

Analysis of Increasing Cesarean Section Rate by Robson's 10-group Classification System in a Tertiary Care Public Charitable Hospital in Haryana

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ABSTRACT

Over the past few decades, delivery by cesarean section (CS) has increased dramatically in most of the countries. Rising CS rates are a major public health concern and leading worldwide health debate regarding potential causes of increased maternal and perinatal morbidity and mortality, associated with cesarean section. Robson's 10-group classification system (RTGCS) helps us to identify the main groups of subjects who contribute most to the overall CS rate. A retrospective cross-sectional study was carried out over 1 year from November 21, 2022 to November 20, 2023, in the mother and child health unit of a tertiary care charitable hospital of Palwal, Haryana: Shree Satya Sai Sanjeevani Hospital and Research Center. Being a tertiary care center with NO BILLING POLICY, Shree Satya Sai Sanjeevani Hospital and Research Center automatically eliminates unnecessary C-sections, thereby adhering to standard treatment guidelines. Also, indications like CS on demand or unindicated LSCS are not entertained as per the ethical standards of our institution. Using the RTGCS, we audited all admissions and appreciated that the incidence of cesarean delivery in our setup was 52.1%, exceeding the set standard by World Health Organization (WHO), by approximately 15%. However, these rates are comparable with other similar studies in India. Our study also reflects the need to define separate standards for maternal outcome and mode of delivery depending upon the level of care... primary or tertiary center, with many referrals for high-risk obstetrics.

Keywords: Cesarean section, High-risk pregnancy, Maternal outcome.

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INTRODUCTION

Cesarean section (CS), although a potentially life-saving procedure, is associated with an increased risk of maternal and perinatal morbidity and mortality.¹

The limit (10–15%) of cesarean section deliveries, set by the World Health Organization (WHO) in 1985, has been crossed by most countries.²

To understand the increasing trend of CS and to maintain effective guidelines, it is necessary to have an objective method to monitor and compare CS rates at the global level, so that bias can be removed and comparison standardized between different levels of care (e.g., primary vs tertiary level).

Being a tertiary care center with NO BILLING POLICY, Shree Satya Sai Sanjeevani Hospital and Research Center automatically eliminates unnecessary C-sections, thereby adhering to standard treatment guidelines. Also, indications like CS on demand or unindicated LSCS are not entertained as per the ethical standards of our institution.

In 2016, WHO proposed the use of the Robson Classification as a universal tool for assessing and monitoring CS rates to enable standard comparisons across the globe.¹ Till date, very few studies have been done to identify the relation between CS rates, causes of LSCS in developing countries, and methods to improve the current rate of cesarean deliveries.

This study was done in a charitable hospital with absolutely free of cost all the services (so the conflict of charges behind vaginal and CS can be nullified). The study population is a mixed population of rural and urban communities of district Palwal of state Haryana near Delhi.

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AIM

The aim of this study was to classify CS deliveries in a non-profitable charitable maternity hospital in Haryana, according to Robson's 10 group classification system, and to find out the major contributing factor for CS.

MATERIALS AND METHODS

A retrospective cross-sectional study was carried out over a period of 1 year from November 21, 2022 to November 30, 2023 in the

Table 1: Robson's 10-group classification system

Group	Robson's* 10-group classification (TGCS)
I	Nulliparous women with a singleton pregnancy, ≥ 37 weeks POG with vertex presentation in spontaneous labor
II	Nulliparous women with a singleton pregnancy, ≥ 37 weeks POG, vertex presentation who had labor induced or were delivered by CS without trial
IIa	Labor induced
IIb	Elective CS, without inducing labor
III	Multiparous women with previous vaginal delivery, with a singleton cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labor
IV	Multiparous women with previous vaginal delivery, with a single cephalic pregnancy, ≥ 37 weeks gestation who had labor induced or were delivered by CS before labor
IVa	Labor-induced
IVb	Elective CS, without labor induction
V	All multiparous women with at least one previous CS, with a single cephalic pregnancy, full-term Ireg
Va	Previous 1 CS
Vb	Previous two or more CS
VI	All nulliparous women with a singleton breech pregnancy
VII	All multiparous women with a singleton breech pregnancy including women with previous CS(s)
VIII	All women with multiple pregnancies including women with previous CS(s)
IX	All women with a singleton pregnancy with a transverse or oblique lie, including women with previous CS(s)
X	All women with a singleton cephalic pregnancy < 37 weeks gestation, including women with previous CS(s)

POG, period of gestation

mother and child health unit of a tertiary care charitable hospital of Palwal, Haryana: Shree SatyaSai Sanjeevani Hospital and Research Center.

