Original Research Article

The ten group Robson classification: an institutional study to analyse the caesarean section rates

Lekshminath Gopinath, Rajani Vaidya*

Department of Obstetrics and Gynaecology, Malabar Medical College Hospital and Research Centre, Modakkallur, Kozhikode, Kerala, India

*Correspondence:
Dr. Rajani Vaidya,
E-mail: dr.rajanivaidya@gmail.com

ABSTRACT

Background: Over the last few decades, there has been an alarming increase in the rate of deliveries by caesarean section (CS) in most of the countries, though the drivers of this trend are not completely understood. In 1985, WHO had proposed that ideal rate for regional CS rates should not exceed 10-15%. The Robson's classification system is simple, robust and flexible. The study was done as it was important to have a tool to monitor, compare the CS rates in a same setting and between different settings over a period of time and to optimise the CS rates.
Methods: It was a retrospective study conducted in the department of obstetrics and gynaecology in a tertiary care centre. The hospital delivery records were reviewed for a period of 15 months from April 2020 to June 2021.
Results: The total number of deliveries during the study period was 1016. The total number of CSs was 441 and the total number of vaginal deliveries was 575. The CS rate was 43.4%. The relative contribution from groups 1, 2 and 5 in our study accounted for 76.36% and group 5 accounted for 44.4% of the total CSs. These 3 groups should be the focus of attention to reduce the overall CS rates.
Conclusions: It is advisable that all institutions can use the Robson's report table to analyse the population catered by them and to make institutional specific policies. This will allow comparing the data amongst the different institutions and countries which can help in policy making.

Keywords: Caesarean section, Robson's classification, Induction of labour

INTRODUCTION

Over the last few decades, there has been an alarming increase in the rate of deliveries by CS in most of the countries, though the drivers of this trend are not completely understood.[1,2] In 1985, WHO had proposed that ideal rate for regional CS rates should not exceed 10-15%, but this was based on evidence available at that time.[3] However, the validity of this threshold has been questioned since then. In the past 35 years, the rate of caesarean has steadily increased from 5% to approximately 30%.[4] But with this, over the time maternal mortality ratio has decreased from almost 300 to less than 10.[4] The reasons for persistently increasing CS rates can be attributed to few causes like increased elective inductions, widespread use of electronic foetal monitoring, maternal request, concern for pelvic floor injury associated with vaginal birth, assisted reproduction, lower operative vaginal deliveries, lower rates of VBAC, malpractice litigations.[5] We need to understand and analyse this increasing trend and implement effective measures to reduce the CS rates because caesarean delivery is associated with higher maternal risks for the current and subsequent pregnancies compared to spontaneous vaginal deliveries. It is important to have a tool to monitor, compare the CS rates in a same setting and between different settings over a period of time and to optimise the CS rates.

The Robson's classification system is simple, robust and flexible. The ten Robson categories are mutually exclusive, totally inclusive and can be applied prospectively.[3] All women admitted for delivery can be classified immediately on the basis of a few variables that are routinely recorded at the time of admission. This helps to assess the quality of care and of clinical management practices by analysing the outcomes of each group of women and also to know the type of population served by the hospital.[3] It also helps in specific monitoring and auditing of the deliveries and offers a standardised comparison method between different institutions in developing and developed countries over a time period.

The purpose of the current study was to analyse the CS rates in our hospital and to classify all deliveries by using modified Robson's ten group classification system.

METHODS

It was a retrospective study conducted in the department of obstetrics and gynaecology in a tertiary care centre. After obtaining the ethical approval from the institute, the hospital delivery records were reviewed for a period of 15 months from April 2020 to June 2021. All the deliveries occurring in the institute were classified according to the Robson's classification and entered in the parturition register. We had been using institutional protocol for induction of labour based on parity and bishops score. The methods included mechanical Foleys bulb induction, medical (prostaglandin E1 and E2, oxytocin) and surgical (artificial rupture of membranes) methods.

