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Caesarian Audit using Robson Classification in Tertiary Care Centre in Mandya: A Cross Sectional Study

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ABSTRACT

Background: The increasing rate of caesarean section (CS) has become a major public health concern because of its impact on maternal and neonatal outcomes. Regular monitoring of CS practices is essential to ensure appropriate use of the procedure. The Robson Ten-Group Classification System (TGCS) is a standardized and internationally accepted method for classifying pregnant women into ten mutually exclusive groups, allowing comparison and audit of CS rates. This study evaluated caesarean section rates using the Robson classification in a tertiary care centre.

Methods: This observational audit included all deliveries conducted during the study period. Women were classified into the ten Robson groups based on parity, onset of labour, fetal presentation, number of fetuses, and gestational age. Caesarean section rates, along with the absolute and relative contributions of each group, were analysed to identify the major contributors to the overall CS rate.

Results: Groups 5 and 2 were the major contributors to the overall caesarean section rate. The high CS rates in these groups were mainly associated with previous caesarean section, failed induction of labour, labour arrest, and suspected fetal compromise. In contrast, although Groups 1 and 3 accounted for a large proportion of deliveries, they showed relatively low CS rates.

Conclusion: The Robson TGCS is an effective tool for auditing caesarean section practices and identifying groups contributing most to the institutional CS rate. Regular Robson-based audits, appropriate induction practices, promotion of vaginal birth after caesarean (VBAC), and improved intrapartum care may help reduce unnecessary caesarean deliveries and improve obstetric care.

Key-words: Caesarean section; Robson classification; Obstetric audit; Labor management; VBAC

INTRODUCTION

Caesarean section (CS) is the delivery of the fetus through surgical incisions made in the abdominal wall (laparotomy) and uterus (hysterotomy) after the period of fetal viability. The term caesarean is derived from the Latin word *caedere*, meaning "to cut," reflecting the surgical nature of the procedure.

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Initially introduced as a life-saving intervention in situations where vaginal delivery posed significant risks to the mother or fetus, caesarean section has become an integral component of modern obstetric care. Advances in surgical techniques, anaesthesia, antibiotic therapy, blood transfusion services, and neonatal intensive care have substantially improved the safety of caesarean delivery, thereby contributing to its increasing utilization worldwide [1–3].

Over the past few decades, a steady and often alarming rise in caesarean section rates has been documented across both developed and developing countries [4–6]. While part of this increase is attributable to valid medical indications such as fetal distress,

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malpresentation, obstructed labor, placenta previa, multiple gestations, and previous caesarean section, a considerable proportion of caesarean deliveries are now being performed for indications that are not universally accepted as medically essential [7–9]. These include perceived improved fetal safety, avoidance of labor pain, fear of pelvic floor trauma, maternal request, medicolegal concerns, and convenience for healthcare providers. Such non-medical and sociocultural factors have played a major role in driving caesarean section rates beyond acceptable limits [10,11].

The World Health Organization (WHO) has stated that caesarean section rates exceeding 10–15% at the population level are not associated with additional reductions in maternal or neonatal morbidity and mortality [12]. Contrary to this recommendation, many countries currently report caesarean section rates exceeding 30%, particularly in urban areas and tertiary care referral centers [13–15]. This discrepancy highlights the need for critical evaluation of obstetric practices, as unnecessary caesarean sections expose women to avoidable surgical risks and increase the likelihood of complications in future pregnancies, including uterine rupture, abnormal placentation, and repeat caesarean deliveries [16–18]. Furthermore, high caesarean rates impose a substantial economic burden on healthcare systems and may adversely affect neonatal outcomes [19].

Given these concerns, reporting overall caesarean section rates alone is insufficient. Understanding which specific groups of women contribute most to the rising trend is essential for designing effective and targeted interventions. To address this need, the Robson Ten-Group Classification System was introduced as a standardized and universally applicable method for analyzing caesarean section rates [20]. This system classifies all women admitted for delivery into ten mutually exclusive and totally inclusive groups based on parity, previous caesarean section, onset of labor, fetal presentation, number of fetuses, and gestational age [21].

The Robson classification offers several advantages over conventional methods of reporting caesarean section rates. By including every delivered woman, it eliminates selection bias and allows comprehensive assessment of obstetric practices [22]. It enables standardized auditing, identification of groups contributing most to the overall CS rate, and monitoring of trends over time [23]. Additionally, it facilitates meaningful comparison of caesarean section rates between institutions, regions, and time periods, thereby supporting benchmarking and quality improvement initiatives [24]. Importantly, the Robson system promotes evidence-based decision-making and enhances accountability in obstetric care [25].