The total number of births was 629, of which, cesarean deliveries were 328 and vaginal deliveries were 301.

Inclusion Criteria

All patients admitted in labor were included in the study.

As an institutional protocol, abiding by the LAQSHYA guidelines, we allot the Robson's* number to each patient at the time of admission in labor ward. Since our institute is a tertiary center, the rate of CS largely supersedes the WHO set a standard of 15%.

All high-risk patients—maternal, neonatal, or both at risk were usually delivered by 37 completed weeks of gestation, in congruence with the Bishop's score**, so as to minimize the risk of CS.

Also, all cases of previous CS are delivered essentially by planned C-section. Therefore, a higher antenatal registration of women with previous LSCS probably justifies the higher prevalence of C-section rate.

All patients in labor were monitored strictly on an intrapartum cardiotocography machine (CTG) and plotted on Partograph*** in active labor, to facilitate clarity and easy decision-making with respect to the progress of labor.

The CS rate was calculated as percentage of total deliveries and contribution of each group to overall CS rate. The data were entered in MS Excel sheet and data analysis was done using SPSS version 21.0.

Bishop's Score**

Bishop's score for assessing, favorability of cervix prior to induction of labor, considering parameters of cervical position, consistency, dilatation, effacement, and station.

Partograph***

A graphical representation of the progress of labor against time (Table 1).

RESULTS

Over the 1-year period, a total of 629 women delivered in MCH SSSSCHR, in which CS were 328 (52.1%) and vaginal deliveries were 301 (47.9%).

The mean age of participants was 24.9 years (Table 2). The maximum women 549 (87.2%) belong to the age group between 19 and 30 years.

In total deliveries multipara 344 (54.68%) women were higher in number as compared with nullipara 285 (45.31%) women.

Maximum women delivered in SSSSIHC were at full-term pregnancy 540 (85.85%).

About 157 women (24.95%) had a history of one or more previous cesarean(s).

Maximum newborn 564 (89.66%) had an APGAR score of more than seven.

Women from rural areas were 464 (73.76%) and urban area was 165 (26.23%).

We analyzed the cesarean rate of all women according to their indications. In this study 157 (47.86%) women underwent cesarean section due to prior history of cesarean section delivery and 73 (22.25%) women had CS delivery as they had fetal distress (Table 3 and Fig. 1).

The data of all women delivered in MCH department of SSSSCHR analyzed according to Robson's 10 group classification with their subdivision (Table 4 and Fig. 2).

(1) Statistics: cause-wise (Table 4).

Group III: 26.3%
Group I: 23.8%
Group VA: 16.7%

(2) Group-specific cesarean section

Group IIB, group VA, group VB and group IX had 100% cesarean rate followed by group VII (87.5%), group IVB (85.71%), group VIII (60%) and group X (59.21%).

Table 2: Characteristics of women who gave birth at SSSSIHC from November 21, 2022 to November 30, 2023

Parameters	Total participant	% of each participant
1 Age (in years)		
<19	34	5.4
19–30	549	87.28
>30	46	7.31
2 Gravida		
Primi	232	36.88
Multi	397	63.11
3 Parity		
Nullipara	285	45.31
Multi	344	54.68
4 Gestation age (in weeks)		
<37	89	14.15
37–42	540	85.85
5 H/o of previous C-section		
None	472	75.04
1	120	19.07
>1	37	5.88
6 Onset of labor spont		
Induction of labor	420	66.77
Pre-labor	65	10.33
7 Fetal presentation		
Vertex	609	96.82
Breech	19	3.02
Transverse	1	0.15
8 APGAR		
<7	65	10.33
>7	564	89.66
9 Baby weight		
<2.5 kg	128	20.34
2.5–3.5 kg	471	74.88
>3.5 kg	30	4.76
10 Area wise		
Urban	165	26.23
Rural	464	73.76

Table 3: Distribution of cesarean section according to their indication

Indication	Number (n = 328)	Percentage (%)
Previous cesarean	157	47.86
Fetal distress	73	22.25
Failed induction	28	8.53
Breech	19	5.79
CPD	17	5.18
NPOL	14	4.26
Oligohydramnios	9	2.74
PIH	4	1.21
FGR	2	0.60
Abruption	2	0.60
Transverse lie	1	0.30
Placenta previa	1	0.30
Multiple pregnancy	1	0.30

be complicated by placenta accreta spectrum, thereby involving the need for postpartum blood transfusions, requiring transfer to tertiary center as well as long-term complications like chronic abdominal pain if trauma to internal viscerae, causing adhesions.^{4,9} In order to minimize such high-risk conditions, we need to curtail the incidence of primary CSs through an AUDIT.

