Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i1.6542

A PROSPECTIVE, OBSERVATIONAL AND ANALYTICAL STUDY TO MONITOR CAESAREAN SECTION RATE IN ACCORDANCE WITH THE MODIFIED ROBSON'S TEN GROUP CLASSIFICATION

Shambhawi Kalyani[1*], Vanita Raut[2],

[1]DNB, Obstetrics and Gynecology, Dr L H Hiranandani Hospital, Powai, Mumbai, Maharashtra
[2]DGO, MD, Consultant, Obstetrics and Gynecology, Dr L H Hiranandani Hospital, Powai, Mumbai, Maharashtra

***Corresponding Author:** Shambhawi Kalyani
[*]DNB, Obstetrics and Gynecology, Dr L H Hiranandani Hospital, Powai, Mumbai, Maharashtra

Introduction

For nearly 30 years, the international healthcare community has considered the ideal rate for caesarean sections (CS) to be between 10% and 15%. This was based on the following statement by a panel of reproductive health experts at a meeting organized by the World Health Organization (WHO) in 1985 in Fortaleza, Brazil: "There is no justification for any region to have a rate higher than 10-15% [1]. Since then caesarean sections have become increasingly common in both developed and developing countries for a variety of reasons [2, 3]. When medically justified, caesarean section can effectively prevent maternal and perinatal mortality and morbidity [4]. However, there is no evidence showing the benefits of caesarean delivery for women or infants who do not require the procedure. As with any surgery, caesarean sections are associated with short and long term risk which can extend many years beyond the current delivery and affect the health of the woman, her child and future pregnancies. These risks are higher in women with limited access to comprehensive obstetric care [5, 6, 7] In order to propose and implement effective measures to reduce or increase CS rates where necessary, it is first essential to identify what groups of women are undergoing CS and investigate the underlying reasons for trend in different settings. This requires the use of a classification system that can best monitor and compare CS rates in a standardised, reliable, consistent and action – oriented manner. Such a classification system should be applicable internationally and useful for clinician and public health authorities. Ideally such a system should be simple, clinically relevant, accountable, replicable and verifiable. [8] Thus amongst the existing systems used to classify caesarean sections, the 10-group classification (also known as the 'Robson classification') has become widely used in many countries in recent years [8,9]. Proposed by Dr Michael Robson in 2001, the system stratifies women according to their obstetric characteristics, thereby allowing a comparison of caesarean section rates with fewer confounding factors. [10]

Currently, there is no standard classification system for caesarean section that would allow the comparison of caesarean section rates across different facilities, cities, countries or regions in a useful and action-oriented manner. As such, it is not yet possible to exchange information in a meaningful, targeted, and transparent manner to efficiently monitor maternal and perinatal outcomes [11].

Aim And Objectives

Aim: To analyze caesarean section (CS) rates using Modified Robson Ten Group Classification System and to identify the main contributors to the overall CS rate.

Objectives: 1. To know the caesarean section rate at our Hospital 2. By using Modified Robsons Ten groups classification system to know the reasons for rising trend being seen in caesarean section rates 3. To know which obstetric population is contributing maximum to the rising caesarean section rate

Material And Methods Study Site - This study was carried out in the Department of Obstetrics and Gynaecology at Dr. L H Hiranandani Hospital, Powai which is a tertiary care hospital and a referral unit for Obstetrics care STUDY POPULATION- All patients who underwent Caesarean section in Dr L. H. Hiranandani Hospital were included in the study, after obtaining due informed and written consent.

Study Design - This is a prospective, observational study.

Sample Size Calculation- For calculation of sample size formula used is - n = [Z2 x p (1-p)] / d2 n - is the size of sample Z - standard variate for the desired level of confidence p - estimate of expected proportion with variable of interest in the populationd - is the absolute error / desired precision In our study, We have chosen a 95% confidence level i.e Z = 1.96 As per previous study by Tahira Kazmi and et al , the Caesarean section rate in the study population was found to be 33 % [26] i.e p = 0.33 . Precision or absolute error of 5 % was taken i.e d = 0.05 Using these values in the above formula , we get the desired sample size i.e n = [Z2 x p (1-p)] / d2 = (1.96)2 x 0.33 (1-0.33) / (0.05)2 = 356

Study Duration - Time period: From 1st August 2016 to 31st July 2017

Inclusion Criteria- All caesarean sections taking place in our hospital at >/=28 weeks of gestation during the study period.

