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CAESAREAN SECTION RATES BY ROBSON TEN-GROUP CLASSIFICATION: A THREE-MONTH CLINICAL AUDIT AT A TERTIARY CARE TEACHING HOSPITAL IN CENTRAL INDIA

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ABSTRACT **Background:** Caesarean section rates are difficult to interpret from a single institutional percentage because obstetric case mix varies. The Robson Ten-Group Classification permits clinically meaningful audit by separating all women into mutually exclusive obstetric groups. **Objective:** To describe caesarean section rates and Robson-group contributions during a three-month audit at a high-volume teaching hospital. **Methods:** This single-centre descriptive clinical audit used aggregate departmental data for all deliveries from January through March 2026. Monthly and pooled caesarean rates, Robson group-specific rates and contributions to all caesareans were calculated. Wilson 95% confidence intervals, Pearson chi-square tests and Fisher-Freeman-Halton exact tests were used as appropriate. **Results:** Among 3,797 deliveries, 1,786 were caesarean deliveries (47.04%; 95% CI: 45.45-48.63). Monthly rates were 47.72%, 44.19% and 48.80% (p = 0.060). Group 5 contributed 33.43% of all caesareans and had a group-specific rate of 96.92%. Groups 1 and 10 contributed 22.45% and 12.82%, respectively. Groups 5, 1, 10, 2 and 3 together accounted for 88.80% of caesareans. Nominal monthly variation was observed in Groups 2, 3, 4 and 8. **Conclusion:** The caesarean burden remained high across the audit period and was concentrated in women with a previous caesarean and in large term cephalic groups. Repeated Robson-based audit should be linked to indication-level review, prevention of avoidable primary caesareans and assessment of vaginal birth after caesarean eligibility.

KEYWORDS : Caesarean section; clinical audit; Robson classification; previous caesarean; tertiary care

INTRODUCTION

Caesarean delivery is indispensable when vaginal birth would endanger the mother or fetus, yet its use has increased steadily across regions. Global analyses estimate that caesareans accounted for 21.1% of births in 2018 and may approach 28.5% by 2030 if prevailing trends continue [1]. The World Health Organization has cautioned against applying a fixed population threshold as a target for individual hospitals; at population level, rates above approximately 10% have not been associated with further reductions in maternal and neonatal mortality, while facility rates are strongly influenced by referral patterns and case mix [2]. A crude institutional rate therefore identifies the scale of use but not the obstetric populations from which it arises.

Robson introduced a ten-group system based on parity, previous caesarean, fetal number and presentation, gestational age and onset of labour [3]. The groups are mutually exclusive and totally inclusive, enabling every woman admitted for delivery to be classified and allowing calculation of group size, group-specific caesarean rate and contribution to the overall rate. The World Health Organization recommends this framework for routine monitoring and comparison over time [4]. Multicountry analyses have shown that increases are often concentrated in women with a previous caesarean and in nulliparous term cephalic groups, making these populations central to efforts to improve appropriateness of care [5].

MGM Medical College and MY Hospital, Indore, manages a large obstetric workload and receives complicated referrals. Monthly Robson summaries were available for three consecutive months, providing an opportunity to examine whether the overall rate and the distribution of caesarean deliveries were stable. The audit aimed to estimate monthly and pooled caesarean section rates, identify the Robson groups contributing most to caesarean use and explore month-to-month variation within groups.

MATERIALS AND METHODS

A single-centre, hospital-based descriptive clinical audit was conducted in the Department of Obstetrics and Gynaecology, MGM Medical College and MY Hospital, Indore. The analytic period covered January through March 2026. The dataset comprised the completed monthly departmental Robson audit sheets, which reported the number of caesarean deliveries and the total number of women in each group. The analysis included all 3,797 deliveries represented in these sheets; the ten group denominators summed exactly to the reported delivery total in every month. The analytic files contained aggregate counts and no patient identifiers.

Women were classified according to the standard Robson Ten-Group Classification [4]. The defining characteristics were parity, previous caesarean delivery, number of fetuses, fetal presentation, gestational age and onset of labour. Term pregnancy was defined as at least 37+0 weeks and preterm pregnancy as less than 37+0 weeks, consistent with the departmental audit sheets. Group-specific subcategories 2a/2b and 4a/4b were not available and were therefore analysed as combined Groups 2 and 4.

For each month, the caesarean section rate was calculated as the number of caesarean deliveries divided by all deliveries. Relative group size was the number of women in a Robson group divided by all deliveries; the group-specific rate was the number of caesareans divided by the total women in that group; and relative contribution was the number of group caesareans divided by all caesareans. Internal consistency checks compared monthly overview totals with the sums of the ten mutually exclusive group counts, and internally complete group-wise counts were used for analysis.

Proportions are presented with Wilson 95% confidence intervals where relevant. Monthly caesarean proportions were compared using Pearson's chi-square test. Within-group month-wise comparisons used Pearson's chi-square test when expected cell counts were adequate and the Fisher-Freeman-Halton exact test for sparse 2x3 tables. Group 9 could not be compared because all five women underwent caesarean delivery. Group-wise tests were exploratory and p values were not adjusted for multiple comparisons. A two-sided p value below 0.05 was considered statistically significant. Analyses were performed using Python 3.12 and SciPy 1.17.0.

