Analysis of caesarean sections using robson ten group classification system at the Jos University Teaching Hospital

Jane C Orjiani, Amaka N Ocheke, Kenechukwu C Michael

Abstract

Background: With Caesarean sections on the rise WHO proposes that healthcare facilities use the Robson's 10-group classification system to audit their Caesarean section rates (CSR). Hence, we sought to determine the relative contributions of each of the Robson's ten groups to the overall caesarean section rate and indications for caesarean sections in JUTH

Methods: A retrospective review of hospital records of women delivered in JUTH from January 2018 to December 2018 was performed and the Robson's ten-group classification system (RTGCS) was used to categorize women**.**

Results: There were 1295 deliveries over the study period of one year. The CS rate was 33.1%. According to the RTGCS, Group 5 which constituted multiparous women with previous CS with a single fetus in cephalic presentation at term (9.7%), Group 1 which constituted nulliparous women with a single fetus in cephalic presentation in spontaneous labour at term (5.7%), and Group 4 which constituted Multiparous women with a single fetus in cephalic presentation who had induction of labour or elective CS at term (3.9%) were substantial contributors to the overall CS rate. The main indications for CS were previous CS (28.7%), hypertensive disorders of pregnancy (14.0), fetal distress (11.0%), and cephalopelvic disproportion (10.3%).

Conclusion: Group 1 warrants the most attention, applying stricter criteria and due diligence in decision-making for primary CS may decrease the high CS rate and subsequently patients for Trial of labour after caesarean section (TOLAC). Proper patient selection for TOLAC will reduce the contribution from Group 5.

Keywords: Caesarean sections, Robson, Ten, Group, Classification, contributions

Highland Med Res J 2023;24(1):45-50

Introduction

Globally, the caesarean section(CS) rate is rising continuously, making caesarean section one of the most common surgical procedures.[1] One in five pregnant women undergo CS.[2] The caesarean section rate is often used as an indicator of the quality of health care.[3] Caesarean section refers to the delivery of the fetus, placenta, and membranes through an abdominal and uterine incision after the age of viability.[4] Novel practices and modifications in surgical skill and technique, infection prevention, antibiotic therapy and blood transfusion have minimized but not eliminated the risks associated with CS.[5]

This rising CS rate is a major public health concern causing worldwide debate and the drivers for these trends are not completely understood. To investigate the underlying mechanisms for the global rise in caesarean section rates, it is fundamental to identify which groups of women are at higher risk of undergoing caesarean section.[7] For this reason, a classification system that can monitor and compare caesarean section rates in a standardized, reliable, and consistent manner has been established.[8]

The International Federation of Gynecology and Obstetrics and WHO recommend the Robson's Ten Group Classification System (RTGCS) as a global standard for assessing, monitoring and comparing caesarean section rates between countries and institutions and healthcare facilities over time (WHO Systematic Review 2011). It consists of ten mutually exclusive patient categories.

By applying RTGCS, caesarean section births are registered in relation to the women and pregnancies' characteristics rather than medical indications.[8]

The Robson Classification System

- Class 1: Nullipara, equal to or greater than 37 weeks, single, cephalic, spontaneous labour.
  Class 2: Nullipara, equal to or greater than 37 weeks, single, cephalic, induced or CS before labour 2a induced labour, 2b CS before Labour
- Class 3: Multipara, equal to or greater than 37weeks, single cephalic, spontaneous labour (excludes previous CS)
- Class 4: Multipara, equal to or greater than 37weeks, single, cephalic, induced or CS before labour (excludes previous CS) 4a induced 4b CS before labour
- Class 5: Multipara, previous CS, equal to or greater than 37 weeks, single cephalic
- Class 6: Nullipara single, breech
- Class 7: Multipara, single, breech (including previous CS)
- Class 8: Multiple pregnancy (with or without previous CS)
- Class 9: Singleton pregnancy, oblique/ transverse lie

Department of Obstetrics and Gynaecology, Jos University Teaching Hospital, Plateau state, Nigeria

All correspondences to:
Jane C Orjiani,
Email: jayneanie@gmail.com

(with or without previous CS)
- Class 10: Single, cephalic less than 37 weeks (including previous CS)

This classification is simple, systematic reproducible, and prospective and gives excellent information regarding the delivering population.[8] Hence, this one-year observational descriptive study was conducted to find out the frequency and the significant contributors to caesarean section rates using RTGCS, and indications of CS in Jos University Teaching Hospital to analyze in depth and make possible recommendations.

