An Observational Study of Evaluation of Caesarean Section Rate by Robson's Ten Group Classification System

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Abstract

Aims and objectives:

- To use Robson's Ten Group Classification System to evaluate caesarean sections in present institution.

- To understand the reasons behind the CS rates for different groups of Ten Group Classification System specific to present institution.

Study Design and Settings: The prospective observational study conducted for a period of one year from 15th July 2020 to 15th July 2021 which included all women admitted in the labour room of *GMERS* medical college and general hospital, Gotri, Vadodara, Gujarat for delivery over in the analysis.

Methods and Material: The data compilation and statistical analysis was performed according to Robson's Ten Group Classification using Microsoft excel version 2011 and Med Calc software. For each group, we have calculated the caesarean section rate within the group and its absolute and relative contribution to the overall caes arean rate.

Results: A total 1768 patients delivered in the present institute and out of which 1069 were vaginal deliveries and 699 were caesarean section over this study period of one year. The overall caesarean section rate (CSR) was 39.54%, maximum contribution to total CS was from group 5, followed by group 1, group 2, group 10, and group 3. Less contribution from group 4, group 7, group 6, group 8 and least from group 9. Group 1, 2, 3 & 4 were low risk group.

Keywords: Robson's Ten-group; Classification system; Caesarean section; Labour.

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INTRODUCTION

The World Health Organization and the International Federation of Gynecology and Obstetrics recommend the Robson's Ten Group Classification System (TGCS) as a standard for monitoring and comparing caesarean section (CS) rates within healthcare facilities. CS rates have increased globally, leading to concerns about long term complications. The Robson's classification

system, endorsed by WHO, offers a complete perinatal classification for all women who deliver, enabling analysis of CS practice in a standardized, reliable, consistent, and action oriented way. An audit of CS deliveries using the Robson's Ten Group Classification System can help institutions understand CS rates and improve care.[1-9]

Aims and Objectives

- To use Robson's Ten Group Classification System to evaluate caesarean sections in present institution.

- To stratify patients undergoing cesarean section into Robson's Ten Group classification system.

- To understand the reasons behind the CS rates for different groups of Ten Group Classification System specific to present institution.

METHODS

This was a prospective observational study. The study was conducted for a period of one year from 15th July 2020 to 15th July 2021. Labour room of Department of obstetrics and gynecology at GMERS medical college and general hospital, Gotri, Vadodara, Gujarat. All women admitted at labor room for delivery over one year from 15th July 2020 to 15th July 2021 were included in the analysis. All women delivered by cesarean section were included while all vaginal deliveries were excluded. Statistical analysis was done using Microsoft excel version 2011 and Med Calc software. Results were presented as frequencies, percentages. For each group, we have calculated the caesarean section rate within the group and its absolute and relative contribution to the over all caesarean rate. All individuals who underwent caesarean section were tabulated according to indications using the recommendations.[10,11,12] Indications included fetal distress, previous scar, non progress of labor, antepartum hemorrhage (APH), failed induction, eclampsia, malpresentation, multiple pregnancy, fetoplacental insufficiency, premature rupture of membrane (PROM). Analysis of indications of caesarean section was done and presented as frequencies and percentage.

RESULT

Table 1: Stratification of deliveries according to Robson's ten group classification system

Robson's group	Description	Total no of CS	Total no of vaginal deliveries	Total no of deliveries
1	Nulliparous, single, cephalic >37 weeks gestation in spontaneous labour	91	285	376
2	Nulliparous, single, cephalic >37 weeks gestation induced or CS before labour	86	144	230
3	Multiparous (excluding previous CS), single, cephalic>37 weeks gestation in spontaneous labour	60	296	356
4	Multiparous (excluding previous CS), single, cephalic >37 weeks gestation who had labour induced or were delivered by CS before labour	38	170	208
5	Multiparous, with at least one previous CS(S), single, cephalic >37 weeks gestation	245	11	256
6	Nulliparous, single, Breech pregnancy	35	3	38
7	Multiparous, single, Breech (including previous CS(S))	38	10	48
8	Multiple pregnancy, (including previous CS(S))	16	22	38
9	Single pregnancy with Transverse lie or Oblique lie (including previous CS(S))	8	0	8
10	Single, cephalic, <37 weeks gestation (including previous scars)	82	128	210
Total		699	1069	1768

