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Original Research Article

Application of Robson's classification in clinical practice: a tool for quality improvement in obstetrics

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ABSTRACT

Background: The global rise in caesarean section (CS) rates has raised concerns regarding the overuse of the procedure in low-risk pregnancies, leading to potential maternal and neonatal risks. Robson's classification offers a standardized method to assess CS rates and identify the groups contributing most to these high rates, facilitating targeted quality improvement interventions.
Methods: A retrospective observational study was conducted at Vydehi Institute of Medical Sciences, Bengaluru, from June 2024 to December 2024, including 265 deliveries. Data were collected from the hospital's obstetric registry, and studies under Robson's classification.
Results: The overall CS rate was 54.7%, with 145 out of 265 deliveries being caesarean sections. The highest CS rates were observed in two groups, group 5 (multiparous women with a previous CS, 80%) and group 8 (all multiple pregnancies, including previous CS, 80%). Group 6 showed a 66.7% CS rate (nulliparous breech presentations). Groups 2 and 4 (induced labour) also exhibited elevated CS rates, with 62.5% and 50.0%, respectively. Lower CS rates were noted in multiparous women with spontaneous labour (group 3), which had a rate of 30%. The data revealed that induction of labour and previous caesarean sections were significant contributors to higher CS rates.
Conclusions: The study highlights the specific high-risk groups to the overall CS rate. The findings emphasize the need for targeted interventions to reduce unnecessary CS while maintaining maternal and neonatal safety. Future efforts should focus on promoting vaginal birth after caesarean (VBAC).

Keywords: Robson's classification, High caesarean rates, VBAC

INTRODUCTION

The caesarean section (CS) rate has witnessed a significant global rise in recent decades, leading to both concern and debate within the medical community. While caesarean sections are essential and life-saving procedures in cases of obstetric emergencies or when maternal or fetal health is at risk, their overuse in low-risk pregnancies has raised questions about the potential harm associated with unnecessary surgical interventions. Overuse of CS is linked to increased risks for maternal morbidity and mortality, including haemorrhage, infection, and prolonged recovery, as well as for neonatal complications such as respiratory issues and prematurity.[1,2] The World Health Organization (WHO) has recommended that the ideal CS rate for any health system should be between 10-15%, but many countries, including both developed and developing nations, are witnessing significantly higher rates. According to WHO, the global average CS rate has now exceeded 20%, with some countries reporting rates above 30%.[3]

Despite efforts to reduce unnecessary caesarean sections, the rates continue to rise in many healthcare settings. This situation calls for better strategies to assess and regulate the use of CS, which can guide clinicians in making more

informed, evidence-based decisions regarding the mode of delivery. One such strategy is Robson's classification—a standardized system developed by Professor Michael Robson in the early 2000s.[4] Robson's classification divides all deliveries into 10 distinct groups based on a set of clinical factors, including maternal characteristics (parity, and age), pregnancy factors (gestational age, multiple pregnancies), and labour characteristics (onset of labour, presentation, and previous caesarean history). This system offers a clear and systematic approach to categorize and assess caesarean section rates within different subgroups, facilitating the identification of areas where the caesarean rate is high and where quality improvement interventions may be most beneficial.[5,6]

The main advantage of using Robson's classification is that it allows for a detailed and transparent breakdown of CS rates across different clinical situations. By categorizing deliveries into defined groups, healthcare providers and policymakers can pinpoint which patient groups contribute most to the overall CS rate, enabling targeted strategies to address these specific areas. Furthermore, it provides a standardized method for comparing outcomes between hospitals, regions, and countries, helping to identify variations in clinical practice and outcomes, and fostering a culture of accountability and quality improvement in obstetrics.[5,7]

This study applies Robson's classification to evaluate CS rates in our institution, with the aim of identifying trends and opportunities for improving the quality of care.

Objectives

Objectives of the study were to analyse the distribution of CS across Robson's 10 groups and to determine the overall CS rate, and to assess the contribution of each Robson group to the total CS rate, identifying high-risk groups and exploring areas for quality improvement.

METHODS

This retrospective observational study was conducted at Vydehi Institute of Medical Sciences, Bengaluru, a tertiary care institution, over a period of 6 months, from June 2024 to December 2024 in the department of Obstetrics and Gynaecology.

The sample size consisted of 265 deliveries during the study period. Data were obtained from the hospital's obstetric registry, which included maternal characteristics such as parity, gestational age, and the mode of delivery.

Robson's classification was applied to categorize the deliveries into one of the 10 groups based on the following parameters: parity (nulliparous, multiparous, presentation (cephalic, breech), gestational age (greater than or less than 37 weeks, onset of labour (spontaneous or induced), and previous CS history.