Methods

This is a retrospective record review of labour ward records from January 2018- to December 2018. Details of all Caesarean sections performed during the study period were retrieved from the operation register. All the women were subsequently classified based on the RTGCS. Data was analyzed manually and results were expressed in pie charts, bar charts tables, and percentages.

Results

The total number of deliveries for the study period was 1295. Of these, 66.9% were vaginal deliveries and 33.1% were caesarean sections. The total number of preterm deliveries was 11.2% and term deliveries were 88.8%. In preterm deliveries, 31.0% were caesarean deliveries while 69.0% were vaginal deliveries. In term deliveries 33.4% were caesarean deliveries while 66.6% were vagina deliveries.

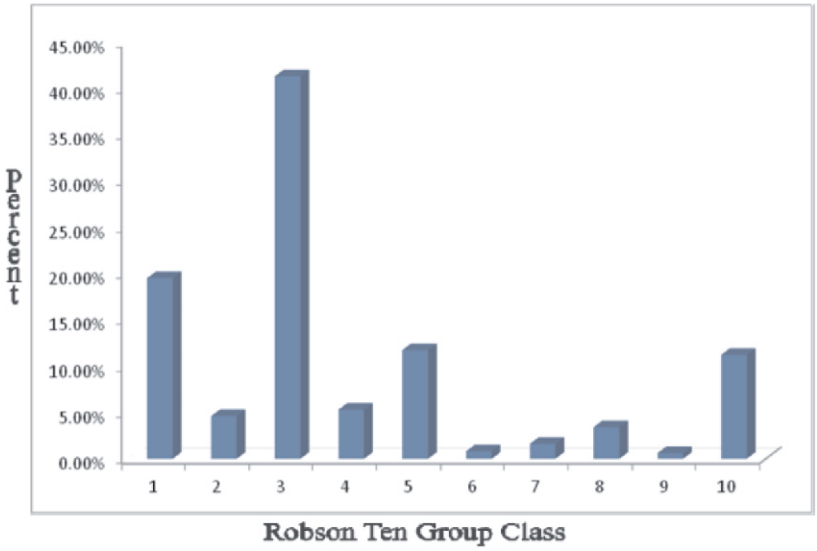

Figure 1: A Bar Chart showing the Distribution of all the Participants across the Robson's Groups

Table 1: Distribution of CS across Robson's ten groups

Classification group	Number of caesaerean sections(A)	Number of Deliveries(B)	Rate of each group (A/B×100)	Relative size in each group (B/Total deliveries×100)	Contribution of each group to overall CS rate (A/total deliveries ×100)
1	76	253	30.0%	19.5%	5.9%
2	48	59	81.4%	4.6%	3.7%
3	34	535	6.4%	41.3%	2.6%
4	50	69	72.5%	5.3%	3.9%
5	125	151	82.8%	11.7%	9.7%
6	9	10	90%	0.8%	0.7%
7	10	21	47.6%	1.6%	0.8%
8	24	44	54.5%	3.4%	1.9%
9	8	8	100%	0.6%	0.6%
10	45	145	31%	11.2%	3.5%
Total	429	1295		100%	33.1%

Table 2: Indications for CS

Indications	Number	Percentage
Failure to progress in labour due Cephalopelvic disproportion (FTP due to CPD)	47	11.0
Antepartum haemorrhage	34	7.9
Malpresentation	28	6.2
Previous CS	123	28.7
Multiple Pregnancy	25	5.8
Hypertensive disorders	60	14.0
Bad obstetric history	16	3.7
Fetal Macrosomia	10	2.3
Fetal Distress	44	10.3
Failed IOL	14	3.3
Previous Myomectomy	5	1.2
Others	23	5.4
Total	429	100

