Use of the Robson classification to assess cesarean section at a medical college hospital in Gujarat, India

Ashutosh Jogia[1], Krishna A Mehta[2]

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

A B S T R A C T

Background: The increasing trends for cesarean section (CS) is not only in India but also globally have been a cause of concern. With the aim of comparing and analyzing CS rates worldwide, the WHO suggests Robson's ten-group classification system (TGCS). **Aims and Objectives:** To find the group of women with High CS rate. Which will help policymakers to target that specific groups of women for the reduction of overall CS. **Materials and Methods:** This was a retrospective study design using hospital records for women delivered between December 1, 2020, and November 30, 2021. Data were entered and analyzed using Excel 2019 and presented in percentages after using Robson's TGCS. **Results:** Out of total 5514 women delivered during the study period, 2262 (41.02%) were delivered by CS. Group 1 and Group 2 included a total of 41.49% of women in the present study. The high CS rates were in Group 9 (abnormal lie) – 100%, Group 5 (previous CS) – 97.35%, and Group 6 (breech, nulliparous) – 77.47%. In all CS, the maximum contribution was done by Group 5 (37.36%) and Group 2 (28.47%). **Conclusions:** The result indicates that Group 5 women with previous CS and Group 2 women with induced labor contributed the maximum to overall CS rates. Trial of labor after CS should be used as a routine. The specific guideline should be followed about the time and cause for induction of labor to decrease the CS rate that occurs due to failed inductions. To monitor CS rate and take actions accordingly, Robson's TGCS should be used in all health facilities where delivery is done.

Key words: Cesarean section; India; Induction of labor; Previous Cesarean section; Robson's classification

INTRODUCTION

Lower segment cesarean section (LSCS) is the most common surgery in obstetrics. According to the WHO, cesarean section (CS) delivery should not exceed 10–15% of all deliveries.[1] However, the worldwide trends suggest that CS rate has risen from 20% to 28% within the past 20 years.[2] India is also facing the same problem as in 1993, CS rate was 2.5%, which rose to 15.5% in 2015. In some states and private institutes, it is over 30% also.[3]

A high rate of CS is a crucial public health problem. It not only increases the cost of health services but also results

in morbidities and mortalities of the mothers as well as neonates.[4,5]

Hence, it is important to stop the unnecessary CS deliveries. However to achieve this, we need to separate women who are at high risk from those who are at low risk. For this, we need to classify women into various groups by any universally acceptable and comparable classification system.

With the same point of view, many methods and classifications were suggested time to time but all of them had non-uniform criteria along with many limitations.[6,7] To overcome this problem, Robson had suggested the

Address for Correspondence:
Dr. Ashutosh Jogia, 705, Pila Patta, Adarshnagar Society, Sector - 24, Gandhinagar, Gujarat, India. **Mobile:** +91-9429300829.
E-mail: drajogia@gmail.com

ten-group classification system (TGCS). TGCS is became universally accepted and so by the time the results are internationally comparable. The TGCS classifies women into 10 totally inclusive and mutually exclusive categories based on their obstetric characteristics (parity, previous CS, gestational age, onset of labor, fetal presentation, and number of fetuses) without needing the indication for CS.[8] Torloni et al., in their two different systematic reviews, identified Robson's TGCS as the most appropriate system for classification of surgical deliveries.[9,10] A modified Robson's classification was also suggested afterward for further in-depth analysis of surgical deliveries.[11]

Although a couple of comparable studies are reported from around the world, only a few of them are conducted in India.[12-14] This study was done in a tertiary care hospital situated in Gujarat, India, which performs more than 7000 deliveries annually with a proportion of surgical deliveries exceeding 30%. This large proportion of CS is mainly because of being a referral hospital for complicated cases.

AIMS AND OBJECTIVES

The objective of this study was to identify the proportion of surgical deliveries in mothers classified as per Robson's TGCS, and find out the groups having the high CS rates. This will help the policymakers to optimize the policies for specific groups and decrease the rate of unnecessary CS which ultimately improves maternal and child health

MATERIALS AND METHODS

This was a retrospective study conducted at a tertiary care hospital in India. Ethical clearance was obtained from the Institutional Ethics Committee.

