Original Article

Use of Robson's Ten Group Classification System to Optimize Caesarean Section Rate; An Audit in a Tertiary Care Centre, Rawalpindi

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Abstract

Objective: To implement Robson's Ten Group Classification System (TGCS) to identify the main contributory factors to the cesarean section (CS) rate and subsequently formulate effective recommendations to optimize this rate.

Methodology: A prospective cross-sectional study was conducted from November 2020 to June 2022 at Benazir Bhutto Hospital, Rawalpindi. All women delivering a live or stillborn baby of ≥ 24 weeks' gestation during the study period were categorized into 10 groups of the TGCS based on specific obstetric parameters. Descriptive statistical analysis was performed to assess the overall CS rate, the size of each group, individual group CS rates, and their contributions to the overall CS rate.

Results: Out of the total deliveries (14,883) during the study period, CS was performed in 6,115 cases, resulting in an overall CS rate of 41.08%. The largest presenting group was Robson's Group 03, while Group 05 (multiparas, scarred uterus, single cephalic term fetus) was the major contributor (45.49%) to the overall CS rate, followed by Group 01 (10.33%), Group 02 (10.20%), and Group 10 (9.95%). The largest contribution by Group 05 can be attributed to the paucity of Vaginal Birth After Caesarean (VBAC), leading to repeat elective CS. Induction of labor (IOL) is another contributing factor.

Conclusion: The Robson's TGCS is effective tool for auditing CS by high-lighting the major contributory factors to CS rate, gearing strategies to optimize CS rate through regular departmental audits, protocols and justified indications. Key words: Robson's classification system, caesarean section rate, indications of caesarean section, caesarean section audit.

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Introduction

Despite WHO recommendation for caesarean section (CS) rate of 10-15% at population level, the rate is on alarming rise worldwide. The international Health regulatory authorities recommend the adoption of Robson's Ten Group classification system (TGCS) to monitor, assess and optimize the CS rate in a standardized manner.

Cesarean delivery is a common obstetric procedure used to rescue the mother and/or fetus in special clinical situations. However, over the years, this mode of delivery has been used injudiciously, resulting in a significant increase in the CS rate worldwide, along with associated risks for both the mother and the neonate.[1,2] A recently published study on 'CS trend analysis' reports that worldwide, 21.1% of women give birth by CS.[3] The most significant rise in CS rates in the past three decades has been notable in Eastern Asia, Western Asia, and Northern Africa, with increases of 44.9%, 34.7%, and 31.5%, respectively. In contrast, sub-Saharan Africa has seen the smallest increase, with just a 3.6% rise. This trajectory suggests that by the year 2030, nearly 28.5% of women worldwide will opt for CS, resulting in approximately 38 million CS procedures annually. For South Asia, this projection is reported as 23%.

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The significant issue of the overutilization of CS, along with its adverse consequences, has gained international attention. This has led to the consideration of various monitoring strategies and systems for evaluating trends in CS rates and their impact on maternal and neonatal outcomes in a more action-oriented and comparable manner.[4,5]

In 2011, a systematic review concluded that women-based classification systems are more effective for auditing CS rates than indications-based or urgency-based classifications. The review suggested the adoption of Robson's Ten Group Classification System (RTGCS) for both local and international use.[6] Later, international health regulatory authorities, such as WHO in 2014[7] and FIGO in 2016[8], recommended the adoption of RTGCS as a global standard to assess, monitor, and optimize the CS rate in a standardized manner and for comparing CS rates both within healthcare facilities over time and between facilities.

The TGCS system was proposed by Robson in 2001.[9] According to specific pregnancy characteristics, this system classifies all delivering women into one of 10 groups that are mutually exclusive and totally inclusive.[10,11]

Multiple studies are now being conducted worldwide to assess the efficacy of this system[12-15,] and to formulate strategies to optimize the CS rate. However, since this rate is subject to various regional, social, cultural parameters, as well as diverse policies of local health regulatory authorities, the interpretation of CS trend analysis in a particular part of the world cannot be generalized.

The TGCS system has already been used regionally to assess CS trends in Pakistan.[16-20] With the same objective, we have also implemented Robson's Ten Group Classification System in our department to identify the main contributory factors to the CS rate and to formulate effective interventions and recommendations for its optimization. Additionally, this implementation aims to develop a database of CS rates for Pakistan.

Methodology

This prospective cross-sectional study was conducted in the Department of Obstetrics and Gynecology at Benazir Bhutto Tertiary Care Hospital, Rawalpindi, for 20 months from November 2020 to June 2022.