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Table 2: Caesarean rate within the group

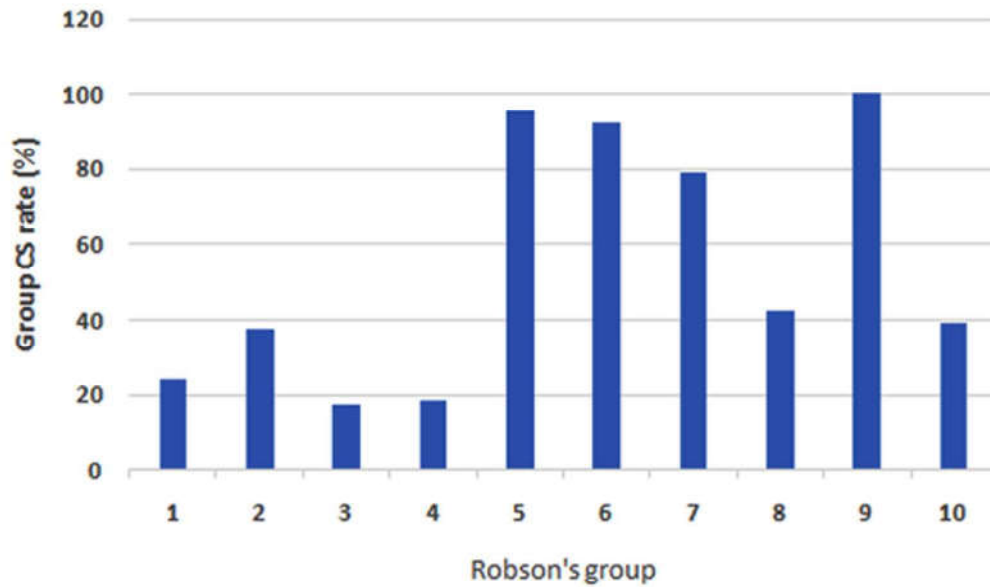| Robson's group	Total number of CS	Total number of deliveries	Group CS Rate (%)
1	91	376	24.20
2	86	230	37.39
3	60	356	16.85
4	38	208	18.27
5	245	256	95.70
6	35	38	92.11
7	38	48	79.17
8	16	38	42.11
9	8	8	100
10	82	210	39.05
Total	699	1768	39.54%

Fig 1: Group caesarean section rate

Table 3: Absolute and relative group contribution of CS in overall CS rate

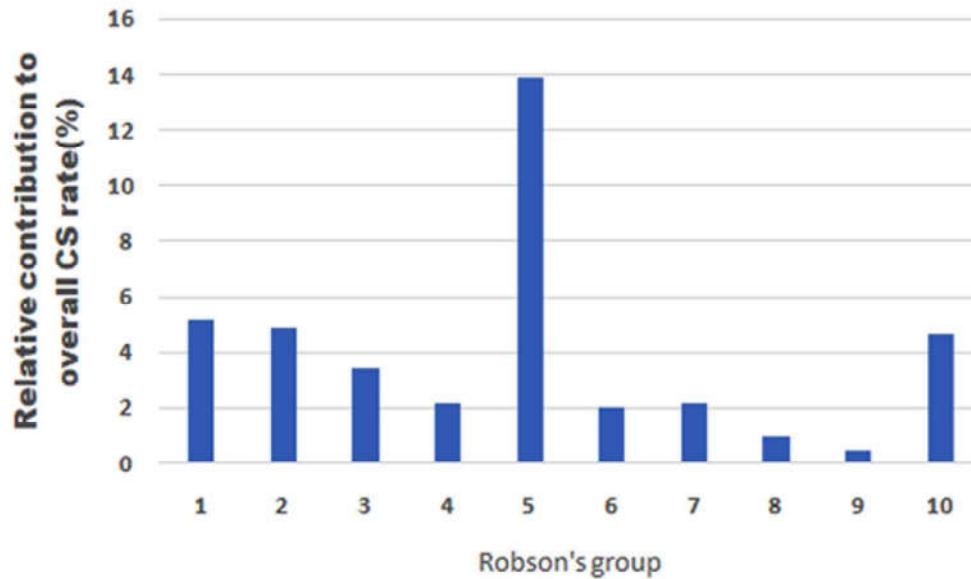| Robson's Group	Number of CS	Absolute Group contribution to overall CS rate (%)	Relative Group contribution to overall CS rate (%)
1	91	13.02	5.15
2	86	12.30	4.86
3	60	8.58	3.39
4	38	5.44	2.15
5	245	35.05	13.86
6	35	5.007	1.98
7	38	5.44	2.15
8	16	2.29	0.90
9	8	1.14	0.45
10	82	11.73	4.64