Exclusion Criteria- Deliveries after confirmed intrauterine fetal demise Taking these criteria into consideration, relevant obstetric data as age, gestational age, parity, mode of previous deliveries, single/multifetal gestation, presentation and lie were noted. It was also recorded whether they spontaneously went in labour or were induced or were taken for CSection before labour. Comorbidities like Gestational Diabetes mellitus, Hypothyroidism, Cholestasis of pregnancy, Gestational hypertension were also recorded. It was identified whether the section was emergency or elective. The indications of Caesarean section were also recorded. According to the above data each patient was categorized in modified Robson's ten group classification.

Table 1 The modified Robson criteria

Group	Description
1	Nullipara, singleton, cephalic, >/=37 weeks, spontaneous labour
2	Nullipara, singleton, cephalic, >/=37 weeks
A.	Induced
B.	C-section before labour
3	Multipara, singleton cephalic, >/=37 weeks, spontaneous labour
4	Multipara, singleton, cephalic, >/=37 weeks
A.	Induced
B.	C-section before labour
5	Previous C-section, singleton, cephalic, >/=37 weeks
A.	Spontaneous labour
B.	Induced labour
C.	C-section before labour
6	All nulliparous breeches
A.	Spontaneous labour
B.	Induced labour
C.	C-section before labour
7	All multiparous breeches (including previous C-section)

A. Spontaneous labour
B. Induced labour
C. C-section before labour
8 All multiple pregnancies (including previous C-section)
A. Spontaneous labour
B. Induced labour
C. C-section before labour
9 All abnormal lies (including previous C-section but excluding breech)
A. Spontaneous labour
B. Induced labour
C. C-section before labour

10 All singleton, cephalic, </=36 weeks (including previous C- section)
A. Spontaneous labour
B. Induced labour
C. C-section before labour
All the data were put in a Microsoft Excel sheet and assessed further using biostatistical methods

Results: The study was carried out between 1st August 2016 till 31st July 2017 at Dr L. H. Hiranandani Hospital, Powai, Mumbai.

Table-2 Deliveries in total and by C-section

Delivery	Number	Percentage
Vaginal	479	52.29%
C-section	437	47.71%
Total	916	100%

Out of total 916 deliveries, 437 were delivered by C- section.

Table-3 Parity wise distribution of C-Section

Parity	Frequency	Percent
Nullipara	267	61.01
Multipara	170	38.99
Total	437	100

Table-4 Distribution of both types of deliveries amongst nullipara and multipara

	Vaginal deliveries	C section
Nullipara (599)	332 (55.43%)	267 (44.57%)
Multipara (317)	147 (46.37%)	170 (53.63%)

Out of total 599 nullipara who delivered, 332 delivered vaginally and 267 were taken for C-section. Out of total 317 multipara who delivered, 147 delivered vaginally, 170 delivered by C-section.