All women who delivered a live or stillborn baby with a gestational age of ≥ 24 weeks, whether by cesarean section (CS) or vaginal delivery, in the department during the study period were included.

Approval for the study was obtained from the institutional research committee, and informed consent from the delivering women was not necessary as this was a non-interventional study where identity disclosure was not required. All women were assigned to one of ten groups of TGCS based on specific parameters such as parity, gestational age, mode of delivery, previous CS, number of fetuses, fetal lie, and fetal presentation.

Hard copies of the data were maintained in maternity records (SVD & LSCS) registers, with an additional column for TGCS classification group. The soft copy of the data was compiled and stored in a specially designed Android app for Robson's TGCS. The compiled data was analyzed using SPSS 21, and means and percentages were calculated. Descriptive statistical analysis was performed for the overall CS rate, the size of each of the ten groups, individual group CS rates, and their contribution to the overall CS rate.

Results

During the 20-month study period from November 2020 to June 2022, there were a total of 14,883 deliveries. Out of these, cesarean sections (CS) were performed in 6,115 cases, resulting in a CS rate of 41.08% (Table I). Multiparous women were more common, accounting for 57.45%, compared to nulliparous women at 32.4%, in Group 01 to Group 07. The majority of women had cephalic fetal presentation (95.57%), while breech and abnormal presentations constituted only 4.43%.

The largest presenting group was Group 03 (multiparas, unscarred uterus, singleton cephalic fetus, spontaneous labor). The major relative contribution, accounting for 45.49% of the overall CS rate, was made by Group 05 (multiparas, scarred uterus, single term cephalic fetus), followed by Group 01 (10.33%), Group 02 (10.20%), and Group 10 (9.95%). (Figure 1) These four groups collectively comprised 76%, while the remaining six groups made up the remaining 24% of the overall CS rate. The highest incidence of CS rate, at 100%, was observed in Group 9 (all abnormal presentations, including previous CS), followed by Group 6 (all nulliparous breeches) at 93%, and Group 5 (previous

Table I: Robson's Ten-Groups Classification System & Distribution of CS Rate.

Group	Robson's Ten-group classification	Total women in group	Group size (%)	CS (n)	CS rate (%)	Absolute contribution to Overall CS (%) [1]	Relative contribution to Overall CS (%) [2]
1	Nullipara; single cephalic term; Spontaneous labour	3566	23.96	632	17.72	4.24	10.33
2	Nullipara; single cephalic term pregnancy;	1006	6.75	624	62.02	4.19	10.20
2a	Induced labour	590	3.96	211	35.76	1.41	3.45
2b	Planned CS	416	2.79	413	99.27	2.77	6.75
3	Multiparas, no uterine scar; single cephalic term; spontaneous labour	4369	29.35	361	8.26	2.42	5.90
4	Multiparas no uterine scar; single cephalic term;	801	5.38	436	54.43	2.92	7.13
4a	Induced labour	549	3.68	186	33.87	1.24	3.04
4b	Planned CS	252	1.69	250	99.2	1.67	4.08
5	Multiparas with uterine scar; single cephalic term;	3075	20.66	2782	90.47	18.69	45.49
5a	Previous 01 uterine scar	1526	10.25	1252	82.04	8.41	20.47
5b	Previous >01 uterine scar	1549	10.4	1530	98.77	10.28	25.02
6	All Nulliparous breeches	253	1.69	236	93.28	1.58	3.85
7	All Multiparous breeches (including previous CS)	307	2.06	262	85.34	1.76	4.28
8	All Multiple pregnancies (including previous CS)	205	1.37	131	63.9	0.88	2.14
9	All abnormal lies (including previous CS)	45	0.31	45	100	0.30	0.73
10	All single cephalic, Preterm (including previous CS)	1256	8.47	606	48.24	4.07	9.95
Total		**14883**	**100**	**6115**	**41.08**	**41.08**	**100**

(%)[1] = n of CS in the group / total N of women delivered in the setting x 100
(%)[2] = n of CS in the group / total N of CS in the setting x 100

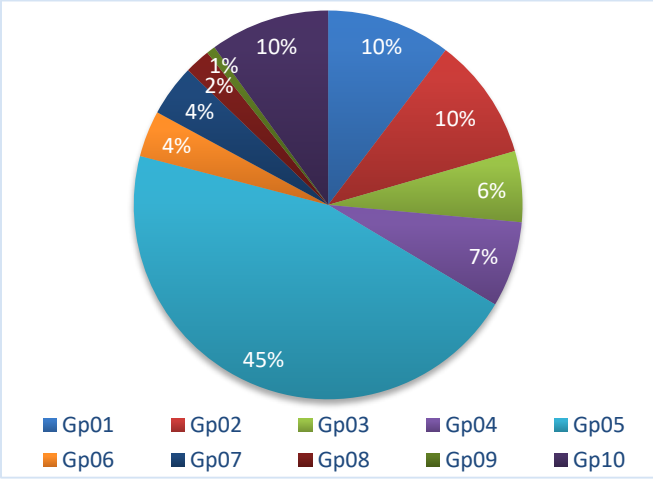

Figure 1. Relative contribution to CS rate.