The Robson (RTGCS) tool enables us to individually categorize institution-based reasons for C-section and can help to standardize LSCS practices across different facilities using this measure^{4,7} which was exactly followed in our study.

Of the total deliveries done in 1 year (629), CSs were 328 (52.15%) which was much higher than the limit set by WHO in 1984 but it correlated with the study done in Kolar (30.8%), Bellary (42%), Belgavi (44%), and other part of Karnataka (58%) and Nigeria (51.2%).^{10–14}

The most common indication for CS in our study was the history of previous cesarean section (47.56%), followed by fetal distress (22.56%), and then the third largest indication was failed induction of labor (8.53%) which is similar to study done by Laya MK et al. and Parveen et al. the most common indication was previous CS 47.56% and 20.4%, followed by fetal distress 13.42% and 19.8%, respectively.^{15,16}

By CS analysis according to RTGCS, group I (23.84%) and group III (26.23%) largely admitted for delivery in our hospital which more or less matched other studies done by Sah and Goel in 2018.^{17–27}

Robson's groups V, I and X highly contributed to the overall CS rate in our hospital which was similar to other studies including Human Development Index (HDI) countries, all of which had predominantly previous LSCS (group V) and group I as leading causes.

In our study, group IIb, group Va, group Vb and group IX had 100% CS rate followed by group VII, group IVb, group VIII and group X had CS rate 87.5, 85.71, 60, and 59.21%, respectively. These rates were comparable in studies in different countries too (26,27).

(3) Robson's group contribution to overall CS.

The largest contributors to the overall CS rate were Group VA (32.01%), followed by group I (16.16%), group X (13.71), group III (9.75%), and group VB (7.62%). These five groups contributed for 79.25% of all cesarean deliveries (Table 4).

DISCUSSION

For last three decades, increasing cesarean rate has been a big concern for public health.^{3–7} Postpartum complications in mother and neonate can be decreased by correctly choosing the mode of delivery: either CS or vaginal delivery.

LAQSHYA guidelines by the Government of India have enlisted CS rate as one of the qualities indicators of maternal health services at any health center⁸ although, it carries with it surgical as well as anesthesia-related complications amounting to maternal morbidity as well as mortality. Subsequent pregnancies may also

CONCLUSIONS

Robson's classification is a simple and clinically relevant objective method to facilitate comparison and analysis of CS rates amongst different groups,¹ that can help us develop a uniform policy to optimize the rate of cesarean section across the globe.

Indications for CS in every institute should be analyzed carefully so that we can jointly work to reduce the overall CS rate by promoting induction of labor in primigravidae and encouraging

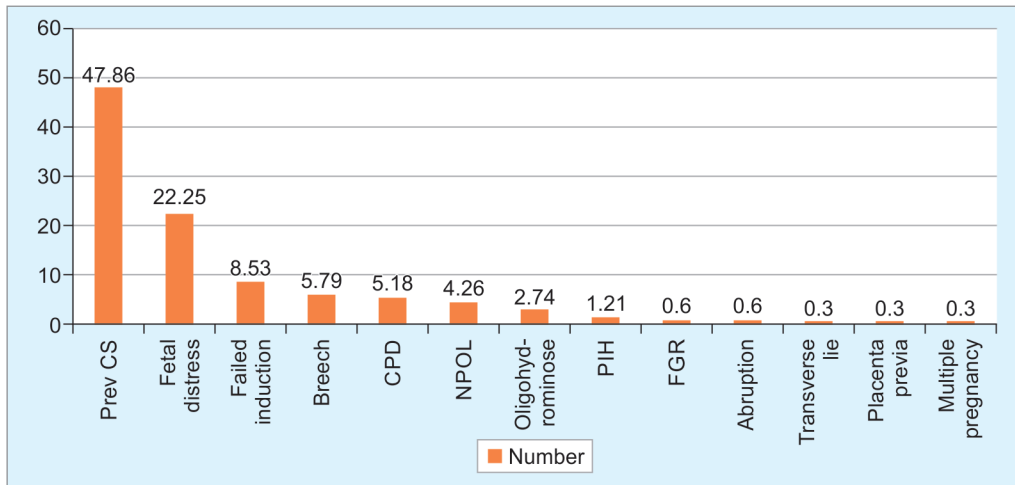


Fig. 1: Distribution of CS according to their indication (n = 328)