Table 3: Indications for CS within the Robson's groups in JUTH

Indications	Group1	Group2	Group3	Group4	Group5	Group6	Group7	Group8	Group9	Group10
FTP 2° CPD	23	13	5	5	0	0	0	0	0	0
APH	5	2	7	10	0	0	0	0	0	7
Malpresentation	0	0	0	0	0	9	10	0	9	0
Previous CS	0	0	0	0	123	0	0	0	0	0
Multiple Pregnancy	0	0	0	0	0	0	0	25	0	0
Hypertensive disorders	15	8	9	15	0	0	0	0	0	10
BOH	0	0	4	8	0	0	0	0	0	4
Macrosomia	6	0	3	0	0	0	0	0	0	0
Fetal distress	15	10	7	7	0	0	0	0	0	2
Failed IOL	0	9	0	5	0	0	0	0	0	0
Previous Myomectomy	50	0	0	0	0	0	0	0	0	0
Others	2	3	2	0	0	0	0	0	0	18
Total	74	48	37	50	123	9	10	25	9	40

FTP- failure to progress CPD- cephalopelvic disproportion APH- antepartum haemorrhage ** IOL induction of labour

Table 1 depicted distribution of women among different groups and caesarean section rates according to RTGCS. It can be appreciated that group 5, which consist of multiparous patients, with at least one previous section and singleton pregnancies at term was the largest contributor to the overall CS rate i.e., 9.7%, followed by group 1(5.9%) and 4(3.9%). Group 1 and 2 were nulliparous, term single cephalic, presentation in spontaneous labour and induced/caesarean section before labour, respectively whereas, group 3 and 4 consist of multiparous patients with similar characteristics relatively. Group 3(41.3%) and 1(19.5%) contributed to most of the obstetric population. Group 10 is also contributing significantly to caesarean section rate 3.5%. group 6-9 has high caesarean section rate because of obstetric conditions in that particular groups. The commonest indication for CS was hypertensive disorders of pregnancy, which were mainly Severe pre eclampsia and Eclampsia, fetal distress and FTP due to CPD. The highest indication was previous CS (Table 2)

Discussion

Cesarean section rate is an important indicator to access the essential obstetric care. The rates have been increasing across the globe and this increase varies from centre to centre. Many classification systems have been proposed earlier for classifying caesarean sections but two systematic reviews conducted by WHO identified RTGCS as the most appropriate to meet local and international needs.[8] It is therefore important to determine the indications for CS at the facility level which makes available data regarding the conduct and management of labour and delivery.

In this study, the caesarean section rate was 33.1% which is higher than the previous rates of 15.8% in 2005[9] and 19.6% in 2016[5] showing an increasing trend as observed globally but falls within the range of 9.9-34.5% observed in Nigeria by previous authors.[5] JUTH being a tertiary care centre receives a lot of referrals which explains the high rate. The WHO proposes that a population CS rate greater than 10% is not associated with a reduction in maternal and neonatal mortality rates.[6] The high CS rate reflects a facility rate, not the total population. JUTH being a tertiary institution is the biggest referral centre in Jos Plateau state and receives several referrals from peripheral centres that are not all well-equipped. When compared to other studies the CS rate was lower than the study conducted by Makanya et al in South Africa and Nakamura Pereira et al in India with CS rates of 42.4% and 51.9% respectively but higher when compared to studies by Mbaye et al in Senegal and Vogel et al in Japan with rates of 18.2% and 18.6% respectively.[10-13]

The main indications for Caesarean sections in this study were previous CS, hypertensive disorders, fetal distress, and failure to progress secondary to cephalopelvic disproportion (CPD). Previous CS was responsible for 28.7% of CS performed during the study period, this was similar to studies done by Gayathry et al and Elzahaf and Ajourd in Lybia.[14] [15] This is largely because women with two previous CS were not allowed Trial of labour after CS (TOLAC) and therefore booked for elective CS while women with one previous CS, there is no place for augmentation of labour. Hypertensive disorders accounted for 14% and it was the second most common indication for caesarean sections done over the study period, this was similar to results obtained by Jama et al.[16] This was mostly women with eclampsia with unfavourable cervix and severe preeclampsia with severe IUGR. This was followed closely by fetal distress (10.3%) as an indication for CS, this finding was similar to the findings by Arpita et al and Isah AD et al in Abuja.[17] [18] This is majorly due to the method of diagnosis of fetal distress. In our facility electronic fetal monitoring is used. Randomized controlled trials have demonstrated that electronic fetal monitoring results in higher caesarean delivery rates without improving neonatal outcome.[19] According to the World Health Organization (WHO), the fetal heart rate should be monitored by intermittent auscultation during the first stage of labour every 15 minutes and every 5 minutes in the second stage of labour.[20] The Electonic fetal monitoring (EFM) should be used in carefully selected patients.[21] However, due to the risk profile of the patients managed at this centre, the majority of patients have electronic fetal monitoring before labour and occasionally during labour. Improving fetal monitoring during labour may potentially reduce the cesarean delivery rate.