WHO recommends the Robson Ten-Group Classification System as a standardized tool for monitoring caesarean section rates [18,21]. Accordingly, the present study was undertaken to analyse caesarean section rates in a tertiary care centre using the Robson classification and identify the major contributing groups.

MATERIALS AND METHODS

Study Design and Setting- This hospital-based cross-sectional observational study was conducted at Mandya Institute of Medical Sciences (MIMS), Mandya, Karnataka, a tertiary care referral center catering to both urban and rural populations. The study was carried out over a period of one month during April 2025 in the labor units of the institution. A cross-sectional design was selected as it allows assessment of caesarean section rates and contributing factors at a specific point in time within a defined population [19].

Study Population and Data Collection- All antenatal women with gestational age ≥28 weeks admitted to the labor room during the study period were included. Data were collected prospectively from medical records and labor room registers using a structured proforma. Information regarding maternal age, parity, gestational age, onset of labor, fetal lie and presentation, number of fetuses, previous obstetric history, and mode of delivery was recorded. Indications for caesarean section and maternal and neonatal outcomes were also documented. These variables were used to classify women according to the Robson Ten-Group Classification System [21].

Sociodemographic Characteristics- Sociodemographic variables including maternal age, residence, booking status, and referral status were recorded to assess their potential influence on caesarean section rates, as these factors are known to affect obstetric outcomes and mode of delivery [30].

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Robson's Classification- All women were classified into one of the ten Robson groups based on six basic obstetric characteristics: parity, onset of labor, gestational age, fetal presentation, number of fetuses, and previous caesarean section history. For each group, group size, caesarean section rate, and absolute and relative contributions to the overall CS rate were calculated [20,23].

Statistical Analysis- Data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Descriptive statistics were used to summarize demographic and obstetric variables. Categorical data were expressed as frequencies and percentages.

RESULTS

There were 640 deliveries (Fig. 1) in the month of April in the institution 339 were normal deliveries (53.0%) and 290 caesarean sections (45.3%), 8 patients had vacuum assisted vaginal deliveries (1.2%), and 3 had VBAC (0.5%). Group statistics output (descriptive stats for each sex) was done by an independent samples t-test.

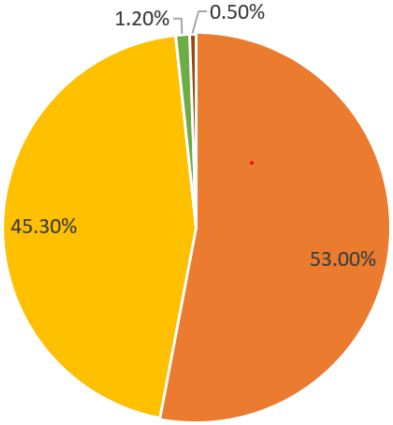

Fig. 1: Different Methods of Deliveries Conducted (%)

As per Fig. 2, Group 5 was the major contributor to CS (45.5%) followed by group 2 (27.6) and group 1. Groups 6, 7 and 9 had 100% CS. Groups 8,9 and 10 contributed less than 2% as in the Robson classification report.

According to Fig. 3, previous LSCS was the most common indication 45.5% followed by failed induction 20% which was followed by fetal distress (8%), breech (7.2%) twin(7.2%), MSL (7%), CPD (4%), amniotic fluid disorder (3.5%) second stage arrest and transverse lie contributing <2% respectively.