RESULTS

A total of 3,797 deliveries were recorded during the three-month period, including 1,786 caesarean and 2,011 non-caesarean deliveries. The pooled caesarean section rate was 47.04% (95% CI: 45.45-48.63). The monthly rate was lowest in February at 44.19%, compared with 47.72% in January and 48.80% in March; the overall month-wise difference did not reach statistical significance (chi-square = 5.638, df = 2; p = 0.060) (Table 1).

Table 1. Month-wise distribution of deliveries and caesarean section rates

Month	Total deliveries	Caesarean deliveries, n	Non-caesarean deliveries, n	CS rate, % (95% CI)	P value
January 2026	1,316	628	688	47.72 (45.03-50.42)	0.060
February 2026	1,145	506	639	44.19 (41.34-47.08)	
March 2026	1,336	652	684	48.80 (46.13-51.48)	
Overall	**3,797**	**1,786**	**2,011**	**47.04 (45.45-48.63)**	—

Values are n unless otherwise stated. CI: confidence interval; CS: caesarean section. Confidence intervals were calculated by the Wilson method. The p value is from the omnibus Pearson chi-square test comparing monthly caesarean proportions.

Group 9 had a 100% caesarean rate, but included only five women. Among groups of substantial size, Group 5 had the highest group-specific rate (597/616; 96.92%), followed by Group 10 (229/349; 65.62%) and Group 1 (401/955; 41.99%). Groups 1 and 2 together comprised 1,658 women and accounted for 590 caesarean deliveries. Nominal month-wise variation was observed in Group 2 (20.72%, 16.86% and 38.57%; $p < 0.001$), Group 3 (35.64%, 22.58% and 25.11%; $p = 0.009$), Group 4 (43.52%, 10.00% and 13.59%; $p < 0.001$) and Group 8 (18.52%, 28.13% and 60.00%; $p = 0.004$) (Table 2).

Group 5 made the largest pooled contribution to all caesareans (33.43%), followed by Group 1 (22.45%), Group 10 (12.82%), Group 2 (10.58%) and Group 3 (9.52%). Together, these five groups accounted for 88.80% of all caesarean deliveries. The contribution pattern was broadly consistent across months, although Group 2 increased to 16.56% in March and Group 10 declined from 15.29% in January to 9.66% in March (Figure 1).

Table 2. Month-wise and pooled caesarean section rates according to the Robson Ten-Group Classification

Robson group	January n/N (%)	February n/N (%)	March n/N (%)	Pooled n/N (%)	P value
1. Nulliparous; singleton, cephalic, term; spontaneous labour	129/337 (38.28)	121/267 (45.32)	151/351 (43.02)	401/955 (41.99)	0.195
2. Nulliparous; singleton, cephalic, term; induced or pre-labour CS	52/251 (20.72)	29/172 (16.86)	108/280 (38.57)	189/703 (26.88)	<0.001
3. Multiparous, no previous CS; singleton, cephalic, term; spontaneous labour	72/202 (35.64)	42/186 (22.58)	56/223 (25.11)	170/611 (27.82)	0.009
4. Multiparous, no previous CS; singleton, cephalic, term; induced or pre-labour CS	47/108 (43.52)	15/150 (10.00)	14/103 (13.59)	76/361 (21.05)	<0.001
5. Previous CS; singleton, cephalic, term	200/203 (98.52)	180/188 (95.74)	217/225 (96.44)	597/616 (96.92)	0.227
6. Nulliparous; singleton breech	16/20 (80.00)	20/23 (86.96)	21/25 (84.00)	57/68 (83.82)	0.917
7. Multiparous; singleton breech, including previous CS	9/12 (75.00)	19/24 (79.17)	5/9 (55.56)	33/45 (73.33)	0.399
8. Multiple pregnancy, including previous CS	5/27 (18.52)	9/32 (28.12)	15/25 (60.00)	29/84 (34.52)	0.004
9. Transverse or oblique lie, including previous CS	2/2 (100.00)	1/1 (100.00)	2/2 (100.00)	5/5 (100.00)	—
10. Preterm; singleton, cephalic, including previous CS	96/154 (62.34)	70/102 (68.63)	63/93 (67.74)	229/349 (65.62)	0.514

Values are caesarean deliveries/total women in the group (group-specific caesarean section rate, %). P values compare caesarean versus non-caesarean distributions across months within each group. Pearson chi-square test was used for Groups 1-4, 8 and 10; Fisher-Freeman-Halton exact test was used for Groups 5-7. Group 9 was not estimable because every woman underwent caesarean delivery. Tests were exploratory and unadjusted for multiple comparisons. Term: at least 37+0 weeks; preterm: less than 37+0 weeks.

