Original Article

J Nepal Health Res Counc 2021 Jan-Mar;19(50): 91-6

DOI: https://doi.org/10.33314/jnhrc.v19i1.2694

Robsons Ten Group Classification of Cesarean Section at a Tertiary Center in Nepal

Gehanath Baral,[1] Alish Shrestha, Arati Sah,[1] Aswani Kumar Gupta[1]

[1]Paropakar Maternity and Women's Hospital, Thapathali, Kathmandu, Nepal.

ABSTRACT

Background: Increasing trend in Ceasarean birth is the issue of both demand and supply side. One of the recommended tools to characterize every pregnancy admitted for childbirth is Robson ten-group classification system that may evaluate obstetric practice. The aim of the study was to assess the cesarean section pattern based on Robson's classification in a central referral hospital.

Methods: A retrospective census of childbirths at Paropakar Maternity and Women's Hospital in Kathmandu performed from September 2018 to February 2019 based on obstetric record. Robson ten-group classification system was the research tool to collect data and Robson Classification Report Table was used to evaluate the data.

Results: There were 10500 births with 34% (32-35%) overall cesarean section rate. Excluding spontaneous and induced labor the supposedly total prelabor CS is 14.5%. Group 1+2+3 size is 81% and 21% CS; 5+10 had 11.3% and 23.3% respectively. Prelabor CS (2b+4b) is 3.54% and additional 11% from malpresentation and preterm. Group CS rate from Class 5 onwards, and ratio of 1 and 2 are as recommended by Robson; 67% of CS were not picked up by Robson class due to indications evolved as the labor progresses and the attributes not pre-classified.

Conclusions: The assessed quality of data and the type of obstetric population by Robson reference values prove this study as a representative research. But the indications of cesarean sections can be predicted for only one-third of pregnancy attributes classified by Robson class. To supplement this tool to reduce rising cesarean birth requires audit of indications at decision making level.

Keywords: Cesarean section; indication; prediction; robson classification

INTRODUCTION

Obstetric proficiency, competency and supporting facility might address the issue of international public health concern on high cesarean birth.[1] World Health Organization (WHO) has also advised that cesarean Section (CS) rates should be between 10-15% and beyond this level there is no additional reduction in maternal and neonatal mortality and morbidity.[2] The lack of standardized internationally accepted classification to monitor and compare CS rates is a factor preventing the better understanding of this rise and its underlying causes.[2-4] Robson Ten-Group Classification System characterizes the pregnancies that has been advised by WHO to adopt for the better understanding of rising trend of CS.[2,5] A representative research is required in high load service delivery center to evaluate this tool and to look for improving care strategy. The current study site is a public hospital where all obstetric services are free of cost to the patients and annual delivery is 20-22 thousands annually.

METHODS

It was a retrospective census of all deliveries at Paropakar Maternity and Women's Hospital in Kathmandu for six months from September 2018 to February 2019. Obstetric variables studied were parity (nullipara or multipara), previous CS (yes or no), onset of labor (spontaneous, induced or pre-labor CS), number of fetuses (single or multiple), gestational age (preterm or term or more), and fetal lie and presentation (cephalic, breech or transverse lie). Parity was counted as the delivery of fetus weighing ≥ 500 g or ≥ 22 weeks, alive or dead, with or without malformations, by any route. These variables were taken from the Robson ten-group classification system that classifies pregnant women in to 10 categories as follow:[3,6,7]

1. Nulliparous, singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour
2. Nulliparous, singleton, cephalic, ≥37 weeks' gestation

Correspondence: Dr Gehanath Baral, Paropakar Maternity and Women's Hospital, Thapathali, Kathmandu, Nepal, Email: gehanath@gmail.com, Phone: +9779841228829.

