International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Jogia PD et al. Int J Reprod Contracept Obstet Gynecol. 2019 Feb;8(2):433-439
www.ijrcog.org

pISSN 2320-1770 | eISSN 2320-1789

DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20190264

Original Research Article

Analysis of caesarean sections according to modified Robson's ten group classification system at a tertiary care centre in Western India

Priyanka D. Jogia[1], Kaushik K. Lodhiya[2]*

[1]Department of Obstetrics and Gynecology, [2]Department of Community Medicine, GMERS Medical College and Hospital, Junagadh, Gujarat, India

Received: 26 November 2018
Accepted: 29 December 2018

***Correspondence:**
Dr. Kaushik K. Lodhiya,
E-mail: kaushiklodhiya@gmail.com

ABSTRACT

Background: The increasing trends for Caesarean section (CS) in India and worldwide have been a cause of concern. The aim is to compare and analyse CS rates across the globe, WHO recommends the Robson's ten group classification system (TGCS). This will help to target appropriate group of women for reduction of overall CS rates.
Methods: This was a retrospective study design using hospital records for women delivered in December 2017. Data was entered and analysed using excel 2007 and presented using modified Robson's ten group classification system.
Results: Out of total 650 women delivered during the study period, 184 (28.3%) delivered by CS. Group 1 and group 2 included a total of 49.53% women in the present study. The CS rates varied from 100% in group 5 (previous CS), group 7 (breech, multiparous) and group 9 (abnormal lie) to as low as 0.9% in group 3. The present study highlights that group 5 i.e. women with previous CS, contributed maximum (37%) to the overall surgical deliveries with group 2 being the second largest contributor (21%).
Conclusions: The findings of the study indicate that group 5-women with prior CS and group 2-women with induced labour contributed maximum to overall CS rates. TOLAC should be a routine and not optional. Simultaneously Judicious selection of women for induction, strict implementation of induction protocols to decrease the cases of failed inductions will also reduce primary CS. To monitor the CS rates and take appropriate actions it is recommended that Robson's TGCS be used continuously in all health institutions.

Keywords: Caesarean section, India, Induction, Maternal morbidity, Robson classification

INTRODUCTION

Lower segment Caesarean section (LSCS) is one of the most commonly performed obstetric surgeries for child birth. As per WHO CS rates of more than 10%-15% is unfair.[1] However the global trends for surgical deliveries have risen from 15% to 30% in the last few decades.[2] There is an alarming increase in CS rates in India from 2.5% of all deliveries in 1993 to 15.5% in 2015 with rates being over 30% in some states and private institutions.[3]

High rate of surgical deliveries is an important public health problem. Along with increasing the cost of health services, it leads to a significant risk to the health of the mother as well as neonates.[4-6] Hence there is a need to curb the unnecessary increase in surgical deliveries. But for this we need to identify which group of women are at high risk for surgical deliveries. For this we need to classify them into suitable categories. Furthermore, the classification system must be acceptable and comparable internationally.

The methods used previously for classifying mothers had non-uniform criteria's along with limitations of each system.[7,8] The ten-group classification system (TGCS) proposed by Robson, has successfully overcome the

limitations of other classification systems. Moreover, TGCS is universally accepted and results are internationally comparable. The TGCS uses the entire relevant patient characteristic to classify the patients into ten mutually exclusive and inclusive groups i.e. each and every patient will be classified into one and only one group.[9] Torloni MR et al in his systematic review identified Robsons TGCS as the most appropriate system for classification of surgical deliveries.[10] A modified Robsons classification was suggested for further in-depth analysis of surgical deliveries.[11]

Although a few of similar kind of studies are reported from around the globe, only a few of them are conducted in India.[12-14] Junagadh GMERS Medical College and Hospital is a tertiary care referral centre in Gujarat, India and conducts more than 7000 deliveries annually with a proportion of surgical deliveries exceeding 30%. The objective of the present study was to identify the proportion of surgical deliveries in mothers classified as per Robson's TGCS. This will help to project the group of women contributing maximum to the overall CS rates and thereby help the policy makers to optimise the rate of surgical deliveries.