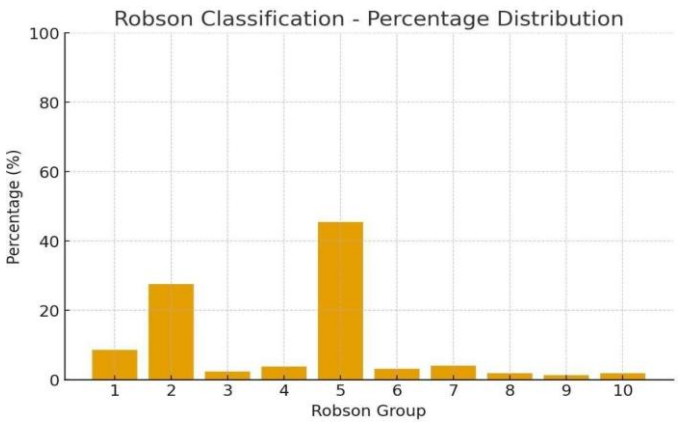

Fig. 2: Robson Classification – Percentage Distribution

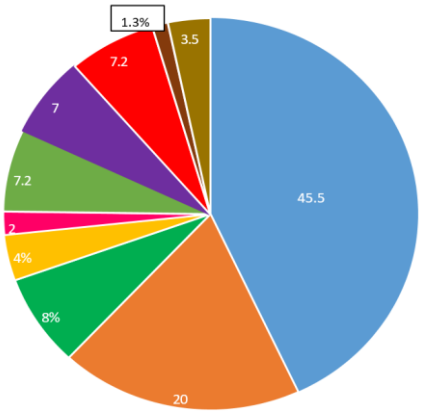

Fig. 3: Indications for LSCS

DISCUSSION

Caesarean section is one of the most commonly performed obstetric procedures worldwide and plays a crucial role in reducing maternal and neonatal morbidity and mortality when appropriately indicated. However, the continuous rise in caesarean section rates has raised concerns regarding unnecessary surgical interventions and their associated short- and long-term complications. Regular evaluation of caesarean section practices is therefore essential to identify areas where obstetric management can be optimized while ensuring safe maternal and fetal outcomes. In this context, the Robson Ten-Group Classification System serves as a practical and standardized framework for assessing caesarean section trends, identifying major the major contributing groups, and guiding evidence-based strategies to improve the quality of obstetric care.

The caesarean section rate observed in the present study was 45.3%, which is higher than the rates recommended by international guidelines. Similar high rates have been reported from several tertiary care centers across India, particularly those managing referred and high-risk pregnancies [21–23]. This variation may be attributed to

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differences in referral patterns, case mix, institutional protocols, and availability of advanced obstetric and neonatal services. As the present study was conducted in a tertiary care referral center, a higher CS rate was expected due to the increased inflow of complicated obstetric cases [24].

Analysis using the Robson Ten-Group Classification System revealed that Group 5 contributed the maximum proportion to the overall caesarean section rate. This observation is consistent with findings from multiple Indian and international studies identifying Group 5 as the dominant contributor to rising CS rates [25,26]. The increasing size of this group reflects high primary caesarean section rates in earlier pregnancies. Encouraging trial of labor after caesarean (TOLAC) in carefully selected women, along with continuous intrapartum monitoring and immediate surgical backup, can significantly reduce repeat caesarean deliveries without compromising safety [27].

Group 2 also contributed substantially to the caesarean section rate. Rising caesarean deliveries in this group are concerning, as they directly increase the size of Group 5 in subsequent pregnancies. Induction of labor without appropriate indications or unfavorable cervical conditions is associated with higher rates of failed induction and operative delivery. Strict adherence to evidence-based induction protocols, assessment of cervical favorability, and vigilant intrapartum monitoring are essential to reduce unnecessary caesarean sections in this group [28].

Although Groups 1 and 3 are considered low-risk categories, their contribution to the overall CS rate in the present study suggests scope for improving intrapartum care. Appropriate use of the partograph, avoidance of early admission, adequate pain relief, and patience in labor management can help reduce unnecessary surgical interventions in these groups [29].

The declining practice of vaginal breech delivery and underutilization of external cephalic version have further contributed to increasing caesarean rates. With proper training, strict selection criteria, and experienced supervision, vaginal breech delivery can be safely performed in selected cases. External cephalic version at term has been shown to significantly reduce non-cephalic presentations and the need for caesarean section [28,30].

LIMITAIONS

Despite its strengths, the study has certain limitations. Being a single-center study conducted in a tertiary care referral hospital, the findings may not be fully generalizable to primary or secondary health care settings, where the case mix and referral patterns differ. The crosssectional design limits the ability to establish causal relationships between clinical practices and caesarean section rates. Additionally, detailed analysis of individual indications for caesarean section within each Robson group was not performed, which may have provided deeper insight into potentially avoidable procedures. Factors such as patient preference, clinician experience, and institutional protocols, which may influence the decision for caesarean delivery, were also not assessed.

CONCLUSIONS

The Robson Ten-Group Classification System is a simple and standardized tool for auditing caesarean section practices. In the present study, it effectively identified the major obstetric groups contributing to the overall caesarean section rate, particularly Groups 5 and 2, facilitating targeted and evidence-based interventions. Optimizing induction protocols, promoting trial of labour after caesarean (TOLAC) in appropriately selected women, and improving intrapartum monitoring may help reduce unnecessary caesarean deliveries while ensuring maternal and neonatal safety. Routine implementation of Robson-based audits can support rational obstetric decision-making, improve the quality of obstetric care, and maintain an appropriate caesarean section rate. Future multicentric studies with larger populations should evaluate maternal and neonatal outcomes across Robson groups. Focused research on high-contributing groups and integration of the Robson classification into routine hospital audit systems may further strengthen quality improvement initiatives and evidence-based obstetric practice.

