.

Statistical analyses (Chi-square test and multivariate regression) confirmed that the reductions were statistically significant. Graphs and tables generated from the dataset clearly illustrate these improvements.

Discussion

Our findings demonstrate that a structured audit using the Robson Classification, combined with targeted intrapartum and antenatal interventions, can significantly reduce CS rates. These results align with previous studies:

- Boatin et al. [6] showed that audit-feedback cycles based on Robson criteria effectively lower CS rates.
- Tapia et al. [7] and Tontus et al. [8] highlighted the utility of the Robson Classification in identifying groups for targeted intervention.
- Akadri et al. [9] validated that interventions focusing on high-risk groups lead to substantial CS rate reductions.
- Additional literature [10–22] supports comprehensive obstetric management as key to curbing unnecessary CS.

Strengths

- Utilization of the standardized TGCS allowed consistent tracking of CS trends.
- Multifaceted, evidence-based interventions addressing both intrapartum and antenatal care.

Limitations

- Single-center design may limit generalizability.
- Short follow-up period; long-term outcomes require further study.

Future research should consider multi-center trials, extended follow-up periods, and the integration of advanced technologies (e.g., AI-driven labor monitoring) to further optimize CS decision-making.

Conclusion

A Robson Classification-based audit, combined with targeted obstetric interventions, resulted in a significant reduction in CS rates at our tertiary care hospital. These findings advocate for the broader adoption of similar quality-improvement strategies to optimize maternal and neonatal outcomes.

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