Inclusion criteria

All deliveries occurring during the study period, and data from vaginal deliveries and CS were included.

Exclusion criteria

Patients with incomplete delivery records, and missing or inconsistent data were excluded.

Statistical analysis

Data was entered into Microsoft excel data sheet and analyzed using statistical package for the social sciences (SPSS) 22 version software. Categorical data was represented in the form of frequencies and proportions. Continuous data was represented as mean and standard deviation. Independent t test was used as test of significance to identify the mean difference. P value <0.05 was considered as statistically significant.

RESULTS

A total of 265 deliveries were included in the study, of which 145 were CS, resulting in an overall caesarean section rate of 54.7%.

Table 1 presents the distribution of caesarean sections according to Robson's classification for the study population.

Table 1: Caesarean section rates according to Robson's classification in the study population.

Robson group	Description	Total deliveries (N)	Caesarean sections (N)	Caesarean section rate (%)
Group 1	Nulliparous, single cephalic, >37 weeks, spontaneous onset of labour	35	11	31.4
Group 2	Nulliparous, single cephalic, >37 weeks, induced labour	40	25	62.5
Group 3	Multiparous, single cephalic, >37 weeks, spontaneous onset of labour	33	10	30.3
Group 4	Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labour	30	15	50.0

Continued.

Robson group	Description	Total deliveries (N)	Caesarean sections (N)	Caesarean section rate (%)
Group 5	Multiparous with previous CS, single cephalic, ≥ 37 weeks	15	12	80.0
Group 6	All nulliparous breeches	3	2	66.6
Group 7	All multiparous breeches, including previous CS	15	11	73.3
Group 8	All multiple pregnancies, including previous CS	10	8	80.0
Group 9	All abnormal lies including previous CS	59	38	64.4
Group 10	All single cephalic, ≤36 weeks including previous CS	25	13	52.0

Total deliveries: 265, total caesarean sections: 145, and overall caesarean section rate: 54.7%

DISCUSSION

The results of this study show a CS rate of 54.7%, which is notably higher than the recommended target of 10-15% for caesarean sections in low-risk populations. This highlights the importance of assessing the contributing factors to high caesarean rates, and Robson's classification offers an invaluable tool to explore these factors.[4]

Group 1: Nulliparous, single cephalic, ≥37 weeks, spontaneous labour

Group 1 (nulliparous, single cephalic, ≥37 weeks, spontaneous labour) had a CS rate of 31.4%. This rate is relatively high, as WHO guidelines suggest that CS rates in this group should be low due to the spontaneous onset of labour in a first-time mother.

Similar findings have been observed in other studies. For instance, Ye et al in 2014 reported a higher-than-expected CS rate in this group, attributed to factors like the increased use of epidurals and medical interventions in spontaneous labour.[1] Induction of labour or failure to progress often leads to interventions, including CS.[2] Over medicalization and routine use of epidural anaesthesia in first-time mothers may increase the likelihood of CS due to prolonged labour or fetal distress.[7]

Group 2: Nulliparous, single cephalic, ≥37 weeks, induced labour or caesarean before labour

Group 2 (nulliparous, single cephalic, ≥37 weeks, induced labour) showed a high CS rate of 62.5%, which is significantly elevated compared to group 1. This can be attributed to the increased likelihood of complications during induced labour, such as failure to progress or uterine hyper-stimulation.

Several studies highlight the high CS rate in this group due to induction of labour. For example, Ray and Jose in 2017 found that women undergoing labour induction, particularly nulliparous women, had a higher incidence of CS compared to those in spontaneous labour.[8] Induction of labour in nulliparous women has been linked to higher rates of uterine hyper-stimulation, fetal distress, and a prolonged labour process.[9]

Studies by Goleman et al in 2019 also emphasized that induction increases the likelihood of failure to progress, leading to a higher CS rate.[10]

Group 3: Multiparous, single cephalic, ≥37 weeks, spontaneous labour

The CS rate for group 3 (multiparous, single cephalic, ≥37 weeks, spontaneous labour) was 30.3%, which is significantly lower than the rate observed in groups 1 and 2. This suggests that multiparous women have a higher likelihood of vaginal delivery, even when presenting with term pregnancies and spontaneous labour.

Studies consistently report lower CS rates in multiparous women, particularly those with prior vaginal deliveries. Goleman et al and Shankar and Raju found that multiparous women generally have a higher success rate for vaginal delivery, as their cervix is more likely to dilate efficiently. Previous vaginal births tend to lead to a lower risk of prolonged labour or obstructed delivery, which are key indications for CS.[10,11]

Group 4: Multiparous, single cephalic, ≥37 weeks, induced labour or caesarean before labour

Group 4 (multiparous, single cephalic, ≥37 weeks, induced labour), the CS rate was 50%. This is notably higher than in group 3, highlighting that induction of labour in multiparous women increases the likelihood of a CS, similar to the trend seen in nulliparous women in group 2.