METHODS

This was retrospective study conducted at GMERS Medical College and Hospital, Junagadh, Gujarat. Ethical clearance was obtained from Institutional Ethics committee.

Inclusion criteria

- All the women delivered during a period of one month from 1st December 2017 to 31st December 2018, irrespective of birth outcome were included in the study.

Exclusion criteria

- Incomplete record forms or case papers with inadequate details were excluded from the study.

Hospital delivery records were used for data collection. A customised data collection tool was used to collect the required information on parity, mode of previous deliveries, previous CS, gestational age, onset of labor, spontaneous or induced labor.

Statistical analysis

All the data was entered and analysed in the Microsoft excel 2007. The women were classified according to modified Robson's criteria. CS rates for individual groups, 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.

RESULTS

Table 1 describes the various groups of modified Robson's ten group classification system. It also describes the relative size of each group in terms of number of deliveries. A total of 650 deliveries occurred during the study period out of which 184 required caesarean section. The overall rate for surgical delivery in the present study was 28%.

Group 1 and 2 (nulliparous, singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour/ induced labour or caesarean section before labour) comprised almost half (50%) of the study population. Group 3 (multiparous, without previous caesarean section, singleton, cephalic, ≥37 weeks' gestation and in spontaneous labour) was the third largest with 16% of total obstetric population.

Women with previous CS, singleton term pregnancy (Group 5) comprised 10% of the total population. Group 4 included 6% women who were multiparous without a previous uterine scar, with singleton, cephalic term pregnancy, and induced or caesarean section before labour.

Amongst 34 (5%) women with breech presentation, 20 (3%) were nulliparous (group 6) and the remaining 14 (2%) were multiparous (group 7). Only six women (0.9%) had multiple pregnancies (Group 8) and an equal number of women had abnormal lies (Group 9). Group 10 comprised of 64 (9%) women with preterm singleton pregnancy with cephalic presentation.

All the deliveries in group 5 (previous caesarean section), group 7 (multiparous, single breech) and group 9 (transverse or oblique lie) were surgical deliveries. Relatively high surgical delivery rates were seen in group 6-nulliparous, single breech (75%), group 8-multiple pregnancies (66%), group 2-full term, nulliparous, singleton, cephalic (33%), the other groups in descending order of surgical deliveries were group 10 (23%), group 4 (18%) and group 1 (6%). Least surgical delivery rate was observed in group 3 (0.9%)-multiparous women without previous caesarean section, singleton, cephalic, ≥37 weeks' gestation and in spontaneous labour.

Table 2 describes the absolute and relative contribution of each group of Robson's classification to the overall CS rates. The overall rate of surgical delivery in the present study was 28.3%.

Group 5 (10%) and group 2 (6%) were the leading contributors to the overall rate of surgical delivery in relation to total number of deliveries. Rest all groups contributed to around 2% or less of surgical deliveries in relation to total deliveries. Group 5 (37%) and group 2 (21%) contributed maximum (60%) to the total surgical deliveries. Each of the remaining groups contributed to less than 10% of total surgical deliveries.

Table 1: Relative size of groups and caesarean rates according to modified Robson's classification.