All pregnant women with gestational age of more than or equal to 24 weeks delivered during April 2020 to June 2021 were included irrespective of birth outcome. Details were collected according to Robson's TGCS (Table 1). It classified all deliveries into one of ten groups on the basis of 6 obstetric variables: obstetric history (parity and previous CS), onset of labour (spontaneous, induced or CS before onset of labour), foetal presentation or lie (cephalic, breech or transverse), number of neonates and gestational age (preterm or term).[3]

Statistical analysis

Data was collected and entered in Microsoft excel sheet and was later analysed manually. Size of each individual group, group CS rates, absolute CS rates in relation to total deliveries and relative CS rates in relation to total number of caesarean sections were calculated and presented as percentage according to the Robson's report table.

RESULTS

The total number of deliveries during the study period was 1016. The CS rate was 43.4%. Table 1 describes the delivery details during the study period.

The relative group size in terms of deliveries and also the caesarean rates in each group is described in Table 3.

Group 1 and 2 (nulliparous, singleton, cephalic, ≥37 weeks gestation, in spontaneous labour/induced labour or CS before labour) comprised the largest population of the study group (39%) of the study population. Group 3 and 4 (multiparous, without previous CS, singleton, cephalic, ≥37 weeks gestation and in spontaneous labour, induced or pre-labour CS) was the next largest with 32% of total obstetric population, followed by group 5 (19.68%).

Group size

$$\text{Group size (\%)} = \frac{n \text{ of women in the group}}{\text{total } N \text{ women delivered in the setting}} \times 100.$$

Group CS rate

$$\text{Group CS rate (\%)} = \frac{n \text{ of CS in the group}}{\text{total } N \text{ of women in the group}} \times 100.$$

According to the Robson's report guidelines, steps to assess the quality of data collection were size of group 9 should be less than 1% and CS rate of group 9 should be 100% by convention.[3] Our study satisfied this criteria as mentioned in Table 3.

To assess the type of population served by the hospital, we needed to look at the size of different population and guidelines advised by Robson's report based on the reference population. Size of group 1 and 2 usually should represented 35-42% of obstetric population. Size 3 and 4 usually represented 30% of women. Size of group 5 was related to overall CS rate. The size of group 5 was roughly usually about half of the total CS rate.[3] In settings with low than overall CS rates, it was usually under 10%. Size of group 6 and 7 should be 3-4%. Size of group 8 should be 1.5-2%. Size of group 10 should be less than 5% in most normal risk settings. Our study population was almost similar to the reference population as advised by the Robson guidelines.[3] Size of group 10 was slightly on higher side as our hospital was a tertiary care centre which catered for preterm and high risk deliveries like IUGR and preeclampsia and other pregnancy with medical complications which may warrant preterm delivery.

The contribution of each groups to overall cesarean rates are shown in Table 4. The contribution of group 5 to overall CS was 19.29%. Group 5 included previous CS patients. This was the major contributor to the cesarean rates in our study. CS rate in this group was 98%. The next major contributor to overall CS rate was group 2, which accounted for 10.91% to overall CS rate. This group included nulliparous, singleton, cephalic induced or pre labour CS patients. CS rate in this group was 40.1%. Group 6, 7, 8, 9 contributed almost equally in the overall CS rates.

Group 5 (19.29%) and group 2 (10.91%) contributed the highest to the overall surgical rate in relation to total number of deliveries. The other groups contributed

between 0.5 to 4% to the overall CS rate. Group 5 (44.4%) and group 2 (25.16%) contributed maximum amongst the total caesarean deliveries. Each of the remaining groups contributed to less than 10% of the total caesarean deliveries. Group 10 included single cephalic pregnancy <37 weeks gestation, including women with previous CSs contributed to 4% of the total surgical deliveries.

Steps to assess the CS rates using the Robson's report table, we had to look into the CS rates of each group.[3]

The CS rate for group 1 less than 10% were achievable. As our hospital catered to high risk population, the size of group 2 was more than group 1 and induction rates were high which explained the high CS rate in group 2a (40.1%), when compared to the reference population in Robson's guidelines. CS rates for group 2 varied consistently around 20-30% in the study population according to Robson guideline. CS rates for group 3 should be normally no higher than 3%. The CS rate for group 4 rarely should be higher than 15%. CS rate in our study for group 3 was around 8.5% and for group 4 was around 28.6% which was higher and the reason could be increased

maternal request for CS, concurrent tubal ligation, failed induction in high risk population in group 4a.

Table 1: Demographic details.