Fig 2: Relative group contribution of eachgroup to overall CS rate

Table 4: Interpretation of the TGCS data based on Robson's recommendations

Sr. No	Robson Recommendation	Findings from present study
1	The total number of caesareans and deliveries should be the sum of the number of each event in Robson groups 1 to 10 combined	Vaginal deliveries = 1069 Caesarean sections = 699 Total deliveries = 1768
2	Group 9 should comprise 0.2-0.6% of women with a CS rate of 100%. Other values may reflect data collection issues	Group 9 total CS = 8 Relative contribution to overall CS rate = 0.45% Group CS rate = 100%
3	Groups 1 and 2 usually account for 35-40% of all deliveries Group 1 should be larger than Group 2.	Group1=376 Group2= 230 Total=606 (34.28%)
4	Groups 3 and 4 usually account for 30-40% of women; Group 3 should be larger than Group 4.	Group 3 = 356 Group 4 = 208 Total= 564 (31.90%)
5	The CS rate in Group 4 should be below 20%	Group 4 CS rate = 18.27%
6	Group 5 should comprise no more than 10% of women	Group 5 = 256 (14.48%)
7	Groups 6 and 7 should include 3-4% of all women, and Group 6 is usually twice the size of Group 7	Group 6 = 38 Group 7 = 48 Total = 86 (4.86 %)
8	Unless the site has an IVF program or is a referral centre, Group 8 should include 1.5-2% of women	Group 8 = 38 (2.15%)
9	Group 10 includes approximately 5% of women. Higher proportions (6-7%) may be seen at referral centres and facilities with a high risk of preterm delivery	Group 10 = 210 (11.88%)
10	If the CS rate in Group 10 is 15-16% it suggests a high proportion of women with spontaneous onset of preterm labour. Higher CS rates (30-40%) in this Group reflect more women with CS following preterm labour induction or a caesarean delivery without labour	Group 10 = 210 Total CS = 82 Group CS rate= 39.04%
11	A CS rate for Group 1 less than 10% is desirable and below 15% is achievable	Group 1 CS rate = 22.87 %

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12	The CS rate for Group 3 should be 2.5-3%.	Group 3 CS rate = 16.85 %
13	With good perinatal outcomes, a CS rate of 50-60% in Group 5 is excellent	Group 5 CS rate = 96.09 %
14	Groups 1, 2, and 5 usually account for two-thirds of all caesarean deliveries.	Group 1 total CS= 91 Group 2 total CS= 86 Group 5 total CS =245 Total=422 (60.37%)