Group No.	Modified Robson's ten-groups classification system	Relative size of each group		CS rate in each group	
		N	%	N	Group wise CS rates (%)
1	Nulliparous, singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour	204	31.38	14	6.86
2	Nulliparous, singleton, cephalic, ≥37 weeks' gestation, induced labour or caesarean section before labour	118	18.15	39	33.05
	Induced	102	15.69	23	22.55
	Caesarean section before labour	16	2.46	16	100.00
3	Multiparous (excluding previous caesarean section), singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour	106	16.31	1	0.94
4	Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, induced or caesarean section before labour	44	6.77	8	18.18
	Induced	42	6.46	6	14.29
	Caesarean section before labour	2	0.31	2	100.00
5	Previous caesarean section, singleton, cephalic, ≥37 weeks' gestation	68	10.46	68	100.00
	Spontaneous labour	25	3.85	25	100.00
	Induced labour	3	0.46	3	100.00
	Caesarean section before labour	40	6.15	40	100.00
6	All nulliparous with a single breech	20	3.08	15	75.00
	Spontaneous labour	8	1.23	3	37.50
	Induced labour	0	0.00	0	0.00
	Caesarean section before labour	12	1.85	12	100.00
7	All multiparous with a single breech (including previous caesarean section)	14	2.15	14	100.00
	Spontaneous labour	4	0.62	4	100.00
	Induced labour	1	0.15	1	100.00
	Caesarean section before labour	9	1.38	9	100.00
8	All multiple pregnancies (including previous caesarean section)	6	0.92	4	66.67
	A. Spontaneous labour	2	0.31	0	0.00
	B. Induced labour	1	0.15	1	100.00
	C. Caesarean section before labour	3	0.46	3	100.00
9	All women with a single pregnancy in transverse or oblique lie (including those with previous caesarean section)	6	0.92	6	100.00
	Spontaneous labour	3	0.46	3	100.00
	Induced labour	1	0.15	1	100.00
	Caesarean section before labour	2	0.31	2	100.00
10	All singleton, cephalic, <37 weeks' gestation pregnancies (including previous caesarean section)	64	9.85	15	23.44
	Spontaneous labour	45	6.92	5	11.11
	Induced labour	11	1.69	2	18.18
	Caesarean section before labour	8	1.23	8	100.00
	Total	650	100.00	184	28.31

The CS rates of individual groups in descending order are group 5, 7, 9, 6, 8, 2, 10, 4, 1 and 3. The decreasing ranking for surgical delivery in each group in relation to total deliveries is group 5, 2, 6, 10, 1, 7, 4, 9, 8 and 3. The decreasing ranking for surgical delivery in each group in relation to total surgical deliveries is group 5, 2, 6, 10, 7, 1, 4, 9, 8 and 3.

Table 2: Absolute and relative contribution of each group of Robson's classification to the overall CS rates.

Group No.	Robson's classification	Absolute contribution on the overall CS rate (%)[a]	Ranking for absolute contribution of groups to CS rates	Relative contribution on the overall CS rate (%)[b]	Ranking for relative contribution of groups to CS rates
1	Nulliparous, singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour	2.15	5	7.61	6
2	Nulliparous, singleton, cephalic, ≥37 weeks' gestation, induced labour or caesarean section before labour	6.00	2	21.20	2
3	Multiparous (excluding previous caesarean section), singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour	0.15	10	0.54	10
4	Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, induced or caesarean section before labour	1.23	7	4.35	7
5	Previous caesarean section, singleton, cephalic, ≥37 weeks' gestation	10.46	1	36.96	1
6	All nulliparous with a single breech	2.31	3	8.15	3
7	All multiparous with a single breech (including previous caesarean section)	2.15	6	7.61	5
8	All multiple pregnancies (including previous caesarean section)	0.62	9	2.17	9
9	All women with a single pregnancy in transverse or oblique lie (including those with previous caesarean section)	0.92	8	3.26	8
10	All singleton, cephalic, <37 weeks' gestation pregnancies (including previous caesarean section)	2.31	4	8.15	4
	Total	28.31		100.00	

DISCUSSION

Over the years there is a steady increase in trends of surgical delivery in India as well as across the globe. Surgical delivery being associated with increased morbidity and mortality of the mother and baby, there is a need to check this epidemic of surgical delivery. However earlier no standard classification system was available to identify the characteristics of women likely to undergo surgical delivery and thereby prevent it. Robson Ten Group Classification System for classifying the women undergoing CS is well accepted internationally and is used for comparison purpose. In order to interpret the TGCS, Robson suggested following guidelines based on his research and experience.[15] These guidelines are quoted below in quotation mark ("). The results of the present study are discussed in this context.