Sample size and inclusion criteria
During a period of 1 year between December 1, 2020, and November 30, 2021, a total of 5514 deliveries were conducted. All of them are included in the study so the sample size became 5514.

Exclusion criteria
Incomplete records or case papers with inadequate details were excluded from the study, as there is no incomplete record or case paper, no exclusion.

Study tool and data collection
Hospital delivery records and case papers were used for data collection. A pre-formed, semi-structured data collection tool was used to collect the required information as per modified Robson classification.

All the data were entered into the Microsoft Excel 2019 and women were classified according to modified Robson's criteria in 10 different groups as below:
- **Group 1:** Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labor
- **Group 2:** Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation who had labor induced or were delivered by CS before labor
- **Group 3:** Multiparous women without a previous CS, with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labor
- **Group 4:** Multiparous women without a previous CS, with a single cephalic pregnancy, ≥37 weeks gestation who had labor induced or were delivered by CS before labor
- **Group 5:** All multiparous women with at least one previous CS, with a single cephalic pregnancy, ≥37 weeks gestation
- **Group 6:** All nulliparous women with a single breech pregnancy
- **Group 7:** All multiparous women with a single breech pregnancy including women with previous CS(s)
- **Group 8:** All women with multiple pregnancies including women with previous CS(s)
- **Group 9:** All women with a single pregnancy with a transverse or oblique lie, including women with previous CS(s)
- **Group 10:** All women with a single cephalic pregnancy <37 weeks gestation, including women with previous CS(s).

Statistical analysis
Every group size, absolute CS rates in relation to total deliveries in each group, and relative CS rates in relation to total number of CS s were calculated and presented as percentage.

RESULTS

Chart 1 described the relative size of every group. Total population in Groups 1 and 2, which includes nulliparous, singleton, cephalic, ≥37 weeks' gestation, in spontaneous labor/induced labor, or CS before labor, was almost 41% followed by Group 3 which is almost 18%.

Group 5 includes women with previous CS, singleton term pregnancy comprised almost 15% and Group 4 comprised almost 9% of women who were multiparous without a previous uterine scar, with singleton, cephalic term pregnancy, and induced or CS before labor.

Total 4% in Groups 6 and 7 which are with Breach presentation, among them, nulliparous women (Group 6) are 3 times higher than multiparous women (Group 7). Only 1.07% of women had multiple pregnancies (Group 8) and only 0.38% of women had abnormal lies (Group 9). Size of Group 10, which includes preterm singleton pregnancy with cephalic presentation, was almost 10%.

Chart 2 shows the CS rate as compared to normal delivery in each group. All the women in Group 9 (transverse or oblique lie) were delivered by CS while in Group 5 (previous CS) 97.35% women and in Group 6 (nulliparous, breech) 77.47% women were delivered by CS. Almost 50% of women who were in either Group 2 (full term, nulliparous, singleton, and cephalic) or Group 7 (nulliparous, breech) were deliverd by CS. The other groups in descending order of CS rate were Group 8 (40.68%), Group 1 (31.75%), Group 10 (23.30%), and Group 4 (11.73%). Least surgical delivery rate 5.85% was observed in Group 3 women (multiparous women without previous CS, singleton, cephalic, ≥37 weeks gestation, and in spontaneous labor).

Table 1 shows the number of women delivered in each group of modified Robson's classification. It also showed the no. of CS in each group and relative CS rate as compared to overall CS. A total of 5514 women delivered and among them 2262 delivered by CS mean that a total of 41.02% of women are delivered by CS. Among them, the highest contributions are from Group 5 (37.36%) followed by Group 2 (28.47%) and Group 1 (13.93%). No any other group contributes more than 7% of total surgical delivery.