In this study failure to progress in labour was responsible for 11% of all caesarean sections performed in the study period, this indication was commonly seen in nulliparous women. Failure to progress and fetal distress were the commonest indications for primary CS. These indications could be targeted for the reduction of caesarean section rates. Use of partogram to monitor labour, skilled vagina examination, judicious use of oxytocics, and the presence of a trained labour companion and training of traditional birth attendants on the early referral as most referred cases come late.[22] The Presence of a labour companion shortens the duration of labour and the likelihood of emergency CS.[23] In our facility companions are allowed but most are not trained and not aware of their responsibilities therefore training of labour companions is advocated which will subsequently lead to a reduction in CS rate.

In this study, the Robson Ten Group Classification System was used to highlight the particular subgroups of women who make the most significant contributions to the cesarean section rate within the study setting. The high cesarean section rate in the institution is attributed to the women with previous cesarean section, single, cephalic, >37 weeks i.e., group 5 with 9.7% and nulliparous, single, cephalic, >37 weeks in spontaneous labour i.e., group 1 with 5.9% and multiparous single, cephalic >37 weeks, induced or cesarean section before labour i.e., group 4 with 3.9% and group 2 i.e nulliparous women with single, cephalic fetus at δ 37 weeks, induced or caesarean section before labour contributing 3.7%. Group 10 is (single, cephalic, including previous CS with gestational age < 36 weeks) also responsible for a significant amount of cesarean sections performed in this population (3.5%). Groups 5,1 and 4 contributed over 50% of the total CS rate. In most studies, group 2 replaces group 4 in the ranking. This demonstrates the significance of Robson's criteria where different institutions would have to develop different strategies to reduce CS rates.

Group five was the major contributor to the caesarean section rate in our facility, which is in line with findings in Kenya, Ethiopia, and Australia and a significant contributor in most studies across the globe.[24] [25] As a protocol in our facility, all women with one previous lower segment CS are allowed a trial of labour with early recourse to CS after proper patient selection and counselling on the risks and benefits associated with it. The major indication for CS in this group was poor progress in labour in women with one previous CS, and as practiced in this facility labour is not augmented in a scared uterus and two previous CS makes the woman a candidate for repeat CS which was the major indication for elective CS in a study by Anyaka et al.[5] The CS rate in this group can also be viewed from the point of the

obstetricians risk taking attitude, and in cases of unfavourable outcomes, its usually a discouraging event for the obstetrician who subsequently will tend to intervene earlier.[26] Trial of labour after CS (TOLAC) rate has decreased over the years because of fear of litigation.[25]

In this study nulliparous women contributed significantly to the obstetric population, as seen in most studies, group 1 was the second highest contributor to the overall caesarean section rate and Group 2 came fourth after Group 4 as a significant contributor to the CS rate, this was similar to the study by Samba and Mumuni.[26] Group 1 was 5.9% and Group 2 was 3.5% making a total of 9.6% to the overall CS rate 33.1%. The main indications for CS in this group were failure to progress, fetal distress, failed induction of labour and eclampsia with an unfavourable cervix. Groups 1 and 2 as primary CS groups are the most important in any obstetric population as they have varied outcomes in labour and its management.[17] Appropriate diagnosis and management of the first and second stages of labour is key in the reduction of CS in this group. Fetal distress, failure to progress and failed induction of labour were seen as the main indications in these groups. Training on the proper use of the partogram and interpretation of fetal cardiotocograph tracing has an important role to play in the reduction of CS. Electronic fetal monitoring which is associated with high CS rate[27] plays a key role in decision making for CS.