Groups 1 and 2

"Groups 1 and 2 usually account for 35-40% of all deliveries; Group 1 should be larger than Group 2 and a CS rate for Group 1 less than 10% is desirable" Group 1 and group 2 included a total of 49.53% women in the present study. Group 1 was 1.8 times larger than group 2 and the CS rate for group 1 was 6.8%.

Several studies have proved that it is the groups 1 and 2 that contributed most to the overall CS rates.[14,16,17] It has been proved that 98% variation in institutional CS rates can be attributed to group 1 and 2 only.[16] The contribution of group 1 and 2 to overall CS rate in the present study was 39.9% which was in agreement with the findings of Pereira MN et al 2016.[18]

Groups 3 and 4

"Groups 3 and 4 usually account for 30-40% of women; Group 3 should be larger than Group 4. The CS rate for Group 3 should be 2.5-3%. The CS rate in Group 4 should be below 20%." Group 3 and group 4 included a total of 23 % women in the present study. Group 3 was more than two times larger than group 4. The CS rates in group 3 and 4 were only 0.9% and 18.8% respectively. The CS rate in group 3 is small and is used as a quality check for data collection. If it is more than 3% probability of inaccurate data increases.

Group 5

"Group 5 should comprise no more than 10% of women. With good perinatal outcomes, a CS rate of 50-60% in Group 5 is excellent". The proportion of women in group 5 in the present study was slightly more (10.46%) than the suggested limit. All the women in group 5 were delivered by CS. This finding is in agreement with studies done by Kansara Vijay et al (98.3%,), Dhodapkar SB et al (89.6%) and Shirsath A et al (87.2%) where CS rates in group 5 were alarmingly high.[19-21]

"Groups 1, 2, and 5 usually account for two-thirds of all caesarean deliveries." In the present study group 1, 2 and 5 were responsible for 65.7% of all the CS.

Group 6 and 7

"Groups 6 and 7 should include 3-4% of all women, and Group 6 is usually twice the size of Group 7" The present study has 5.23% women in group 6 and group 7 combined. Group 6 was 1.5 times the size of group 7.

Group 8 and 9

"Group 8 should include 1.5-2% of women. Group 9 should comprise 0.2-0.6% of women with a CS rate of 100%." In the present study group 8 and 9 each comprised of 0.9% of the study population. All the women in group 9 were delivered by CS.

Group 10

"Group 10 includes approximately 5% of women. If the CS rate in Group 10 is 15-16% it suggests a high proportion of women with spontaneous onset of preterm labour." The size of group 10 in the present study was 9.8%, nearly two times the recommendation. The CS rate in group 10 was 23.4%, amongst which 53% were taken for CS before labour, 33% were in women with spontaneous labour and only 14% were induced.

Overall

"The total number of caesareans and deliveries should be the sum of the number of each event in Robson groups 1 to 10 combined." The results of the present study are in agreement with this observation.

The proportion of women in certain group varied slightly from that suggested by Robson due to relatively small sample size of the study and the type of health facility dealing with more of high-risk cases. Dhodapkar SB et al also had slightly different proportions in some of the groups due to similar reasons.[20] The overall CS rates in the present study was 28.3% which is higher than that recommended by WHO 15%.[1] However the rate suggested by WHO was for all deliveries across all institutions. This being a referral centre along with a tertiary care centre, the characteristics of women admitted are different which justifies the higher rate for surgical deliveries in the present study. This is also the reason for deviation from the suggested rates of CS for different groups by Robson with particular reference to group 5 and group 10 in the present study. Higher overall rates for surgical deliveries ranging from 30 to 40% were also observed by other studies in India as well as abroad.[22-24]

The present study highlights that group 5 i.e. women with previous CS, contributed maximum (37%) to the overall surgical deliveries. This finding is consistent with the studies of Dhodapkar SB et al (40%), Wanjari SA et al (32.8%), Shirsath A et al (54.5%) and Kansara V et al (46.1%).[19-21,25] The only option available to decrease the CS rate in group 5 is trial of labour after caesarean section (TOLAC). However, this depends on the judgement of the obstetrician, his risk-taking attitude along with required counselling and favourable response from the patient. Here the key is to reduce the overall size of group 5 by reducing the primary CS rates.