Mode of delivery	Vaginal delivery	C-section	Total
Number	575	441	1016
Percentage	56.59	43.4	100

Absolute group contribution to overall CS rate (%)

Absolute group contribution to overall CS rate (%)=$\dfrac{n \text{ of CS in the group}}{total\ N\ of\ women\ delivered\ in\ the\ setting} \times 100$.

Relative contribution to the overall CS rate

Relative contribution to the overall CS rate (%)=$\dfrac{n \text{ of CS in the group}}{total\ N\ of\ CS\ in\ the\ setting} \times 100$.

Table 2: The Robson classification with subdivisions.[3]

Groups	Obstetric population
1	Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour
2	Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation who had labour induced or were delivered by CS before labour
2a	Labour induced
2b	Pre-labour CS
3	Multiparous women without a previous CS, with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour
4	Multiparous women without a previous CS, with a single cephalic pregnancy, ≥37 weeks gestation who had labour induced or were delivered by CS before labour
4a	Labour induced
4b	Pre-labour CS
5	All multiparous women with at least one previous CS, with a single cephalic pregnancy, ≥37 weeks gestation
5.1	With one previous CS
5.2	With two or more previous CSs
6	All nulliparous women with a single breech pregnancy
7	All multiparous women with a single breech pregnancy including women with previous CS(s)
8	All women with multiple pregnancies including women with previous CS(s)
9	All women with a single pregnancy with a transverse or oblique lie, including women with previous CS(s)
10	All women with a single cephalic pregnancy <37 weeks gestation, including women with previous CS(s)

Table 3: Relative size of groups and caesarean rates.

Groups	Relative group size (%)	CS rates in each group (%)
1	169 (16.63)	30 (17.75)
2	226 (22.24)	111 (49.11)
2a	192 (18.89)	77 (40.1)
2b	34 (3.34)	34 (100)
3	176 (17.32)	15 (8.52)
4	150 (14.76)	43 (28.6)
4a	133 (13.09)	26 (19.54)
4b	17 (1.67)	17 (100)

Continued.

Groups	Relative group size (%)	CS rates in each group (%)
5	200 (19.68)	196 (98)
5.1	159	155
5.2	41	41
6	8 (0.78)	7 (87.5)
7	10 (0.98)	6 (60)
8	14 (1.37)	9 (64.2)
9	6 (0.59)	6 (100)
10	57 (5.61)	18 (31.5)
Total	1016 (100)	441 (43.4)

Table 4: Absolute and relative contribution of each group to the overall CS rates.

Groups	Absolute contribution to the overall CS rate (%)	Relative contribution to the overall CS rate (%)
1	2.95	6.8
2	10.91	25.16
2a	7.57	17.46
2b	3.34	7.7
3	1.47	3.4
4	4.22	9.6
4a	2.55	5.8
4b	1.67	3.8
5	19.29	44.4
6	0.68	1.58
7	0.59	1.36
8	0.88	2.04
9	0.59	1.36
10	1.77	4.08
Total	43.4	100

In group 5, CS rates of 50-60% were considered appropriate provided there was good maternal and perinatal outcome. CS rates in group 5 in our study were around 98% because of very few trial of labour after caesarean. Rates for group 8 were usually around 60%. CS rate in group 10 in most populations was usually around 30%. CS rates in our study for group 8 and 10 were almost similar to the guidelines.

DISCUSSION

Over the years, the rate of caesarean deliveries was increasing steadily. It was the need of the hour that we analysed the CS rates at the institutional level and implement the strategies to monitor it. With the increasing CS rates there was increased maternal morbidity because of placenta accreta spectrum, isthmocele, scar endometriosis, uterovesical fistula, caesarean scar pregnancy and other complications which can affect the patient's quality of life.

The caesarean section rate in our study was 43.4% which was more than the expected rate. This classification helped us to identify the groups which contributed the most to the overall CS rate. There by quality check could be implemented at the institutional level to modify the CS rate

in a particular group. The proportion of women in few groups in our study differed slightly from that suggested by Robson's classification due to small sample size of the study and the type of health facility dealing with a greater number of high-risk cases. This being a referral and tertiary care centre, the characteristics of women admitted were different which explained the higher rate for surgical deliveries in the present study and particularly in reference to group 5.