More importantly, labour should be individualized, with good monitoring, if both mother and baby are fine, there is no need to set a time limit in a tertiary facility.[17] A large study on singleton term pregnancies in spontaneous labour concluded that active labour with cervical os dilatation of 0.5-1cm per hour only begins after 6cm cervical dilatation and it may take a longer time to get to 6cm,women may be having CS when they are yet to get to the active phase.[25] Studies have shown that a reduction in the induction of labour in group 2 will reduce the CS rate.[17]

In this study group 3 was the largest of the obstetric population contributing 2.6% of the total CS rate of 33.1%. This is a low-risk group, the main indication of CS was antepartum haemorrhage and hypertensive disorders. Group 4 is another low-risk group and the third-highest contributor to the overall CS rate. The main indication here was hypertensive disorders, fetal distress, bad obstetric history and antepartum haemorrhage. Proper patient selection for induction of labour and accurate diagnosis of fetal distress will reduce CS in this group.

Groups 6,7,8 and 9 had lesser representation on the overall CS rate, their contributions 0.7%, 0.8%, 1.9% and 0.6% respectively, making a total of 4% but a high CS rate in their groups with group 9 having a 100% caesarean section rate. These three groups mainly represented malpresentation and group 8 represented Twin gestation. This could be reduced by encouraging external cephalic versions and stabilizing inductions. Also, breech delivery in multiparous women should be routinely performed where there are no contraindications to vagina delivery. Women with twin gestation opting for caesarean sections could be encouraged to have vaginal delivery where there are no contraindications as some of the contributory indications was precious baby.

Group 10 was the fifth largest contributor to CS rate 3.5%. This was similar to a study by Zimmo et al.[2] which was similar to what was obtained in other low income countries.[28]

The limitation of the study is that it was retrospective with the challenges associated with such studies. However, the study gives a picture of the landscape of caesarean section in JUTH and forms a baseline for interventions and further studies.

Conclusion

From this RTGCS of Caesarean sections in JUTH, groups 5, 1 and 4 were the highest contributors to the CS rate. This can be reduced by appropriately monitoring labour and properly diagnosing fetal distress in patients in group 1, this will help reduce the primary CS rate and for women in group 5, TOLAC should be encouraged.

References

1. Tura AK, Pijpers O, de Man M, Cleveringa M, Koopmans I, Gure T, Stekelenburg J.Analysis of caesarean sections using Robson 10 group classification system in a University hospital in eastern Ethiopia a cross sectional study. BMJ. 2018;8(4):1-8
2. Zimmo MW, Laine K, Hassan S, Bottcher B, Fosse E, Ali-Masri H *et al* Caesarean section in Palestine using the Robson Ten Group classification system: a population based cohort study. BMJ Open. 2018;8(10):1-8
3. Bragg F, Cromwell DA, Edozien LC. Variation in rates of caesarean section among English NHS trusts after accounting for maternal and clinical risk: cross sectional study. BMJ. 2010;341(7777):818
4. Incerpi MH. Operative delivery in Decherney AH, Nathan L, Leufer N, Roman AS (Eds) Current Diagnosis and Treatment Obstetrics and Gynaecology 11th edition, McGrawHill Medical, 2013; 334-348.
5. Anyaka C, Ocheke A, Shambe S, Egbodo C, Pam V, Karshima J, Daru P. Trends in Elective Caesarean Section at the Jos University Teaching Hospital, Jos Nigeria. Science Journal of Clinical Medicine. 2016; 5(6): 51-54.