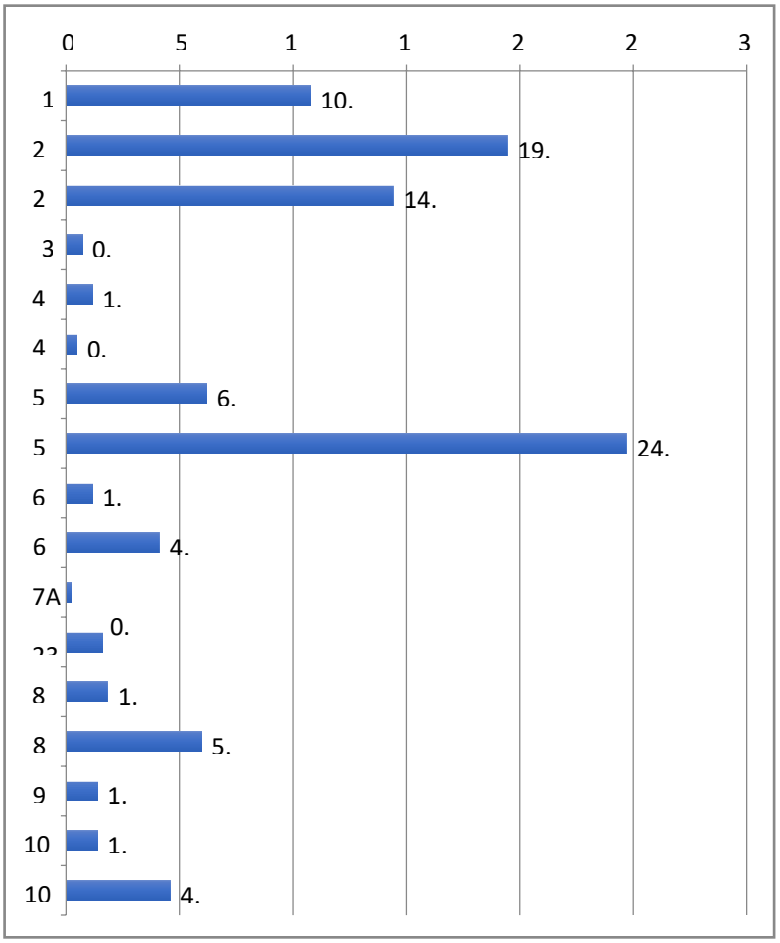

Figure – 1 Modified Robson‟s Ten Group Classification system wise distribution

Table- 5 Type of C-section in group wise distribution (statistically significant)

Class	Type of C-section		Total
	Emergency C-section	Elective C-section	
1	47 100 %	0 0 %	47 100 %
2A	85 100 %	0 0 %	85 100 %
2B	11 17.5 %	52 82.5 %	63 100 %
3	3 100 %	0 0 %	3 100 %
4A	5 100 %	0 0 %	5 100 %
4B	0 0 %	2 100 %	2 100 %
5A	27	0	27

	100 %	0 %	100 %
5C	7 6.5 %	101 93.5 %	108 100 %
6A	5 100 %	0 0 %	5 100 %
6C	6 33.3 %	12 66.7 %	18 100 %
7A	1 100 %	0 0 %	1 100 %
7C	1 14.3 %	6 85.7 %	7 100 %
8A	8 100 %	0 0 %	8 100 %
8C	9 34.6 %	17 65.4 %	26 100 %
9C	1 16.7 %	5 83.3 %	6 100 %
10A	6 100 %	0 0 %	6 100 %
10C	11 55 %	9 45 %	20 100 %
Total	*233* *53.3 %*	*204* *46.7 %*	*437* *100 %*

χ^2=307.83 · df=16 · Fisher's p<0.001

Table 6- Indication wise distribution of C-sections in each Group of Robsonclassification (statistically significant)

Indications	Robson's group										Total
	1	2	3	4	5	6	7	8	9	10	
Triplets	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	1 100 %	0 0 %	0 0 %	1 100 %
Severe IUGR with Doppler	0 0 %	2 33.3 %	0 0 %	0 0 %	2 33.3 %	0 0 %	0 0 %	0 0 %	0 0 %	2 33.3 %	6 100 %
Breech	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	23 76.7	7 23.3	0 0 %	0 0 %	0 0 %	30 100

						%	%				%
Malpresentatio ns (other than Breech)	0 0 %	0 0 %	0 0 %	1 16.7 %	0 0 %	0 0 %	0 0 %	0 0 %	5 83.3 %	0 0 %	6 100 %
Severe Oligohydramnios	0 0 %	5 71.4 %	0 0 %	0 0 %	2 28.6 %	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	7 100 %
Previous 2LSCS	0 0 %	0 0 %	0 0 %	0 0 %	4 57.1 %	0 0 %	1 14.3 %	0 0 %	0 0 %	2 28.6 %	7 100 %
Ante Partum Haemorrhage	1 10 %	5 50 %	1 10 %	0 0 %	2 20 %	0 0 %	0 0 %	0 0 %	0 0 %	1 10 %	10 100 %
Previous Myomectomy	2 20 %	5 50 %	0 0 %	0 0 %	3 30 %	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	10 100 %
Bad Obstetrics History	0 0 %	4 40 %	1 10 %	1 10 %	2 20 %	0 0 %	0 0 %	0 0 %	0 0 %	2 20 %	10 100 %
Severe Uncontrolled Hypertensio n	0 0 %	2 20 %	0 0 %	0 0 %	2 20 %	0 0 %	0 0 %	0 0 %	0 0 %	6 60 %	10 100 %
Twins	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	0 0 %	31 93.9 %	1 3 %	1 3 %	33 100 %
On Demand	2 5 %	12 30 %	0 0 %	1 2.5 %	24 60 %	0 0 %	0 0 %	0 0 %	0 0 %	1 2.5 %	40 100 %
Fetal distress	21 39.6 %	21 39.6 %	1 1.9 %	1 1.9 %	6 11.3 %	0 0 %	0 0 %	0 0 %	0 0 %	3 5.7 %	53 100 %
Cephalopelvi c disproportio n	3 3.4 %	29 33.3 %	0 0 %	0 0 %	54 62.1 %	0 0 %	0 0 %	0 0 %	0 0 %	1 1.1 %	87 100 %
Non progress of Labour	17 14.7 %	60 51.7 %	0 0 %	3 2.6 %	32 27.6 %	0 0 %	0 0 %	0 0 %	0 0 %	4 3.4 %	116 100 %