2a. Induced labour

2b. Caesarean section before labour

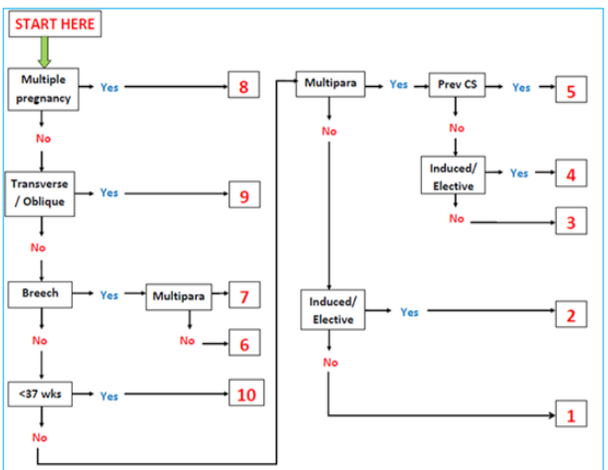
3. Multiparous (excluding previous caesarean section), singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour
4. Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation

4a. Induced labour

4b. Caesarean section before labour

5. Previous caesarean section, singleton, cephalic, ≥37 weeks' gestation
6. All nulliparous with a single breech
7. All multiparous with a single breech (including previous caesarean section)
8. All multiple pregnancies (including previous caesarean section)
9. All women with a single pregnancy in transverse or oblique lie (including those with previous caesarean section)
10. All singleton, cephalic, <37 weeks' gestation pregnancies (including previous caesarean section)

Data collected according to the Flow chart for the classification of women in the Robson Classification in ten groups of pregnancies from the obstetric record maintained at operation theater and labor wards. Robson Classification Report Table was used to evaluate the data tabulated by 10 Robson group in row and 7 columns of outcome indicators (Figure-1).



1	2	3	4	5	6	7
Group	CS	Total	Group size, %	Group CS rate, %	Absolute group contribution to CS rate, %	Relative contribution of group to overall CS rate, %
1-10						

Figure 1. Flow chart for the classification of women in the Robson Classification (Boxed number value indicates Robson Group) and Report Table.[6]

RESULTS

There were 10500 deliveries in six months i.e. 52-66 deliveries per day with 34% (3557 cesarean vs 6943 vaginal deliveries) Cesarean Section rate i.e. 18-22 CS per day. Delivery pattern is consistent ranging from 32% to 35% per month during the study period (Figure 2).

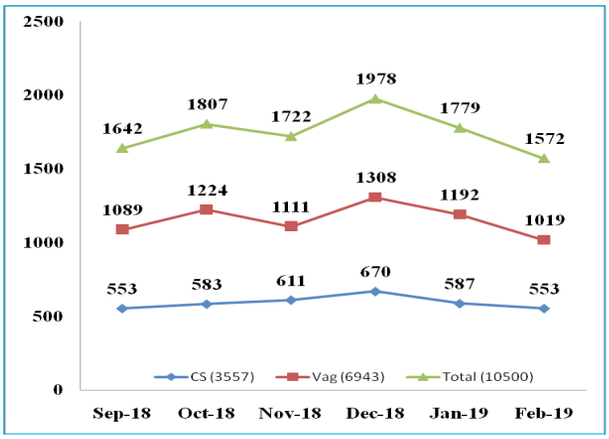


Figure 2. Frequency distribution of mode of delivery by months.

32.6% (1947/5968) of nullipara singleton term pregnancies (group 1 and 2) had CS whereas it was 15.6% (457/2936) in multipara without past CS (group 3 and 4); 27% (2404/8904) underwent CS in first four groups; 36.8% (630/1711) of induced cases had CS (group 2a and 4a), and 98.6% (8/592) had repeat CS (group 5).

Primary CS excluding multiple pregnancy, malpresentation and preterm (group 1 to 4) was 27% (2404/8904) whereas 50% (408/817) of cases from group 7, 8, 9 and 10 had cesarean delivery in whom the previous mode of delivery was not the classifying factor.