Table 5: Indications of caesarean sections by Robson's group

| Indications	Total CS	Fetal distress	Abnormal pelvis	Previous scar	Non progression	APH	Failed induction	Eclampsia	Mal presentation	Multiple pregnancy	Feto-placental insufficiency	PROM
Robson's group												
1	91	49 (53.8)	20 (21.9)	0	12 (13.1)	6 (6.59)	0	0	0	0	2 (2.2)	2 (2.2)
2	86	62 (72.09)	4 (4.6)	0	8 (9.3)	4 (4.6)	2 (2.3)	6 (6.82)	0	0	0	0
3	60	30 (50)	8 (13.33)	0	8 (13.3)	8 (13.3)	0	0	0	0	4 (6.67)	2 (3.33)
4	38	23 (60.5)	3 (7.9)	0	4 (10.53)	2 (5.2)	4 (10.53)	2 (5.26)	0	0	0	0
5	245	40 (16.3)	69 (28.16)	128 (52.24)	0	8 (3.27)	0	0	0	0	0	0
6	35	2 (5.71)	2 (5.71)	0	0	2 (5.71)	0	0	29 (82.86)	0	0	0
7	38	2 (5.26)	0	2 (5.26)	0	2 (5.26)	0	0	28 (73.68)	0	4 (10.53)	0
8	16	5 (13.25)	0	4 (25)	0	0	0	0	4 (25)	2 (12.5)	1 (6.25)	0
9	8	0	0	0	0	0	0	0	8 (100)	0	0	0
10	82	30 (36.59)	8 (9.76)	28 (34.15)	2 (2.44)	6 (7.32)	0	2 (2.44)	0	0	6 (7.32)	0
Total	699	243	114	162	34	38	6	10	69	2	17	4
CS rate (%) according to indication		34.76	16.3	23.18	4.86	5.44	0.86	1.43	9.87	0.28	2.43	0.57
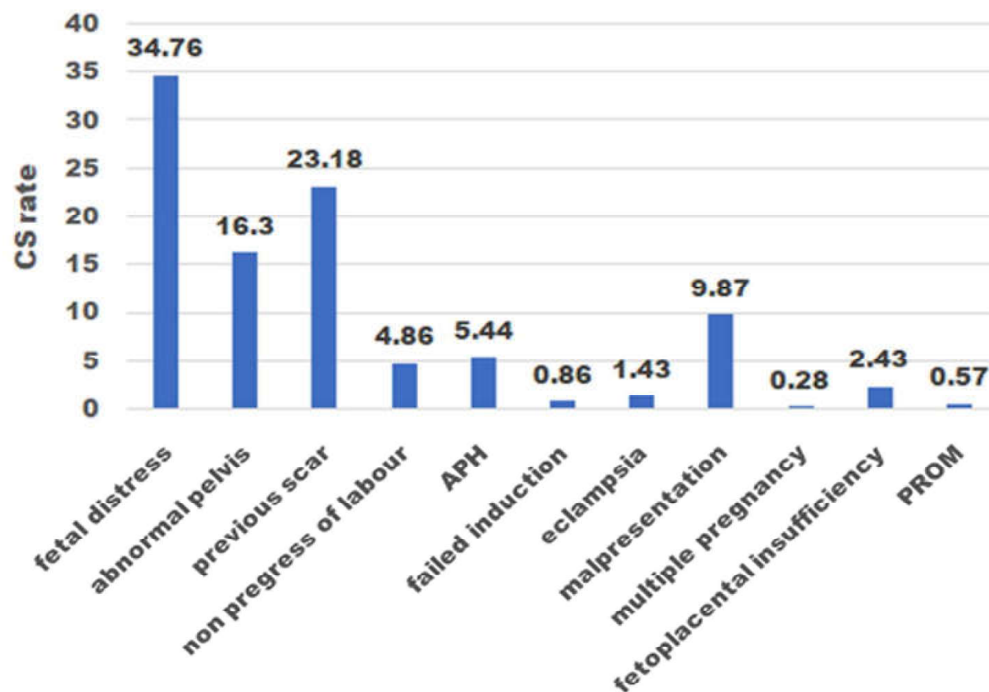
Fig 3: Caesarean section rate according to indications

DISCUSSION

When medically rationalized, Caesarean section is a key intervention to decrease maternal and neonatal morbidity and mortality. It is also one of the best indicators of the quality of maternal health services.