DISCUSSION

Along with classification, Robson also suggested some guidelines and key values, to interpret the classification, based on his research.[13] These guidelines and values are written below in italic, under quotation mark (""). The results of the present study are compared and 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 <10% is desirable."[13]

Here, in the present study, Group 1 and Group 2 included a total of 41.49% of women. This is similar to the suggested value. Here, Group 2 is larger than Group 1 and the CS rate is almost 31.75% in Group 1. These results are different from Robson's value. The reason for this difference is research institutes. As Robson's guideline is for all institutes, while the present study is done in a tertiary referral center. Most of the cases are referred from the lower center which were either high risk or found some difficulty in a normal delivery, so the number of CS is increased.
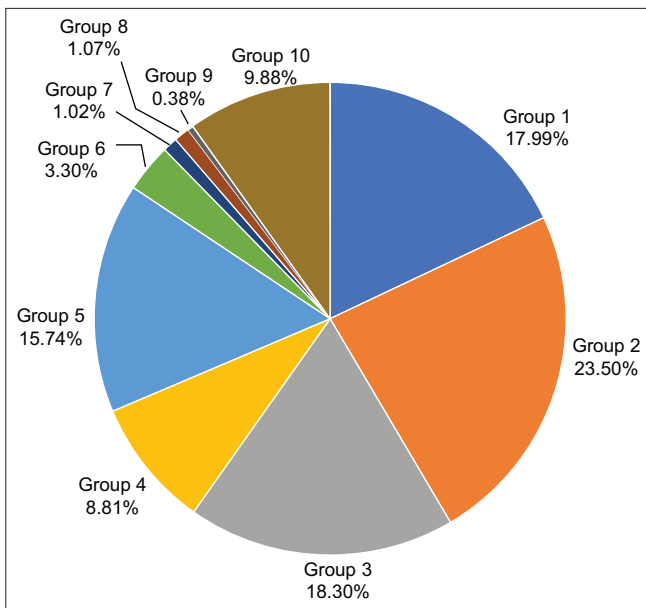

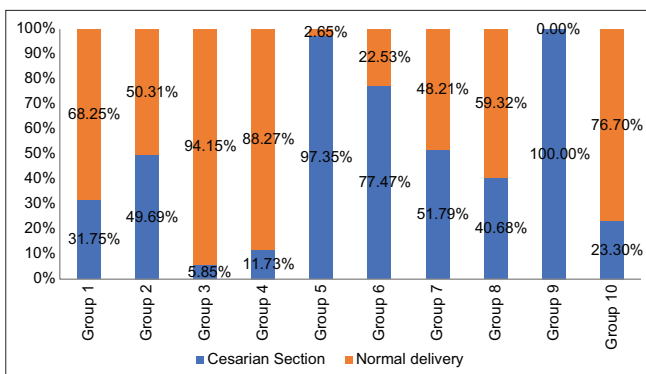**Chart 1:** Relative size of every group

Chart 2: Absolute cesarean section rates in relation to total deliveries in each group

Table 1: Relative CS rates in relation to total number of CS

Group No.	No. of CS	Relative contribution to overall CS rate (%)	Total delivery
1	315	13.93	992
2	644	28.47	1296
3	59	2.61	1009
4	57	2.52	486
5	845	37.36	868
6	141	6.23	182
7	29	1.28	56
8	24	1.06	59
9	21	0.93	21
10	127	5.61	545
Total	2262 (41.02%)	100	5514

CS: Cesarean section

Many other studies have also proved that it is Groups 1 and 2 that contributed most to the overall CS rates.[15-17] In this study, the relative contribution of Groups 1 and 2 in overall CS was 42.40% which was similar to the study done by Pereira 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%."[13]

Here, in this study, Group 3 and Group 4 included a total of 27.11% of women and Group 3 was more than double of Group 4. The CS rates in Group 3 were 5.85% and in Group 4 were 11.73%. These were similar to the value provided by Robson.

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."[13] In this study, Group 5 comprises to 15.74% of woman which was more than Robson's value. It is easily understandable because it is a known fact that lower centers usually do not take risk with previous CS patients and directly refers them to higher (tertiary care) centers and higher center doctors perform CS in the referred case without much thinking.

In this study, almost 97% of women in Group 5 were delivered by CS. This finding is in much higher than Robson's value but similar with other studies done by Kansara et al., (98.3%) and Dhodapkar et al., (89.6%). [19-20]

Groups 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."[13] In the present study, Group 6 has 3.30% and Group 7 has 1.02% of women. Group 6 was almost 3 times the size of Group 7. Thus, the results were similar and in accordance with Robson's value.