In the present study group 2 was the second largest (21%) contributor of surgical delivery and along with Group 5, was accountable for nearly 60% of total CS. This finding is in agreement with that of Samba A et al where groups 2, 4 and 5 contributed nearly half (47.5%) of the overall caesarean section rate.[26] Moreover, research also suggests that induction of labour in nulliparous women have increased the CS rates.[16,27] This suggests that women with induced labour had higher probability of surgical delivery as compared to women with spontaneous labour. Therefore, indications for induction of labour needs to strictly followed in order to reduce the burden of surgical interventions.

The study also highlights the CS rates amongst women with breech presentation, nulliparous (group 6) or multiparous (group 7), are 75% and 100% respectively. In study by Dhodapkar SB et al all the women of group 6

and 7 were delivered by CS.[20] Samba A et al reported 69 % CS rates for all breech presentations.[26] These findings indicate reluctance or fears on the part of surgeon for external cephalic version or assisted vaginal breech delivery. Teaching of skills for ECV and assisted breech delivery and their reinforcement will help to decrease the need for CS amongst women with breech presentation.

CONCLUSION

The findings of the study indicate that group 5-women with prior 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 a routine and not optional. Simultaneously Judicious selection of women for induction, strict implementation of induction protocols to decrease the cases of failed inductions will also reduce primary CS. Periodic trainings on ECV and assisted vaginal breech delivery would lead to reduction of CS rates in group 6 and 7. To monitor the CS rates and take appropriate actions it is recommended that Robson's TGCS be used continuously in all health institutions.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organization. Appropriate technology for birth. Lancet. 1985;2:436-7.
2. Health at a Glance 2011: OECD indicators. OECD Publishing; 2011, Availabe at: http://www.oecd.org/els/health-systems/49105858.pdf.
3. The alarming increase in caesarean births in India. Livemint, Epaper, Available at: http://www.livemint.com/Politics/z3S7GLR5mayCDE9QokRzsI/The-alarming-increase-in caesarean-births-in-India.html.
4. Mylonas I, Friese K. Indications for and risks of elective cesarean section. Dtsch Arztebl Int. 2015;112(29-30):489-95.
5. Souza JP, Gülmezoglu A, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, et al. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO Global Survey on Maternal and Perinatal Health. BMC Med. 2010;8:71.
6. Liu S, Liston RM, Joseph KS, Heaman M, Sauve R, Kramer MS, et al. Maternal mortality and severe morbidity associated with low-risk planned caesarean delivery versus planned vaginal delivery at term. CMAJ. 2007;176:455-60.
7. Robson MS, Scudamore IW, Walsh SM. Using the medical audit cycle to reduce cesarean section rates. Am J Obstet Gynecol. 1996;174:199-205.
8. Thomas J, Callwood A, Brocklehurst P, Walker J. The National Sentinel Caesarean Section Audit. BJOG. 2000;107:579-80.
9. Robson M. Classification of caesarean sections. Fetal Matern Med Rev. 2001;12:23-39.
10. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, et al. Classifications for cesarean section: a systematic review. PLoS One. 2011;6:e14566.
11. SOGC COMMITTEE OPINION. Classification of caesarean sections in Canada: the modified Robson criteria. J Obstet Gynaecol Can. 2012;34(10):976-9.
12. Perinatal Services BC. Examining cesarean delivery rates in British Columbia using the Robson Ten Classification. Part 1: Understanding the Ten Groups. Vancouver, BC; December 2011, Available at: http://www.perinatalservicesbc.ca/NR/rdonlyres/3CE464BF-3538-4A78-BA51-451987FDD2EF/0/SurveillanceSpecialReportRobsonTenClassification Dec2011. pdf.
13. Chong C, Su LL, Biswas A. Changing trends of caesarean section births by the Robson Ten Group Classification in a tertiary teaching hospital. Acta Obstet Gynecol Scand, 2012;91:1422-7.
14. Kelly S, Sprague A, Fell DB, Murphy P, Aelicks N, Guo Y, et al. Examining caesarean section rates in Canada using the Robson classification system. J Obstet Gynaecol Can. 2013;35:206-14.
15. Robson MS. Can we reduce the caesarean section rate? Best Pract Res Clin Obstet Gynaecol. 2001;15(1):179-94.
16. Brennan DJ, Robson MS, Murphy M, O'Herlihy C. Comparative analysis of international cesarean delivery rates using 10-group classification identifies significant variation in spontaneous labor. Am J Obstet Gynecol. 2009;201:308.e1-8.
17. Le Ray C, Blondel B, Prunet C, Khireddine I, Deneux-Tharaux C, Goffinet F. Stabilising the caesarean rate: which target population?. BJOG. 2015;122(5):690-9.
18. Pereira MN, Leal MC, Pereira AP, Domingues RM, Torres JA, Dias MA, et al. Use of Robson classification to assess cesarean section rate in Brazil: the role of source of payment for childbirth. The Author(s) Reproductive Health. 2016;13(Suppl 3):128.
19. Kansara V, Patel S, Aanand N, Muchhadia J, Kagathra B, Patel R. A recent way of evaluation of cesarean birth rate by Robson's 10-group system. J Med Pharmaceut Allied Sci. 2014;01:62-70.
20. Dhodapkar SB, Bhairavi S, Daniel M, Chauhan NS, Chauhan RC. Analysis of caesarean sections according to Robson's ten group classification system at a tertiary care teaching hospital in South India. Int J Reprod Contracept Obstet Gynecol. 2015;4:745-9.