Nullipara singleton term pregnancies anticipated for vaginal delivery either spontaneous (RGTC-1) or induced (RGTC-2a) labor had 29.5% (1685/5706) CS rate. Likewise multipara singleton term pregnancies without previous CS anticipated for vaginal delivery either spontaneous (RGTC-3) or induced (RGTC-4a) labor had 12.3% (347/2826) CS rate. Combined CS rate for multipara (RGTC-3+4a+4b) is 15.6% (457/2936). Excluding spontaneous and induced labor the supposedly total prelabor CS is 14.5%. Prelabor CS (RGTC-2b+4b) at term without malpresentation and previous CS is 3.54% of total deliveries; and additional 11% from malpresentation and preterm. Group CS rate from Class 5 onwards, and proportion of group 1 and 2 are as recommended by Robson.

Nullipara or multipara breech presentation without previous CS at term (class-6 and 7) had 84.4% (238/282) CS rate (Figure 3).

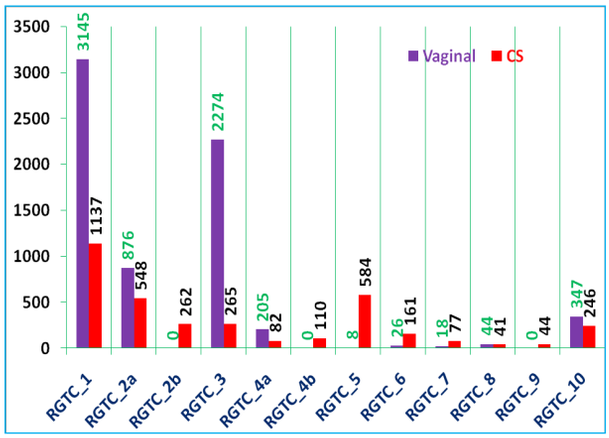


Figure 3. Mode of delivery by Robson Class (N=10500).

Induction of labor without previous CS had 38% CS rate in nullipara (group 2a) and 29% in multipara (group 4a).

All singleton cephalic pregnancies at term without previous CS (class-1-4) had CS rate of 27% (2404/8904); and 67% of total CS performed during study period were due to fetal distress, CPD, oligohydramnios, APH, pre-eclampsia-eclampsia, obstructed labor, BOH, cord prolapsed etc. Fetal distress only comprised of 42% for CS. CS rate for nullipara singleton cephalic preterm is 41.5% (246/593) (Figure-4).

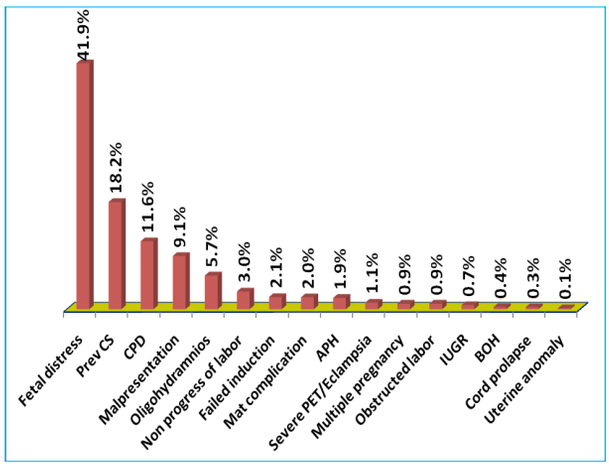


Figure 4. Indications of Cesarean Section.

Singleton pregnancy at term with previous CS without malpresentation (RGTC-5) had 98.65% CS rate. The group size and the group contribution for CS is 5.5%. Group 5 (prev CS)+10 (preterm) constitutes 11.3% and 23.3% CS rate. Size of group-9 is 0.42% (Table-1). Group size of Class-1,2 and 3 is 81%, absolute group contribution to CS is 21% and relative contribution to CS is 62%.

Table 1. Robson Classification Report Table.