Groups 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%."[13] Same values are found in the present study, Groups 8 and 9 comprised 1.07% and 0.38% of the cases, respectively, and 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 labor."[13]

The size of group 10 in the present study was 9.88%, almost double than the recommendation, but not as high as suggestive of preterm labor. The proportion of women in certain groups varied from that suggested by Robson because as being a tertiary, referral hospital, deals with more number of high-risk cases. Dhodapkar et al., also had same results because of similar reasons.[20]

The overall CS rate in the present study was 41.02% which is higher than that recommended by the WHO 15%.[1] However, this 15% CS rate suggested by the WHO was for all deliveries across all types of institutions and this study institute was a tertiary referral center, so more number of high-risk patients and need to deliver by CS. Same higher overall rates for CS ranging from 30 to 40% were also observed by other studies done in tertiary centers in India as well as globally.[21-23]

The present study shows that Group 5 (women with previous CS) contributed maximum (37.36%) to the overall LSCS. This finding is consistent with the studies of Kansara et al., (46.1%), Dhodapkar et al., (40%), and Wanjari (32.8%).[19,20,24] To decrease the CS rate in Group 5, Trial of Labor After Cesarean Section (TOLAC) is the only available option. However, for TOLAC, no specific guidelines or objective values are available and so it entirely depends on the subjective decision of the obstetrician and his/her risk-taking attitude.

The present study also shows that the CS rates among Group 6 women (with breech presentation, nulliparous) are around 77%. In a study by Dhodapkar et al., all the women of Group 6 were delivered by CS.[20] Samba et al., reported 69% CS rates for all breech presentations.[25] These findings indicate the fear of obstetrician for external cephalic version (ECV) or assisted vaginal breech delivery. Encouraging and teaching skills for ECV and assisted breech delivery can easily decrease the number of CS in this group.

Limitations of the study

This finding of this study did not represent the whole nation and all types of institutes. As this study was done in a single tertiary care center so deals with a high CS rate as compared to the primary and secondary care centers.

CONCLUSIONS

Robson classification is very helpful to find out unnecessary CS, so to monitor the CS rate and take necessary actions, Robson's classification should be used in all health facilities.

Group 5 women (previous CS) and Group 2 women (nulliparous with induced labor) share the major portion of the overall CS rate. This highlights the need to create proper policies and guidelines about vaginal delivery after previous CS until the mother and baby are not in danger (for Group 5) and avoid unnecessary induction of labor (for Group 2).

CS rate is also greatly increased in breech presentation (Groups 6 and 7). Hence, specific training on ECV and assisted vaginal delivery should be organized periodically and also encourage obstetricians to perform ECV to reduce CS rate in Groups 7 and 8.

REFERENCES

1. World Health Organization. Appropriate technology for birth. Lancet. 1985;2:436-437.

   https://doi.org/10.1016/S0140-6736(85)92750-3

2. OECD. Health at a Glance 2019: OECD Indicators. OECD Publishing; 2019. Available from: https://www.oecd.org/els/health-systems/health-at-a-glance-19991312.htm [Last assessed on 2021 Jan 04].

3. The Alarming Increase in Caesarean Births in India. Livemint, Epaper. Available from: http://www.livemint.com/Politics/z3S7GLR5mayCDE9QokRzsI/The-alarming-increase-in caesarean- births-in-India.html [Last assessed on 2021 Jan 06].

4. Mylonas I and Friese K. Indications for and risks of elective cesarean section. Dtsch Arztebl Int. 2015;112(29-30):489-495.

   https://doi.org/10.3238/arztebl.2015.0489

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.

   https://doi.org/10.1186/1741-7015-8-71

6. Robson MS, Scudamore IW and Walsh SM. Using the medical audit cycle to reduce cesarean section rates. Am J Obstet Gynecol. 1996;174(1Pt 1):199-205.

   https://doi.org/10.1016/s0002-9378(96)70394-0

7. Thomas J, Callwood A, Brocklehurst P and Walker J. The national sentinel caesarean section audit. BJOG. 2000;107(5):579-580.

   https://doi.org/10.1111/j.1471-0528.2000.tb13296.x

8. Robson M. Classification of caesarean sections. Fetal Matern Med Rev. 2001;12(1):23-39.

   https://doi.org/10.1017/S0965539501000122

9. 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(1):e14566.

   https://doi.org/10.1371/journal.pone.0014566

10. Betrán AP, Vindevoghel N, Souza JP, Gülmezoglu AM and Torloni MR. A systematic review of the Robson classification for caesarean section: What works, doesn't work and how to improve it. PLoS One. 2014;9(6):e97769.