When we analyzed the Robson's report table of our study, it was evident that, the CS rate in group 2 (nullipara induced or pre-labor CS) was more than group 1 (nullipara, in spontaneous labor) and CS rate of group 4 (multipara induced or pre-labor CS) was more than group 3 (multipara in spontaneous labour). There was a rising trend in the incidence of induction of labour for various reasons. Induction of labour was associated with increased CS rates in our study. Strategies to reduce failed induction had to be implemented. Proper assessment based on Bishop's score, indication for induction, methods used for induction and the criteria used for failed induction had to be properly documented. Reduction in CS in this particular group reduced CS rate not only in the current hospital statistics, but it also reduced the number of women in group 5 in the future.[6]

Group 1 and 3 had a lower CS rate indicating multiparous women who were induced or who came in spontaneous labour had higher vaginal delivery rate. This also showed that nulliparous women who presented in spontaneous labor also had lower CS rates, indicating that we were dealing with a comparatively low risk population.

A major contributor to overall CS rate was group 5. This was mainly because most women with previous one LSCS underwent an elective repeat CS prior to labour. Even though vaginal delivery can be tried after one LSCS, women opting for VBAC had been declined over years due to fear of uterine rupture.[7,8] To reduce the CS rate in group 5, a trial of labour (TOL) after CS should be considered in every woman presenting for care after discussing the risk and benefits of VBAC.[9] The present study highlighted that group 5, that is, women with previous CS, contributed maximum (44.4%) to the overall causes of cesarean deliveries. This finding was consistent with the studies of Dhodapkar et al (40%), Wanjari et al (32.8%), Shirsath et al (54.5%) and Kansara et al (46.1%).[10-13] Induction of labour was associated with higher CS rate in both groups 2a and group 4a. In a study conducted by Samba et al at Ghana, CS rate was 46.9% which was higher compared to our study.[14] Groups 2, 4 and 5 contributed nearly more than half of the overall CS rate which was similar in our study. According to Fatusic et al CS rate was 25.47% which was less than our study.[15]

According to the study by Wang et al in Chinese population, though the CS rate has decreased from 66.9 to 44.7%, it was slightly higher compared to our rate. They found nulligravida with singleton term cephalic pregnancy (group 1), multiparous with previous CS (group 5) and preterm CS (group 10) as key population to focus upon to reduce the CS rates.[16] This clearly demonstrated the significance of the Robson's criteria, where different institutions and countries had to develop different strategies to address the CS rates.

The relative contribution of groups 1, 2, 5 to the overall CS rate normally contributed to 2/3rd (66%) of all CS performed in most of the hospitals. The relative contribution from groups 1, 2, 5 in our study accounts for 76.36% and group 5 accounted for 44.4% of the total CS(s). These 3 groups should be the focus of attention to reduce the overall CS rates. The CS rate in group 5 was high, which indicated the high incidence of CS rates in group 1 and 2 in the previous years and it was worth evaluating and exploring the indications of CS in these groups to reduce the CS rates.

Limitations

The outcome in our study was possibly influenced by the type of patient referrals, institutional protocols and the facilities available. This classification system had got few limitations as it did not allow the analysis of CS on maternal request and specific indications like placenta previa, pre-existing medical and surgical conditions, foetal distress which were the few common indications where CS was indicated. Indications of CS should be analysed separately in each groups along with Robson's classification.

CONCLUSION

The findings of the study indicate that group 5 women with previous CS and group 2 women with induced labour contributed maximum to overall CS rates. This suggests that the probability of CS increases greatly if the women had a prior surgical delivery. This highlights the need for policies to encourage vaginal birth after caesarean. TOLAC should be advised after proper counselling and consent. Judicious selection of women for induction, strict implementation of induction protocols to decrease the cases of failed inductions will also reduce the primary CS rates. Regular departmental audit and critical review should be done to monitor the indications of inductions and caesarean sections and try to reduce the primary CS rates which automatically reduce the repeat CS rates. We should designate a person in charge for proper organisation of data collection and to include all deliveries according to Robson's classification to avoid missing data and misclassification. It is advisable that all institutions can use the Robson's report table to analyse the population catered by them and to make institutional specific policies. This will allow comparing the data amongst the institutions between different regions and countries and can help in policymaking.

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