6. Hinshaw K, Arulkumaran S. Malpresentation, Malposition, Cephalopelvic disproportion and Obstetric Procedures in Edmonds D.K, Lees C, Bourne T (Eds) Dewhurst's Textbook of Obstetrics and Gynaecology 9th Edition, Wiley Blackwell, 2018; 354-371.
7. Amita R, Sumy J. Analysis of Caesaerean Section rates according to Robson's ten group classification system and evaluating indications within the groups. International Journal of Reproduction, Contraception, Obstetrics and Gynaecology. 2017;6(2):447-457.
8. World Health Organization. Robson Classification Implementation Manual. Geneva. Journal of Chemical Information and Modeling.2019;53(9): 1689-1699
9. Mutihir JT, Daru PH, Ujah IAO. Elective Caesarean sections at the Jos University Teaching Hospital, Tropical Journal of Obstetrics and Gynaecology. 2005;22(1):39-41.
10. Makhanya V, Govender L, Moodley J. Utility of the Robson ten Group classification system to determine the appropriateness of caesarean section at a rural regional hospital in Kwazulu-Natal, South Africa. S Afr Med J. 2015;105(4):292-5
11. Nakamura-Pereira M, Maria do Carmo L, Esteves-Pereira AP, Domingues RS, Torres JA, Moreira ME et al. Use of Robson classification to access caesarean section rate in Brazil: the role of source payment for childbirth. Reproductive Health. 2016;13(3):246-256
12. Mbaye M, Gueye M, Gueye MDN, Niang NKS, Moreau JC. Analysis of caesarean section rates according to Robson classification in an urban health centre in Senegal. Int J Reprod Contracept Obstet Gynaecol.2015;4(4):1100-1102
13. Vogel JP, Betrán AP, Vindevoghel N, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Glob Health. 2015;3(5):e260-70. doi: 10.1016/S2214-109X(15) 70094-X.
14. Gayathry D, Guthi VR, Bele S, Vivekannada A. A study of maternal morbidity associated with caesarean delivery in tertiary care hospital. Int J Community Med Public Health 2017;4(5):1542-7.
15. Elzahaf RA, Ajroud S. Prevalence and indication of caesarean section in Al-wahda Hospital Derna, Lybia: A retrospective study. Libyan J Med Sci. 2018;2(2):68-72
16. Jawa A, Garg S, Tater A, Sharma U. Indications and rates of lower segment Caesarean section at a tertiary care hospital- an analytical study. Int J Reprod contracept obstet Gynaecol. 2016;5(10): 3466-9.
17. Pamar D, Qureshi ZP, Lubano K, et al. Use of Robson Classification to compare caesarean sections patterns at the Kenyata National Hospital after and before free maternity services in Kenya. Journal of Obstetrics and Gynaecology of Eastern and Central Africa. 2018: 30(2):46-53
18. Tanaka K, Mahomed K. The Ten-Group Robson Classification: A Single Centre Approach Identifying Strategies to Optimise Caesarean Section Rates. Obstet Gynecol Int. 2017;2017: 5648938. doi: 10.1155/2017/5648938.
19. 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 (Sunnyvale). 2016;6(385):2161-0932
20. Kacerauskiene J, Barcaite E, Railaite D, et al. Using the 10-group classification to reduce the caesarean section rate. European Journal of Obstetrics and Gynaecology and Reproductive Biology. 2016;206(2):128-139
21. Kazmi T, Saisema SV, Khan S. Analysis of Caesarean section rate- According to Robson 10 group classification, Oman Medical Journal. 2012;27(5):415-417
22. McCusker J, Harris DR, Hosmer DW Jr. Association of electronic fetal monitoring during labor with cesarean section rate and with neonatal morbidity and mortality. Am J Public Health. 1988;78(9):1170-4. doi: 10.2105/ajph.78.9.1170. PMID: 3407813; PMCID: PMC1349387.
23. Ayres-de-Campos D, Spong CY, Chandraharan E; FIGO Intrapartum Fetal Monitoring Expert Consensus Panel. FIGO consensus guidelines on intrapartum fetal monitoring: Cardiotocography. Int J Gynaecol Obstet. 2015;131(1):13-24. doi: 10.1016/j.ijgo.2015.06.020. PMID: 26433401.
24. Ikechebelu JI, Udigwe GO. Accuracy of diagnosis of Fetal Distress. International Journal of Medicine and Health Development. 2004; 9(1):12-13
25. Ajah LO, Ibekwe PC, Onu FA. Evaluation of Clinical Diagnosis of Fetal Distress and Perinatal Outcome in a Low Resource Nigerian Setting. J Clin Diagn Res. 2016 Apr;10(4):QC08-11. doi: 10.7860/JCDR/2016/17274.7687.
26. Isah AD, Adewole N, Zaman J. A five-year survey of caesarean delivery at Nigerian tertiary hospital. Trop J Obstet Gynaecol. 2018;35(1):14-7.
27. Reddy YA, Dalal A, Khurshed R. Robson Ten Group Classification System for Analysis of Caesarean sections in an Indian Hospital. Research Journal of Obstetrics and Gynaecology. 2018;11(1):1-8