Table 4: Distribution of all CS deliveries according to group

Robson's 10-group classification							
Group	Sub group	Total a = (b + c)	Vaginal deliveries (b)	CS delivery (c)	Group size (%) (a/X)	Group-specific CS (%) (c/a)	Relative group contribution to overall CS (%) (c/Y)
I		150	97	53	23.84	35.33	16.16
II	II(a)	38	19	19	6.04	50	5.79
	II(b)	12	0	12	1.9	100	3.65
III		165	133	32	26.23	19.39	9.75
IV	IV(a)	30	17	13	4.76	43.33	3.96
	IV(b)	7	1	6	1.11	85.71	1.82
V	V(a)	105	0	105	16.69	100	32.01
	V(b)	25	0	25	3.97	100	7.62
VI		7	0	7	1.11	10	2.13
VII		8	1	7	1.27	87.5	2.13
VIII		5	2	3	0.79	60	0.91
IX		1	0	1	0.15	100	0.3
X		76	31	45	12.08	59.21	13.71
		X = 629	301	Y = 328	100	NA	100

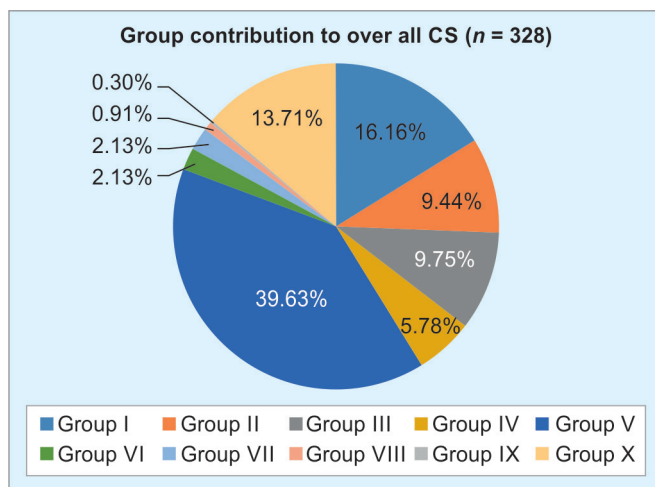


Fig. 2: Distribution of CS delivery according to Robson's 10-group classification system (RTGCS)

trial of scar after cesarean section (TOLAC) in centers equipped with pre-requisites. Monitoring of patients using fetal cardiotocography and partogram is absolutely essential for a favorable outcome.

REFERENCES

1. Robson Classification: Implementation Manual. Geneva: World Health Organization; 2017. Available at: <https://www.who.int/publications/i/item/978197>.
2. Mittal P, Pandey D, Suri J, et al. Trend prediction for cesarean deliveries based on Robson Classification System at a Tertiary Referral Unit of North India. The Journal of Obstetrics and Gynecology of India 2020; 70:111–118. DOI: 10.1007/s13224-019-01275-7.
3. Abubeker FA, Gashawbeza B, Gebre TM, et al. Analysis of cesarean section rates using Robson ten group classification system in a tertiary teaching hospital, Addis Ababa, Ethiopia: A cross-sectional study. BMC Preg Childb 2020;20(1):1–7. DOI: 10.1186/s12884-020-03474-x.
4. World Health Organization. WHO statement on caesarean section rates, vol. WHO/RHR/15.02. Geneva: World Health Organization; 2015. (WHO/RHR/15.02).