    https://doi.org/10.1371/journal.pone.0097769

11. SOGC COMMITTEE OPINION. Classification of caesarean sections in Canada: The modified Robson criteria. J Obstet Gynaecol Can. 2012;34(10):976-979.

    https://doi.org/10.1016/S1701-2163(16)35412-3

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 from: http://www.perinatalservicesbc.ca/NR/rdonlyres/3CE464BF-3538-4A78-BA51451987FDD2EF/0/SurveillanceSpecialReportRobsonTenClassificationDec2011pdf [Last assessed on 2021 Jan 08].

13. Chong C, Su LL and Biswas A. Changing trends of caesarean section births by the Robson Ten Group Classification in a tertiary teaching hospital. Acta Obstet Gynecol Scand. 2012;91:1422-1427.

    https://doi.org/10.1111/j.1600-0412.2012.01529.x

14. Robson MS. Can we reduce the caesarean section rate? Best Pract Res Clin Obstet Gynaecol. 2001;15(1):179-194.

    https://doi.org/10.1053/beog.2000.0156

15. Jogia PD and 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(2):433-439.

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

16. Brennan DJ, Robson MS, Murphy M and 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(3):308.e1-e8.

    https://doi.org/10.1016/j.ajog.2009.06.021

17. Ray CL, Blondel B, Prunet C, Khireddine I, Deneux-Tharaux C and Goffinet F. Stabilising the caesarean rate: Which target population? BJOG. 2015;122(5):690-699.

    https://doi.org/10.1111/1471-0528.13199

18. Nakamura-Pereira M, do Carmo Leal M, Esteves-Pereira AP, Domingues RM, Torres JA, Dias MA, Moreira ME. Use of Robson Classification to Assess Cesarean Section Rate in Brazil: The Role of Source of Payment for Childbirth. Reprod Health. 2016;13(Suppl 3):128.

    https://doi.org/10.1186/s12978-016-0228-7

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 Pharm Allied Sci. 2014;1:62-70. Available from: https://jmpas.com/abstract/211 [Last assessed on 2021 Jan 08].

20. Dhodapkar SB, Bhairavi S, Daniel M, Chauhan NS and 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;4:745-749.

    https://doi.org/10.18203/2320-1770.ijrcog20150085

21. Patel RV, Gosalia EV, Deliwala KJ, Vasa PB and Pandya VM. Indications and trends of caesarean birth delivery in the current practice scenario. Int J Reprod Contracept Obstet Gynecol. 2014;3(3):575-580.

    https://doi.org/10.5455/2320-1770.ijrcog20140927

22. Katke RD, Zarariya AN and Desai PV. LSCS Audit in a Tertiary Care Center in Mumbai: To Study Indications and Risk Factors in LSCS and its Effect on Early Perinatal Morbidity and Mortality Rate. Int J Reprod Contracept Obstet Gynecol. 2014;3(4):963-968.

    https://doi.org/10.5455/2320-1770.ijrcog20141217

23. Abdel-Aleem H, Shaaban OM, Hassanin AI and Ibraheem AA. Analysis of cesarean delivery at Assiut University Hospital using the ten group classification system. Int J Gynaecol Obstet.

2013;123(2):119-123.

https://doi.org/10.1016/j.ijgo.2013.05.011

24. Wanjari SA. Rising caesarean section rate: A matter of concern? Int J Reprod Contracept Obstet Gynecol. 2014;3(3):728-731.

https://doi.org/10.5455/2320-1770.ijrcog20140979

25. Samba A and 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.

https://doi.org/10.4172/2161-0932.1000385

Authors' Contributions:
AJ- Concept of the study, design of the study, review of literature, preparation of the manuscript, interpretation of results, and statistical analysis. **KM-** Concept of the study, collection of data, review of literature, and helped in the preparation of the manuscript.

Work attributed to:
GMERS Medical College, Junagadh, Gujarat, India.

ORCID ID:
Dr. Ashutosh Jogia- https://orcid.org/0000-0003-3922-7803
Dr. Krishna Mehta- https://orcid.org/0000-0002-2127-8330

Source of Support: None, **Conflicts of Interest:** None.