Caesarean section is the recommended mode of delivery in transverse lie or nullipara with breech presentation, absolute disproportion, placenta previa, cord prolapse, fetal asphyxia and it is considered appropriate and justified for this category of women. However, in women where caesarean section is done purely on maternal request, without a medical indication, caesarean section cannot be considered as appropriate or justified. When CS is done for fo *et al.* distress, sometimes on delivery the foetus is depressed and must be admitted to neonatal intensive care unit (NICU) for its survival, where as, at other times the foetus is born healthy and with good Apgar scores. Hence, caesarean section for this category of women is always a dilemma for the obstetrician. Women with previous scarred uterus make up another debatable category for CS. All categories of women contribute to the overall CS rate of the institution. Hence, it has been suggested that the overall institutional CS rate should no longer be thought of as being too high or too low, but rather, whether they are appropriate or not.

This study was conducted to use Robson's TGCS to audit caesarean sections in present institution, and to know the indications behind the CS rates for various groups of TGCS specific to present institution.

The overall CS rate of present institution for the 1 year study period was 39.54% ie. 699 caesarean sections of 1768 total deliveries.

Sneha *et al.*, also reported a similar CS rate of 32.6% at a tertiary care teaching hospital in South India.[13]

Comparable to CS rate of 34.7% in a study conducted in a tertiary teaching hospital, Addis Ababa, Ethiopia.[14]

Arpita *et al*, also reported a high over all CS rate of 44.61% from another large teaching hospital in Karnataka.[15]

The first group of TGCS is traditionally a large group, and thus, accounts for a large percentage of the overall CS rate.

In our study also, group 1 was largest 21.26% of total population and overall CS rate was 13.02% done in nulliparous women in spontaneous labour at term, indicating that department is dealing with a relatively high-risk population in group 1 of TGCS since present institution is a tertiary referral centre.

Group 3 was the second largest accounting for population which was 20.14% of total.

This finding is consistent with a study done in India where Group 1 and Group 3 contributed to 24.2% and 19.4% of all deliveries respectively.[16]

Similarly, studies done in Brazil, Italy, and Tanzania showed Group 3 and Group 1 were the two most represented obstetric groups.[17,18,19]

Group 3 contributed to 8.58% of present overall CS rate. This rate is like study by Priyanka *et al* (16.31%).[20]

Almost half of these women in group 1 and group 3 underwent CS for foetal distress; other common indications for referral to present institution were abnormal presentation, non-progress of labour, severe antepartum hemorrhage, eclampsia, and pre-eclampsia with severe features leading to fetoplacental in sufficiency.

Screening of such high-risk patients at early gestational age and referral to higher centre for proper management of conditions like preeclampsia, low lying placenta, pregnancy associated with medical disorders is needed.

Women in group 2 where labour was induced, constituted 12.3% of overall CS rate in present institution. Indications for induction of labour were varied. However, within this group common indications for induction were eclampsia, pre-eclampsia with severe features and postdates. According to *Nice* guidelines these postdate pregnancy should be offered induction of labour between 41 and 42 weeks, to avoid the risks of prolonged pregnancy. Maternal anxiety and family pressure to hasten the delivery process, as well as, obstetrician's anxiety to avoid sudden foetal demise often contribute to induction before 42 weeks of gestation.

According to some systematic reviews, the risk of CS is not increased due to induction of labour, however, the procedure itself is not without risk.

Recently, Mahomed *et al.* reported from a retrospective cohort study, involving only nulliparous women with uncomplicated singleton pregnancy at 40-0 to 41-6 weeks, that incidence of CS was significantly higher in the induction group at 40-0 to 41-6 weeks when compared to women with spontaneous labour at 40-0 to 41-6 weeks.[21]

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Proper counselling by senior obstetrician and strict adherence to the guidelines may even see more women progress to spontaneous labour and thus avoid unnecessary inductions and CS in this group of TGCS.