1	2	3	4	5	6	7
Group	CS	Total	Group size, % (A)	Group CS rate, % (B)	Absolute group contribution to CS rate, % (C)	Relative contribution of group to overall CS rate, % (D)
1	1137	4282	40.78	26.55	10.83	31.97
2	810	1686	16.06	48.04	7.71	22.77
3	265	2539	24.18	10.44	2.52	7.45
4	192	397	3.78	48.36	1.83	5.40
5	584	592	5.64	98.65	5.56	16.42
6	161	187	1.78	86.10	1.53	4.53
7	77	95	0.90	81.05	0.73	2.16
8	41	85	0.81	48.24	0.39	1.15
9	44	44	0.42	100.00	0.42	1.24
10	246	593	5.65	41.48	2.34	6.92
Total	3557	10500	100	33.88	33.88	100

A. *Group size (%) = n of women in the group / total N women delivered in the hospital x 100*
B. *Group CS rate (%) = n of CS in the group / total N of women in the group x 100*
C. *Absolute contribution (%) = n of CS in the group / total N of women delivered in the hospital x 100*
D. *Relative contribution (%) = n of CS in the group / total N of CS in the hospital x 100*

Quality of data assessed by three variables and the type of obstetric characteristics of the population assessed by nine variables are in the line with the values as recommended by the Robson references. Breech group size is small (2.68%) and nullipara to multipara ratio (1.97:1) is also at acceptable level but the group CS rate is very high (over 80%) (Table 1 and 2).

Table 2. Assessment of quality of data and type of population by using the Robson Classification Report Table.

		Steps of assessment	Location in Table 2	Reference value of Robson[6-8]	Values obtained
Quality of data	1	Total numbers of delivery and CS	Last lines of Column 2 & 3	-	3557 CS out of 10500
	2	Size of Group 9 (*Singletons in transverse or oblique lie)*	Column 4	<1%	0.42%
	3	CS rate of Group 9	Column 5	100%	100%
Type of population	1	Size of Groups 1 + Group 2 *(Nulliparous women ≥37 weeks gestation singleton cephalic)*	Column 4	35-42%	56.84%
	2	Size of Groups 3 + 4 (*Multiparous women ≥37 weeks gestation singleton cephalic, without previous CS)*	Column 4	30%	27.96%
	3	Size of Group 5 (*Multiparous women ≥37 weeks gestation singleton cephalic with previous CS)*	Column 4	<10%	5.64%
	4	Size of Groups 6 + 7 (*Breeches in nulliparous & multiparous women)*	Column 4	3-4%	2.68%
	5	Size of Groups 8 *(Multiples)*	Column 4	1.5-2%	0.81%
	6	Size of Groups 10 (*Preterm cephalic singletons)*	Column 4	4.2%	5.65%
	7	Ratio of the size of Group 1 vs Group 2 *(Nulliparaterm cephalic singletons spontaneous labour/ Nulliparaterm cephalic singletons Induced or pre-labour CS)*	Size of Group 1 ÷ size of Group 2, Column 4	≥2:1	2.54:1
	8	Ratio of the size of Group 3 vs Group 4. *(Multipara without previous CS, term cephalic singletons spontaneous labour/ Multipara without previous CS, term cephalic singletons induced or pre-labour CS)*	Size of Group 3 ÷ size of Group 4, Column 4	≥2:1	6.4:1
	9	Ratio of the size of Group 6 vs Group 7. *(Nulliparabreech /Multipara breech)*	Size of Group 6 ÷ size of Group 7, Column 4	2:1	1.97:1

DISCUSSION

This study evaluates the maximum number of obstetric cases by Robson class in a single center within six months of period. This high load site is the non-profit public center presumably maintaining balance between reproductive and professional risk during service delivery. Thus, it may provide a representative dataset with presumably minimum information bias in contrast to the majority of the studies published so far.