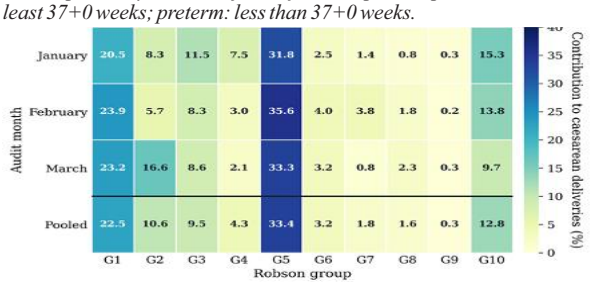

Figure 1. Monthly contribution of Robson groups to caesarean deliveries

Each cell gives the percentage of caesarean deliveries in that month attributable to the corresponding group; darker colour denotes a larger contribution. Monthly caesarean denominators were 628, 506 and 652; pooled n=1,786.

DISCUSSION

This audit documented a pooled caesarean section rate of 47.04%, with no statistically significant change in the overall rate across the three months. The result is consistent with the high caesarean burden commonly reported from referral institutions, where the obstetric population differs from the community. Another Central Indian teaching hospital reported a rate of 63.89% [6], whereas a large North Indian referral-unit series reported annual rates of 22.4%-25.5% [7]. Rates of 43.13% in Eastern India, 38.16% in Bihar and 46.76% in Mumbai further illustrate why institutional comparisons should be interpreted alongside group structure rather than as league tables [8-10].

Group 5 was the dominant contributor, accounting for one-third of all caesareans and showing a group-specific rate of 96.92%. This resembles the 34.97% contribution reported in Bihar and the 95.67% group-specific rate reported in Eastern India [8,9]. The finding represents the cumulative consequence of previous primary caesareans as well as current decisions concerning trial of labour after caesarean. It does not, by itself, establish that repeat caesareans were avoidable. A useful next audit cycle would subdivide Group 5 by number of previous scars and onset of labour, document eligibility and counselling for vaginal birth after caesarean, and review the clinical indication for repeat surgery.

Groups 1 and 2 together contributed 33.03% of all caesareans. Their size makes them important because decisions in a first pregnancy influence the future Group 5 population. The 41.99% rate in Group 1 and the month-to-month change in Group 2 merit case-level review of labour progress, fetal surveillance, induction protocols and senior decision-making before primary caesarean. Mittal et al. similarly identified Groups 5, 2 and 1 as the leading contributors in a three-year North Indian analysis [7]. In the Mumbai series, Groups 5, 1 and 10 were the three largest contributors, matching the order in the present audit [10].

Group 3 also warrants attention. Although it comprises multiparous women without a previous caesarean who entered spontaneous labour at term, its pooled caesarean rate was 27.82%. The rate should not be interpreted as inappropriate without reviewing individual indications, intrapartum referrals and the accuracy of labour-onset classification. A focused review of these cases could distinguish genuine maternal or fetal indications from potentially modifiable decisions and could also identify miscoding between Groups 3 and 4.

Group 10 contributed 12.82% of caesareans and had a group-specific rate of 65.62%. This may reflect the preterm and high-risk referral workload, but the aggregate dataset cannot distinguish medically indicated prelabour surgery from caesarean after spontaneous or induced preterm labour. Groups 6-9 were small and therefore contributed little despite high rates in breech and abnormal lie groups. The 100% rate in Group 9 should be read with its denominator of five and is consistent with the group definition rather than evidence of a major population burden.

The apparent monthly shifts in Groups 2, 3, 4 and 8 were exploratory. They may arise from changing case mix, induction activity, referral patterns or random variation, and the three-month aggregate design cannot determine the cause. The heatmap nevertheless identifies where indication-level review is most likely to be informative. Serial audit using the same definitions, preferably with Groups 2 and 4 subdivided and with maternal and neonatal outcomes attached, would distinguish persistent practice patterns from short-term fluctuation.

Robson classification is best used as a screening and monitoring tool rather than as a judgement on an individual clinical decision. An effective audit response should therefore avoid imposing a uniform numerical target on dissimilar groups. Instead, the largest contributors should undergo structured indication review, followed by agreed actions, repeat measurement and concurrent monitoring of maternal and neonatal outcomes. This preserves access to medically necessary

caesarean delivery while identifying practice that may be safely improved [4,5].

The principal strength was complete classification of a large consecutive delivery population into a standardized, mutually exclusive framework, with independent recalculation of all rates and internal denominator checks. Limitations include the short single-centre period, reliance on aggregate audit sheets, absence of demographic, indication and outcome data, lack of risk adjustment and inability to examine 2a/2b and 4a/4b subgroups. The group-wise tests were exploratory without multiplicity correction, so isolated p values should be interpreted cautiously and confirmed over a longer audit cycle.

CONCLUSION

Caesarean use remained high but broadly stable during the three-month audit. Group 5 was the largest contributor, while Groups 1, 2 and 10 also accounted for substantial proportions. Regular Robson-based surveillance should be coupled with indication-level review, careful prevention of avoidable primary caesareans, standardized induction and labour-management pathways, and systematic assessment of vaginal birth after caesarean eligibility without compromising maternal or neonatal safety.

DECLARATIONS

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