Group 4 constituted 5.44% of present overall CS rate. The common indications were fetal distress, nonprogress of labour, failure of induction and abnormal presentation. Other study has stated similar contribution from this group, 2.3% to their overall CS rate.[22]

Group 5 with previous CS pregnancy at term, was the largest contributor with 35.05% of the overall CS rate mostly due to women having CS prior to labour.

Only 10 women had VBAC during the study period and they were admitted to labour room in an active stage of labour. Total 96.09% of women of group 5 were delivered by CS.

This finding agrees with studies done by Kansara Vijay et al. (98.3%).[23]

There was 36.96% of overall CS rate of group 5 in the study done by Jogiya P et al.[20]

Comparable CS rate (40.1%) found in study done by Dhodapkar SB et al.[13]

Even though vaginal birth after one CS has been advocated as a safe option, the number of women who attempt trial of labour after caesare an has declined over recent years due to fear of uterine rupture, as well as, the fear of litigations, amongst the care givers, in case anything goes wrong.[24-28]

Increasing CS rate among women with breech presentation is a common phenomenon particularly since the publication of the term breech trial, and present hospital is no exception.[29,30]

Groups 6 and 7 consist of women with breech presentation and show a high caesarean section rate.

Group 6 contributes to 5.007% of overall CS rate. 92.11% women of group 6 delivered by CS. 3 women delivered vaginally in group.[6]

Group 7 contributes to 5.44% of overall CS rate. 79.17% women of group 7 delivered by CS. These findings are like 91.3% (group 6) and 77.7% (group 7) of the study done by Tanaka et al.[22] and Chitra TV et al respectively[31]. Even though this group is relatively small, health care givers should be more proactive in offering external cephalic version to all eligible women with breech presentation and consider offering vaginal breech delivery to suitable women.

Group 8 had total 16 CS (2.29% of overall CS rate) for twin gestations. Group CS rate was (42.11%). It is comparable to study by Jacob KJ et al. (21.6%).[32]

There were 8 CS (1.14% of overall CS rate) for malpresentations in Group 9. All 8 women were delivered by CS (100%). It is like study by Tanaka et al. (100%).[22]

Group 10, women delivery before 37 weeks, contributed to 11.73% of overall CS rate. Fetal distress, previous scar, fetoplacental in sufficiency in hypertensive disorders, APH and abnormal pelvis were the common indications to this group.

Group 10 contributed 7.4% and 9.7% to the overall institutional CS rates in different studies from India.[13,33] The proportion of women who had previously had a caesarean section increased in most countries across the world. It would be prudent to explore measures to decrease primary CS for women in groups 1, 2, 3 and 4.

This will, in time, affect the overall CS rates in group 5. Where facilities exist, trial of labour after caesarean (TOLAC) should be offered to women with previous CS after proper patient selection and counselling. This is the only way to reduce CS rates in group 5.

Robson TGCS is simple and reproducible classification, but also has certain limitations. It does not consider the indications for induction of labour or CS, e.g., abruptio placenta or preterm eclampsia, where CS is considered a life saving procedure. It also does not account for pre-existing medical, surgical, or foetal disease and the degree of prematurity; all of which may influence the decision to under take CS. No information regarding women who have under gone trial of labour after CS (TOLAC) is obtained from TGCS. Many modifications to TGCS have been proposed to over come these deficiencies, but none has gained universal acceptance nor stood the test of time.[34,35]

CONCLUSION

- The Robson's Ten group classification is based on well defined parameters and it was easy to apply.

- It helped to identify the main groups of subjects who contribute most to the overall CS rate.

- Group 5 and Group 10 were leading contributor to overall caesarean section rate.

- To reduce CS rate in Group 5, CS rate in first

four groups has to be reduced primarily.

- It is important to focus on the first four TGCS groups which constitute about 66.18% of all deliveries in present institution.

- It is within the low-risk groups that one is probably going to find the highest and most in appropriate indications for caesarean sections.

- To reduce the overall caesarean section rate to certain extent, detailed analysis of low- risk groups to identify possible modifiable factors and use of specific interventions by adhering to recommendations is necessary.

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