This study found a stable CS rate of 32-35% over the time period; 27% is contributed by apparently normal pregnancy by Ro8bson group 1 through 4 and 16.4% by group 5. It accounts to two-third (67.6%) relative contribution for CS that indicates a need to focus on these groups. Similarly high contribution was shown in first four groups followed by group 5 in studies done by Kazmi et al[9] (40% and 33%), Ray et al[10] (29.5% and 28.7%), Tura et al[11] (53% and 21%), Begam et al[12] (30% and 24.6%), Patel et al[13] (55% and 17%) and Makhanya et al[14] (56.6% and 17.2%). But opposite was shown by Tanaka et al[15] (35.7% and 46.4%) and Reddy [16] (37.3% and 41.8%). Still the significant bulk is in first four groups to be focused. Elective CS, prelabor CS and previous CS rates are increasing to skew the relative contribution of each Robson group over the time; thus to classify CS into previous CS group and prelabor CS group as different classes.[7]

Though the relative group contribution was 28% (1002/3557) in group 2&4 (induced labor and elective CS), the Group CS rate was 48% (1002/2083) requiring focus on primary CS. Such condition is also described by Vogel et al.[7]

Similarly, the group 5 (past CS) size is 5.6% only, it has the third relative contribution (16.4%) for CS after group 1 and 2 as in Jakob et al[17], Kazmi et al[9], Ray et al[10] and Tura et al.[11] Thus focus should be for nullipara so that

subsequent pregnancy would have less CS rate at present time as also reported by Makhanya et al.[14]

High rate of CS (84.4%) in breech (group 6 and 7) indicates lost obstetric art if excluded other associated complications though the group contribution is less (3-4%) as also reported by Ray et al.[10] Induction group (2a and 4a) falls within overall CS rate but very high from the recommended level (4-6%).[6,7] This warrants clinical practice guideline in place.

Low risk group 1-4 size is greater and its CS rate contribution is 27%, thus the indications for primary CS has to be audited carefully.[15,18] This group had highest rate of 94% as reported by Gargari SS et al[19] but total sample size was small. Thus the indications of each have to be critically analyzed both before and during labor to see if there are any gap in obstetric practice; if not then its inherent gap in current classification has to be analyzed as there are 67% of total CS performed during study period were not picked up by Robson class such as fetal distress, CPD, oligohydramnios, APH, pre-eclampsia-eclampsia, obstructed labor, BOH, cord prolapsed etc. There were 42% cesarean performed for fetal distress only. CS rate for nullipara singleton cephalic preterm is 41.5% (246/593) that is too high requiring audit of indication. It was less (11%) in private urban hospital as reported by Begum et al.[12] There were other indications as well like contextual issues that were not identified at the time of admission by Robson class which were important in terms of future morbidities.[19,20]

VBAC rate is very less with 98.6% CS rate. Though the group size and group contribution for CS is low (5.5%) the subsequent mode of delivery with the current trend may increase the volume in this group. There seems to be some space for VBAC as supported by Ray et al[10], Kazmi et al[9], Tanaka et al[15], and Reddy et al[16] and Jakob et al.[17]

Size of group-9 is (0.42%) that is within recommended range (0.4-0.6%) and it's CS rate (100%) as well; group size of 2,3,4,5 and 6 as well as the group ratio for 1 and 2, 3 and 4, and 6 and 7 also comply with the recommendations.[6,15]

CONCLUSIONS

This study provides a high load obstetric dataset, and most of the parameters on quality of data and types of population are as recommended by Robson to be the representative research. The current time frame doesn't show the bulk of repeat cesarean section but the bulk in primary CS in low risk population may change the statistics in the years to come. Indications for two-third of CS evolved after admission and as the labor progressed. Mode of delivery influenced by contextual issue can't be predicted. Pregnancy attributes classified by Robson clarifies the target population at admission but only the audit of indications of CS at decision making level might provide ways to prevent increasing trend of Cesarean birth. There is no account of past cesarean delivery in multiple pregnancy, malpresentation and preterm in this classification system.