21. Shirsath A, Risbud N. Analysis of cesarean section rate according to Robson's 10-group classification system at a tertiary care hospital. Int J Sci Res. 2014;3(1):401-2.
22. Patel RV, Gosalia EV, KJ, Vasa PB, Pandya VM. Indications and trends of caesarean birth delivery in the current practice scenario. Int J Reprod Contracept Obstet Gynecol. 2014;3:575-80.
23. Katke RD, Zarariya AN, Desai PV. LSCS audit in a tertiary care center in Mumbai: to study indications and risk factors in LSCS and its effect on early peri-natal morbidity and mortality rate. Int J Reprod Contracept Obstet Gynecol. 2014;3:963-8.
24. Abdel-Aleem H, Shaaban OM, Hassanin Al, Ibraheem AA. Analysis of cesarean delivery at Assiut University Hospital using the ten group classification system. Int J Gynaecol Obstet. 2013;123(2):119-23.
25. Wanjari SA. Rising caesarean section rate: a matter of concern? Int J Reprod Contracept Obstet Gynecol. 2014;3:728-31.
26. Samba A, Mumuni K. A review of caesarean sections using the ten-group classification system (Robson classification) in the Korle-Bu Teaching Hospital (KBTH), Accra, Ghana. Gynecol Obstet. 2016; 6:385.
27. Brennan DJ, Murphy M, Robson MS, O'Herlihy C. The singleton, cephalic, nulliparous woman after 36 weeks of gestation: contribution to overall cesarean delivery rates. Obstet Gynecol. 2011;117:273-9.

Cite this article as: Jogia PD, Lodhiya KK. Analysis of caesarean sections according to modified Robson's ten group classification system at a tertiary care centre in Western India. Int J Reprod Contracept Obstet Gynecol 2019;8:433-9.