CS, single cephalic, >37 weeks) at 90.47%. The lowest CS rate, at 8%, was seen in Group 3 (multiparous excluding previous CS, single cephalic, >37 weeks in spontaneous labor), followed by Group 01 (nulliparous, single cephalic term, spontaneous labor) at 18%. In our study, the majority of nulliparous breeches (93% in Group 6) were delivered by CS. All women with breech, transverse, or oblique presentations (groups 6, 7, and 9 combined) contributed 8.86% to the overall CS rate. The primary CS rate (groups 1-4, 6-10) was 37%, while the repeat CS rate (group 5, 7-10) was 63%. (Figure 2)

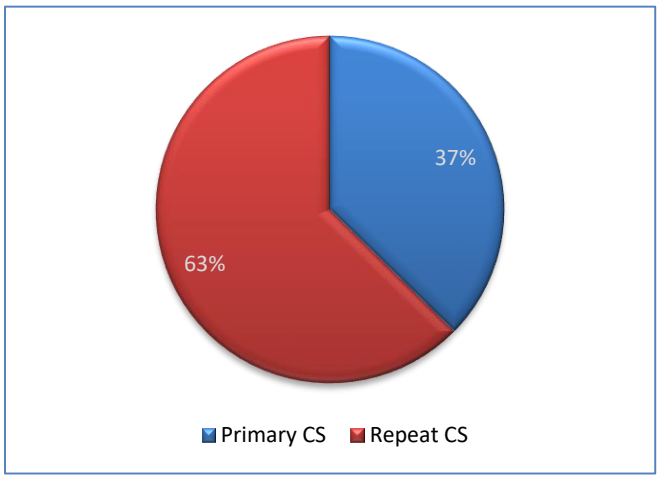

Figure 2. Incidence of primary vs repeat CS

Discussion

The WHO recommends a cesarean section (CS) rate of 10-15% at the population level, as higher rates are not associated with reduced maternal and newborn mortality rates.[21] Instead of aiming for a specific rate, efforts should be made to only offer CS to women who are in need and when it is medically necessary. WHO suggests the Robson classification system as a universal benchmark for evaluating, monitoring, and contrasting CS rates over time within and between healthcare facilities. In our present study, we employed Robson's Ten Group Classification System in our department to emphasize its simplicity and feasibility in identifying the main factors contributing to the CS rate, enabling us to formulate effective intervention strategies to optimize this rate in the future.

In our study population, multiparas were more common (57.45%) than nulliparous women (32.4%) in Groups 01 to 07. A similar proportion was observed in another local study with 70.1% vs. 29.9%,[16] and in a study from Bihar, multiparous women (55.92%) outnumbered nulliparas (44.08%).[15] The majority of women had a cephalic fetal presentation (95.57%), while breech and abnormal presentations were only 4.43%, which is comparable to a local study with figures of 93.4% vs. 6.6% respectively.[16] There is a marked variation in CS rates worldwide, ranging from as low as 5% in sub-Saharan Africa to as high as 42.8% in Latin America and the Caribbean.[3] This variation can be explained by differences in population demographics, regional obstetric practices, policies, and available healthcare logistics. Nevertheless, CS rates have risen in all regions since 1990. During our 20-month study period, the total number of deliveries was 14,883, with a CS rate of 41.08%. Comparable CS rates of 38%[15] and 42.8%[22] were seen in two Indian studies. Being a tertiary care facility, our hospital receives high-risk obstetric referrals from a wide catchment area, which may partially explain this high CS rate.

After randomization into Robson's TGCS, the largest presenting group in our study was Group 03 (29.35%), consisting of multiparas with an unscarred uterus, singleton cephalic fetus, and spontaneous labor, contributing to 5.9% of the overall CS rate. However, the largest relative contribution of 45.49% to the overall CS rate was made by Group 05 (multiparas, scarred uterus, term single cephalic fetus), followed by Group 01 (10.33%), Group 02 (10.20%), and Group 10 (9.95%) Figure 1. These four groups collectively comprised 76% of the overall CS rate, with the remaining six groups accounting for 24%. A similar contribution pattern was observed in another local study,[18] with Group 5 followed by Groups 1, 2, and 10 being the major contributors.