CONTRIBUTION OF AUTHORS

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Critical review- Kavyashree G
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REFERENCES

[1] Cunningham FG, Leveno KJ, Bloom SL, et al. Williams Obstetrics. 26th ed. New York: McGraw-Hill; 2022.
[2] Konar H. DC Dutta's Textbook of Obstetrics. 10th ed. New Delhi: Jaypee Brothers; 2023. Available at: https://www.jaypeedigital.com/book/9789356963313.
[3] Gabbe SG, Niebyl JR, Simpson JL. Obstetrics: Normal and Problem Pregnancies. 7th ed. Philadelphia: Elsevier; 2017.
[4] Betrán AP, Ye J, Moller AB, et al. The increasing trend in caesarean section rates: Global estimates. PLoS One, 2016; 11: e0148343.
[5] Boerma T, Ronsmans C, Melesse DY, et al. Global epidemiology of caesarean section use. Lancet, 2018; 392: 1341-48.
[6] Vogel JP, Betrán AP, Vindevoghel N, et al. Use of caesarean section: Global analysis. Lancet, 2015; 386: 2275-83.
[7] Keag OE, Norman JE, Stock SJ. Long-term risks of caesarean delivery. PLoS Med., 2018; 15: e1002494.
[8] Lumbiganon P, Laopaiboon M, et al. Mode of delivery and maternal outcomes. Lancet, 2010; 375: 490-99.
[9] Minkoff H, Chervenak FA. Elective primary caesarean delivery. Am J Obstet Gynecol., 2003; 189(3): 617-20.
[10] Declercq E, Menacker F, MacDorman M. Rise in caesarean deliveries in the USA. Birth, 2006; 33(4): 296-304.
[11] Hopkins K. Are Brazilian women really choosing caesarean section? Soc Sci Med., 2000; 51(5): 725-40.
[12] World Health Organization. WHO Statement on Caesarean Section Rates. Geneva: World Health Organization; 2015.
[13] Molina G, Weiser TG, Lipsitz SR, et al. Relationship between caesarean section rate and mortality. Lancet, 2015; 385: 1341-48.
[14] Gibbons L, Belizán JM, Lauer JA, et al. The Global Numbers and Costs of Caesarean Sections. Geneva: World Health Organization; 2010.
[15] Shah A, Fawole B, M'Imunya JM, et al. Caesarean delivery outcomes in Africa. BJOG, 2011; 118(10): 1173-82.
[16] Silver RM, Landon MB, Rouse DJ, et al. Maternal morbidity associated with repeat caesarean delivery. Obstet Gynecol., 2006; 107(6): 1226-32.
[17] Marshall NE, Fu R, Guise JM. Impact of multiple caesarean deliveries. Am J Obstet Gynecol., 2011; 205(3): 262.e1-8.
[18] Clark SL, Belfort MA, Hankins GDV, et al. Maternal death in the 21st century. Am J Obstet Gynecol., 2008; 199(1): 36.e1-5.
[19] Liu S, Heaman M, Kramer MS, et al. Maternal mortality and severe morbidity. CMAJ, 2007; 176(4): 455-60.
[20] Robson MS. Classification of caesarean sections. Int J Gynaecol Obstet., 2001; 73(2): 217-22.
[21] World Health Organization. Robson Classification: Implementation Manual. Geneva: World Health Organization; 2017. Available at: https://www.who.int/publications/i/item/9789241513197.
[22] Torloni MR, Betrán AP, Souza JP, et al. Classification systems for caesarean section. PLoS One, 2011; 6(1): e14566.
[23] Brennan DJ, Robson MS, Murphy M. Comparative analysis using Robson classification. Eur J Obstet Gynecol Reprod Biol., 2009; 147(2): 151-56.
[24] Kelly S, Sprague A, Fell DB, et al. Examining caesarean rates using Robson system. J Obstet Gynaecol Can., 2013; 35(3): 206-14.
[25] Farine D, Shepherd D. Classification of caesarean sections in Canada. J Obstet Gynaecol Can., 2016; 38(9): 862-69.
[26] Betrán AP, Torloni MR, Zhang J, et al. WHO working group on caesarean section. BJOG, 2014; 121(Suppl 1): 1-9.

doi: 10.21276/SSR-IIJLS.2026.12.4.46

[27]Souza JP, Gülmezoglu AM, Lumbiganon P, et al. Caesarean section analysis using Robson classification. BMC Pregnancy Childbirth, 2011; 11: 83.

[28]Hofmeyr GJ, Kulier R. External cephalic version for breech presentation. Cochrane Database Syst Rev., 2012; 10: CD000083.

[29]Levin KA. Study design in epidemiology. Int J Epidemiol., 2006; 35(1): 24-29.

[30]Barber EL, Lundsberg LS, Belanger K, et al. Indications contributing to caesarean delivery. Obstet Gynecol., 2011; 118(1): 29-38.