Others	1 9.1 %	3 27.3 %	0 0 %	0 0 %	2 18.2 %	0 0 %	0 0 %	2 18.2 %	0 0 %	3 27.3 %	11 100 %
Total	47 10.8 %	148 33.9 %	3 0.7 %	7 1.6 %	135 30.9 %	23 5.3 %	8 1.8 %	34 7.8 %	6 1.4 %	26 5.9 %	437 100 %

$\chi^2 = 1.4e+03 \cdot df = 135 \cdot Fisher's\ p < 0.001$

IUGR = Intrauterine growth retardation, CPD= Cephalopelvic disproportion, HTN =Hypertension, BOH=Bad obstetric history

Discussion

The rise in C-section rates has caused worldwide debates about its necessity. This has warranted a need for studies in order to propose and implement effective measures to reduce C-section rates where necessary. Upon analyzing the reasons behind this rise, the factors responsible include safer surgical procedure, medico legal litigations, maternal choice, advanced age of women giving birth, obesity and various co existing medical conditions making pregnancies a high risk one. With the aim to analyze the C-section rate using Modified Robson's Ten Group Classification, the study was carried out at Dr. L. H. Hiranandani Hospital, Powai, Mumbai, between 1st August 2016 to 31st July 2017. Out of total of 916 deliveries during the study duration, 479 were vaginal births while, 437 were C-sections, thereby making C-section rate as 47.7%. In study carried out by Abera Kenay Tura and et al in Ethiopia, out of 4758 deliveries, 1224 were C-sections. Therefore, C – section rate was (25.7%) [12]. Vinita Das and et al at Lucknow, India, found C-section rate as 49.9%. Total deliveries they had were 8526. Out of them, 4251 were C-sections. [13], comparable to our study. K. Tanaka and et al at Queensland, Australia, recorded 2625 deliveries in total in their institution during their study period. Out of which 618 had C-sections. Thus, C-section rate turned out to be 23.5%. [14]

	Total deliveries	**C-section rate**
Vinita Das and et al **[32]** (Indian study)	8526	49.9%
Abera Kenay Tura and et al **[29]** (Ethiopian study)	4758	25.7%
K. Tanaka and et al **[24]** (Australian study)	2625	23.5%
Current study	916	47.7%

Table 7- Thus, the topmost contributors to C-section rates in each of the above studies are collectively shown

Robson's Group	Studies			
	Vinita Das and et al [32] (Indian)	Abera KenayTura and et al [29] (Ethiopian)	K. Tanaka and et al [24] (Australian)	Currentstudy
1.Nullipara, singleton, cephalic, >/=37 weeks,spontaneous labour	13.4%	19.3%	9.4%	10.76%
2.Nullipara, singleton, cephalic, >/=37 weeks, induced labour or takenfor C-section before labour	13.1%	6.5%	12.3%	33.87%
3.Multipara, singleton, cephalic, >/37 weeks, spontaneous labour	14.2%	21.4%	4.2%	0.69%
4 Multipara, singleton, cephalic, >/37 weeks, induced labour or takenfor C-section before labour	12%	5.4%	9.7%	1.6%
5.Previous C-section, singleton, cephalic,>/=37weeks	17.7%	21.1%	46.4%	30.89%
6. All nulliparous with a single breech	3.5%	2.8%	3.4%	5.26%
7. All multiparous with a single breech (including previous Cesarean section)	4.4%	8%	4.2%	1.83%
8. All multiple pregnancies (includingprevious cesarean section)	3.6%	6.3%	3.2%	7.78%
9. All women with a single pregnancy in transverse or oblique lie(including those with previous cesarean section)	2.9%	3%	2.3%	1.37%
10. All singleton cephalic <37 weeks gestation pregnancies (including previous Caesarean section)	14.6%	6.2%	4.9%	5.95%