REFERENCES

1. Van Roosmalen J, Van Der Does CD. Caesarean birth rates worldwide. A search for determinants. Trop Geogr Med. 1995;47(1):19-22. [Article]
2. WHO Statement on Caesarean Section Rates. 2015. URL: [Accessed March 6, 2019].https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/
3. Robson MS. Can we reduce the cesarean section rate? Best Pract Res Clin obstet Gynecol. 2001;15:179-94.[Article]
4. Wanjari SA. Rising caesarean section rate: A matter of concern? Int J Reprod Contracept Obstet Gynecol. 2017;3:728-31.[Article]
5. WHO. Appropriate technology for birth. Lancet. 1985;2:436-7. https://ci.nii.ac.jp/en
6. WHO. Robson Classification: Implementation Manual. Geneva: World Health Organization; 2017. Licence: CCBY-NC-SA3.0IGO.[Download PDF]
7. Vogel JP, Betran AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, et al. Use of the Robson classifi cation to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Glob Health. 2015;3: e260–70.[Article]
8. Robson M, Hartigan L, Murphy M. Methods of achieving and maintaining an appropriate caesarean section rate. Best Pract Res Clin Obstet Gynaecol. 2013;27(2):297-308. [Article]
9. Kazmi T, Saiseema VS, Sultana Khan S. Analysis of cesarean section rate - According to Robson's 10-group classification. Oman Med J. 2012;27(5):415-7.[PMC3472574]
10. Ray A, Jose S. Analysis of caesarean-section rates according to Robson's ten group classification system and evaluating the indications within the groups. Int J Reprod Contracept Obstet Gynecol. 2017;6(2):447-51.[Article]
11. Tura AK, Pijpers O, De Man M, Cleveringa M, Koopmans I, Gure T, et al. Analysis of caesarean sections using Robson 10-group classification system in a university hospital in eastern Ethiopia: a cross sectional study. BMJ Open.

2018;8:e020520.[Article]

12. Begum T, Nababan H, Rahman A, Islam MR, Adams A, Anwar I. Monitoring caesarean births using the Robson ten group classification system: A cross-sectional survey of private for-profit facilities in urban Bangladesh. PLoS ONE. 2019;14(8): e0220693.[Article]
13. Patel KS, Nag RS. Assessment of indications of caesarean section among high risk women by Robson criteria: a prospective study. Int J Reprod Contracept Obstet Gynecol 2018;7:2623-7.[Article]
14. Makhanya V; L Govender L, Moodley J. Utility of the Robson Ten Group Classification System to determine appropriateness of caesarean section at a rural regional hospital in KwaZulu-Natal, South Africa. S Afr Med J. 2015;105(4):292-5.[Article]
15. Tanaka K, Mahomed K. The Ten-Group Robson Classification: A Single Centre Approach Identifying Strategies to Optimise Caesarean Section Rates. Obstet Gynecol Int. 2017; Article ID 5648938.[Article]
16. Reddy AY, Dalal A, Khursheed R. Robson Ten Group classification system for analysis of cesarean sections in an Indian hospital. Res J Obstet Gynecol. 2018;11(1):1-8.
17. Jacob KJ, Jayaprakash M, Hibina KP. TMC (Thrissur Medical College) modified Robson criteria for caesarean sections. Int J Reprod Contracept Obstet Gynecol. 2017;6(11):5038-504.[Article]
18. Fistula Care Plus. 2016. Is it feasible to implement a cesarean indication classification system? Findings from five countries. New York: Fistula Care Plus/EngenderHealth. 2016.[Download PDF]
19. Gargari SS, Essén B, Fallahian M, Lutvica AM, Mohammadi S. Auditing the appropriateness of cesarean delivery using the Robson classification among women experiencing a maternal near miss. Int J Gynecol Obstet. 2019;144:49–55.[Article]
20. Betran AP, Vindevoghel N, Souza JP, Gulmezoglu AM, 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.[Article]