5. 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. DOI: 10.1016/j.bpobgyn.2012.09.004.
6. Torloni MR, Betran AP, Souza JP, et al. Classifications for cesarean section: A systematic review. *PLoS ONE* 2011;6(1):e14566. DOI: 10.1371/journal.pone.0014566.
7. Robson MS. Classification of caesarean sections. *Fetal Maternal Med Rev* 2001;12(1):23–39. DOI: 10.1017/S0965539501000122.
8. WHO, UNFPA, UNICEF, AMDD. *Monitoring Emergency Obstetric Care: A Handbook*. Geneva: World Health Organization; 2009.
9. Harrison MS, Pasha O, Saleem S. A prospective study of maternal, fetal and neonatal outcomes in the setting of cesarean section in low-and middle-income countries. *Acta Obstet Gynecol Scand* 2017;96(4):410–420. DOI: 10.1111/aogs.13098.
10. Gomathy E, Radhika K, Kondareddy T. Use of the Robson classification to assess caesarean section trends in tertiary hospital. *Int J Reprod Contracept Obstet Gynecol* 2018;7(5):1796–1800. DOI: 10.18203/2320-1770.ijrcog20181905.
11. Varija T, Kumar VCM, Tarihalli C. Analysis of caesarean section rate in tertiary care hospital according to Robson's 10 groups classification. *Int J Reprod Contracept Obstet Gynecol* 2018;7(4):1380–1384. DOI: 10.18203/2320-1770.ijrcog20181023.
12. Reddy AY, Dalal A, Khurshed R. Robson ten group classification system for analysis of cesarean sections in an Indian hospital. *Res J Obstet Gynecol* 2018;11(1):1–8. DOI: 10.3923/rjog.2018.1.8.
13. Patil SB, Rajitha D. Robson classification: Beyond caesarean rates. *Int J Reprod Contracept Obstet Gynecol* 2023;12(7):2241–2246. DOI: 10.18203/2320-1770.ijrcog20231941.
14. Akadri AA, Imaralu JO, Salami OF, et al. Robson classification of caesarean births: Implications for reducing caesarean section rate in a private tertiary hospital in Nigeria. *BMC Pregnancy and Childbirth* 2023;23:243. DOI: 10.1186/s12884-023-05557-x.
15. Laya MK, Vijaya Sree M. Analysis of caesarean sections with the Robson's ten group classification system. *Int J Reprod Contracept Obstet Gynecol* 2023;12(4):1083–1087. DOI: 10.18203/2320-1770.ijrcog20230817.
16. Parveen R, Khakwani M, Naz A, et al. Analysis of cesarean sections using Robson's Ten Group Classification System. *Pak J Med Sci* 2021;37(2):567–571. DOI: 10.12669/pjms.37.2.3823.
17. Sah S, Goel R, Goel JK. Analysis of caesarean section rate according to Robson's criteria in tertiary care centre. *International Journal of Reproduction Contraception Obstetrics Gynecology* 2018;7(8):3060–3064. DOI: 10.5001/omj.2012.102.
18. Costa ML, Cecatti JG, Souza JP, et al. Using a Caesarean Section Classification System based on characteristics of the population as a way of monitoring obstetric practice. *Reprod Health* 2010;7:13. DOI: 10.1186/1742-4755-7-13.
19. Litorp H, Kidanto HL, Nystrom L, et al. Increasing caesarean section rates among low-risk groups: A panel study classifying deliveries according to Robson at a university hospital in Tanzania. *BMC Pregnancy Childbirth* 2013;13:107. DOI: 10.1186/1471-2393-13-107.
20. Triunfo S, Ferrazzani S, Lanzone A, et al. Identification of obstetric targets for reducing caesarean section rate using the Robson Ten Group Classification in a tertiary level hospital. *Eur J Obstet Gynecol Reprod Biol* 2015;189:91–95. DOI: 10.1016/j.ejogrb.2015.03.030.
21. Mittal P, Pandey D, Suri J, et al. Trend prediction for caesarean deliveries based on Robson classification system at a tertiary referral unit of North India. *J Obstet Gynaecol India* 2020;70:111–118. DOI: 10.1007/s13224-019-01275-7.
22. Naik M, Rani S, Ratnani R. Assessing caesarean section trends in a tertiary care teaching hospital using Robson's ten group classification. *Int J Health Clin Res* 2021;4(8):215–218. e-ISSN: 2590–3241, p-ISSN: 2590–325X.
23. 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:e260–270. DOI: 10.1016/S2214-109X(15)70094-X.
24. Pati T, Marandi S, Mohapatra S. Analysis of caesarian section rate using Robson's classification in a tertiary care hospital of eastern Odisha. *J Med Sci Clin Res* 2018;6:157–161. DOI: 10.18535/jmscr/v6i9.28.
25. Sungkar A, Santoso BI, Surya R, et al. Classifying caesarean section using Robson classification: An Indonesian tertiary hospital survey. *Maj Obs Gin* 2019;27:66–70. DOI: 10.20473/mog.V27I22019.66-70.
26. Bernardes J, Costa-Pereira A, Ayres-de-Campos D, et al. Evaluation of interobserver agreement of cardiotocograms. *Int J Gynaecol Obstet* 1997;57(1):33–37. DOI: 10.1016/S0020-7292(97)02846-4.
27. Stavrou EP, Ford JB, Shand AW, et al. Epidemiology and trends for Caesarean section births in New South Wales, Australia: A population-based study. *BMC Pregnancy Childbirth* 2011;11:8. DOI: 10.1186/1471-2393-11-8.