SUMMARY AND CONCLUSION

The present study was a prospective observational study conducted at Dr L.H.Hiranandani Hospital, Powai, Mumbai from 1st August 2016 to 31st July 2017. Out of total 916 women who delivered in our hospital, 437 women underwent C- section during this period.

As per inclusion and exclusion criteria, relevant demographic, obstetric data and examination findings were noted. It was also recorded whether they spontaneously went in labour or were induced or were taken for C- Section before labour. Women were classified as per Robson's Ten Group Classification system for further analysis. It was identified whether the section was emergency or elective. The indications of Caesarean section were also recorded for detailed analysis.

Out of total of 916 deliveries during the study duration, 479 were vaginal births while,437 were C-sections, thereby making C-section rate as 47.7%.

Most of the patients who underwent C-section were in age group of 31-35 years (53.32%).

As per modified Robson's ten group classification the most common group was group5 C (previous C-section, singleton, full term, >/=37 weeks, taken for C-section before labour) contributing 24.71%. While group 2A and 2B respectively were 19.42% and 14.42%, by combining these two subgroups makes the group 2 the highest contributor. In our study, group 3 had the lowest C-section rate of 0.69%. As group 5 & 2 are the most common group going for C section, following measures are

recommended to optimise c section rates -

a) Counselling of patients in antenatal period regarding natural births and their benefits

b) Proper training of doctors to undertake operative vaginally surgeries

c) Proper intrapartum fetal monitoring and interpretation of the same in order to make the right diagnosis of fetal distress

Refrences

1. World Health Organization (WHO). Appropriate technology for birth. Lancet [Internet]. 1985; 2 (8452): 436-7.
2. Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J et al. on behalf of the WHO Multi-Country Survey on Maternal and Newborn Health Research Network. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Global Health 2015;3(5):e260-70.
3. Ye J, Betran AP, Vela MG, Souza JP, Zhang J. Searching for the Optimal Rate of Medically Necessary Cesarean Delivery. Birth. 2014;41(3):237-43.
4. Hannah ME, Hannah WJ, Hewson SA, Hodnett ED, Saigal S, Willan AR. Planned caesarean section versus planned vaginal birth for breech presentation at term: a randomised multicentre trial. Term Breech Trial Collaborative Group. Lancet. 2000;356(9239):1375-83.
5. Lumbiganon P, Laopaiboon M, Gulmezoglu AM, Souza JP, Taneepanichskul S, Ruyan P, et al. Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health 200708. Lancet. 2010;375:490-9.
6. Villar J, Carroli G, Zavaleta N, Donner A, Wojdyla D, Faundes A, et al. Maternal and neonatal individual risks and benefits associated with caesarean delivery: multicentre prospective study. BMJ. 2007;335(7628):1025.
7. Souza JP, Gulmezoglu 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 medicine. 2010;8:71.
8. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, et al. (2011) Classifications for cesarean section: A Systematic Review. PLoS ONE 6(1):e14566. Doi: 10.1371/journal.pone.0014566.
9. 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.
10. Robson MS. Classification of caesarean sections. Fetal and maternal medicine review. 2001 Feb;12(1):23-39.
11. Robson M, Hartigan L, Murphy M. Methods of achieving and maintaining an appropriate caesarean section rate. Best Pract Res Clin Obstet Gynaecol. 2013;27:297-308.
12. Abdel-Aleem H, Shaaban OM, Hassanin AI, Ibraheem AA. Analysis of cesarean delivery at Assiut University Hospital using the Ten Group Classification System. International Journal of Gynecology & Obstetrics. 2013 Nov 1;123(2):119-23.
13. 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 open. 2018 Apr 1;8(4):e020520.
14. Tanaka K, Mahomed K. The Ten-Group Robson Classification: a single centre approach identifying strategies to optimise caesarean section rates. Obstetrics and gynecology international. 2017 Jan 10;2017.