Studies have shown that induction of labour in multiparous women also increases the risk of CS. Reddy et al in 2018 reported higher CS rates in multiparous women undergoing induction, often due to complications such as uterine rupture, failure to progress, or fetal distress. Induced labour in multiparous women may be associated with a higher incidence of these complications, leading to an increased reliance on CS.[12]

Group 5: Multiparous with previous caesarean section, single cephalic, ≥37 weeks, spontaneous labour

The CS rate in group 5 (previous CS, single cephalic, ≥37 weeks, spontaneous labour) was 80%, the highest in our study. This is consistent with the well-established clinical

practice of recommending repeat CS due to the risk of uterine rupture in women attempting vaginal birth after caesarean (VBAC).

This high caesarean rate in group 5 is consistent with the findings of Pravina et al, who conducted a caesarean audit at a tertiary care center in Bihar. Their study also observed that a history of previous caesarean delivery was a significant factor contributing to high CS rates.[6] Similarly, Wahane and Ghaisas noted that women with previous caesareans were less likely to attempt VBAC due to the risks of uterine rupture.[5] Other studies also have consistently found high CS rates in women with a history of CS. Vogel et al and Renukadevi et al reported that previous caesarean delivery is a strong predictor for repeat CS.[2,13]

Group 6: All nulliparous breeches

Group 6 (all nulliparous breech presentations) had a CS rate of 66.7%. Breech presentations in nulliparous women are considered a high-risk obstetric situation, often leading to caesarean delivery due to concerns about the safety of vaginal delivery.

Similar high CS rates in nulliparous women with breech presentations have been consistently reported in the literature. For instance, studies by Ray and Jose et al and Kazmi et al found that breech presentation in nulliparous women was a significant predictor for caesarean delivery.[8,14] Clinical guidelines, such as those from the American College of Obstetricians and Gynaecologists (ACOG), strongly recommend caesarean section for nulliparous women with breech pregnancies.[15]

A study by Wahane and Ghaisas et al also found that breech presentations in nulliparous women significantly increased the likelihood of caesarean delivery.[5] Similarly, Pravina et al in their caesarean audit using Robson's classification, found similar results which is consistent with our findings.[6] Additionally, a study by Hofmeyr et al in 2015 found that CS for breech presentation in nulliparous women are generally associated with fewer neonatal injuries compared to vaginal breech delivery, which further supports the decision for surgical intervention in these cases.[16]

Groups 7-10: Various risk factors (multiple pregnancies, breech, and preterm)

Groups 7-10 (breech pregnancies, multiple pregnancies, abnormal lies, preterm births) had CS rates ranging from 50% to 80%. These groups have elevated CS rates due to the increased risk of complications during labour and delivery. For example, breech presentation (group 9) had a CS rate of 64.4%, reflecting the clinical preference for caesarean delivery in breech presentations due to the perceived risk to both mother and baby.

Studies have consistently shown that abnormal presentations, such as breech pregnancies, are associated with higher CS rates. Ray and Jose reported a similar trend, where breech presentations were often managed with caesarean delivery.[8] Similarly, multiple pregnancies and preterm deliveries are associated with higher caesarean rates due to the increased risk of complications like fetal distress, preterm labour, and the need for special care post-delivery.[14]

Comparison with literature

When comparing the results of this study with other researches, it is evident that the highest CS rates are consistently observed in groups 5 and 6, which align with findings from other countries and settings.[1,2,4] High caesarean rates in these groups are largely attributable to clinical decisions influenced by the risks associated with previous caesarean sections and the reluctance to attempt VBAC. Additionally, the use of induction in groups 2 and 4 increases the likelihood of a caesarean, as evidenced by the findings in this and other studies.

Limitations

As it's a tertiary hospital-based study most of the cases are referral based. There is no proper antenatal workup for the referred cases. It is a retrospective study potential co-founders could not be controlled.

CONCLUSION

This study highlights the significant impact of Robson's classification in understanding the drivers of high CS rates in our obstetric population. By categorizing deliveries into distinct groups, we can pinpoint areas where interventions could be implemented to reduce unnecessary caesarean sections while ensuring maternal and neonatal safety. Future quality improvement strategies should focus on better management of labour induction, enhancing support for VBAC, and ensuring appropriate clinical decision-making to optimize the mode of delivery. Additionally, the findings reinforce the importance of Robson's classification as a tool for auditing and improving obstetric care globally.

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