Induction of labor increases the risk of CS, making Group 2 (instead of Group 01) the second largest contributor after Group 5 in local[19] and Indian studies.[9,15] In all studies worldwide, groups 1, 2, 5, and 10 contribute to the majority of CS, with Group 5 consistently reported as the largest contributor to the overall CS rate due to the presence of a scarred uterus. Group 10, which includes all preterm deliveries, is the fourth largest contributor. The contribution of Groups 1 and 2 alternates after Group 5 in different studies, possibly due to regional differences in the practice of labor induction. These four groups need to be the focus of analysis to optimize the future CS rate.

The largest contribution by Group 05 is mainly attributable to the scarcity of Trial of Labor After Cesarean (TOLAC), leading to a high rate of Elective Repeat Cesarean Delivery (ERCD). Despite RCOG guidelines[23] advocating the safety of Vaginal Birth After Cesarean (VBAC) in appropriately selected cases, the rate of VBAC is declining due to fears of uterine rupture and other obstetrical and social reasons. Repeat CS itself is associated with a high magnitude of feto-maternal complications, especially morbidly adherent placenta, placenta previa, adherent bladder, and uterine scar dehiscence. Induction of labor (IOL) is another major contributory factor to a high CS rate, and irrational IOL results in a greater number of failed inductions, fetal distress, and ultimately, more CS procedures. Judicious IOL should reduce the CS rate in Group 2, including all nulliparas with the potential for vaginal birth, thus decreasing the size of future Group 5.

Similar to a few other studies,[9,22] the highest incidence of individual CS rates in our study was for Group 9 (all abnormal presentations, including previous CS) at 100%, followed by Group 6 (all nulliparous breeches) at 93%, and Group 5 (previous CS, single term cephalic) at 90.47%. The lowest CS rate of 8% was seen in Group 3 (multiparous, excluding previous CS, single cephalic term, spontaneous labor), which is comparable to a 10% rate in another study.[22] The majority (93%) of nulliparous breeches (Group 6) in our study were delivered by CS, compared to 100% in a previous study,[9] which reflects suboptimal practices regarding External Cephalic Version (ECV) and vaginal trial for suitable breech presentations.

Our study revealed that the incidence of primary CS (Groups 1-4, 6-10) was lower than the repeat CS rate (Group 5, 7-10), i.e., 37% vs. 63%. This is in contrast to the 61.82% vs. 38.17% ratio seen in another study.[15] The noticeable contribution of 9.95% to the overall CS rate by Group 10 (preterm deliveries) reflects our frequent high-risk maternity care.

Recommendations: Based on the implementation of Robson's classification and in line with past studies[15,20,24], our findings have enabled us to develop center-specific future strategies and recommendations to reduce the high CS rate in specific subgroups of TGCS and optimize the overall CS rate;

1. Establishment dedicated antenatal VBAC counseling clinics with adherence to RCOG-recommended VBAC checklists[23] to assist women in making informed choices between TOLAC and ERCD, highlighting the benefits of VBAC and future complications associated with ERCD. Training residents and young consultants in this perspective should improve the rate of VBAC, thereby reducing the size of Group 5 and the overall CS rate.
2. Base IOL on evidence, following recent NICE guidelines.[25] Limit IOL for unclear indications and unfavorable cervix. A reasonable approach is to defer IOL in low-risk post-dated pregnancies until 41 completed weeks of gestation. Proper case selection, standard guidelines, and uniform departmental policies are imperative to avoid unnecessary IOL and CS in Group 2.
3. Address the two most common indications for primary CS, 'Failure to progress' and 'Fetal distress,' in the context of the modern WHO 'Labour-Care Guide.'[26]
4. Adhere to guidelines for ECV[27] and breech vaginal trials,[28] which would also be rewarding.

The Way Forward; 1) After endorsing these recommendations in our department too, we plan to have an interval-CS audit study through Robson's TGCS to comment upon and document any improvement in reducing the overall CS rate. 2) Conducting a second phase multi-centered study involving all teaching hospitals of the region to make our findings more generalized.

Conclusion

The alarming rise in caesarean section rate worldwide is an issue of great concern as it is not only associated with subsequent serious feto-maternal complications but also drains out surgical health resources. The Robson's TGCS is an effective tool for auditing CS by high-lighting the major contributory groups to CS rate, hence suggesting interventions and strategies accordingly to optimize CS rate through regular departmental audits and protocols aiming mainly at reducing primary CS and convincing women for TOLAC where possible.

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