

Analysis of Caesarean Section Rates by Robson's Classification

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ABSTRACT

BACKGROUND

A standard and comprehensive classification system is needed to maintain appropriate Caesarean section (CS) rates like Robson Ten Group Classification System. The present study was conducted to analyse Caesarean section rate and its distribution according to Robson's classification.

METHODS

A descriptive study was conducted in the Department of Obstetrics and Gynaecology, Deen Dayal Upadhyay Hospital, Hari Nagar, New Delhi, from August 2018 to May 2019 on pregnant women of more than 28 weeks of gestation admitted for delivery.

RESULTS

Out of 8099 deliveries, 2924 required Caesarean section. The overall Caesarean section rate was 36.11 %, 1616 (55.27 %) were primary Caesarean section and 1308 (44.73 %) were repeat Caesarean section. Preterm delivery by Caesarean section was in 7.49 %. Majority of Caesarean section were in 37- 40 weeks of gestation (79.42 %). Out of 2924 cases 90.62 %, 8.21 % and 1.17 % were cephalic presentation, breech and other presentations respectively. 32 Caesarean section cases were twin pregnancy, 20.83 % was induced whereas 23.91 % was in spontaneous labour. Previous Caesarean section (44.74 %) was the commonest cause followed by foetal distress (16.82 %). Commonest cause for repeat Caesarean section was foetal distress (25.76 %). Major contributor to overall Caesarean section rate was Robson's group 5 (38.72 %) followed by group 2 and group 1 i.e 21.64 % and 11.79 % respectively. Least contributor was group 8 (1.09 %).

CONCLUSIONS

Robson's classification can help to identify broad categories of women to be targeted to decrease Caesarean section rates. Caesarean section rate can be reduced by decreasing primary Caesarean section, offering trial of labour (TOLAC), strict induction protocols implementation and precise interpretation of foetal heart rate tracings.

KEYWORDS

Caesarean Section, Robson's Classification, Malpresentation

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BACKGROUND

The rising trend of caesarean section (CS) is a major cause of concern all over the world including India. According to the Indian Council of Medical Research¹ (ICMR) task force study, CS rate has increased from 21.8 % in 1993 - 94 to 28.1 % in 2005 - 06. Identifying the cause for increasing CS is need of the hour as CS is associated with increasing mortality and morbidity.² Various reasons for the increase in caesarean sections are use of electronic foetal monitoring during labour, increasing number of pregnancies following infertility treatment, increasing incidence of elderly gravida, increasing number of women with prior CS, lesser use of instruments and medico legal concerns etc. World Health Organization (WHO) has recommended that CS rates should not be more than 15 %, as CS rate above this is not associated with additional reduction in maternal and neonatal mortality and morbidity.³

Owing to the absence of a standard classification for reporting of all deliveries, determination of accurate caesarean section rates is a challenge. Robson criteria (also known as Ten Group Classification System, TGCS) is a standard classification system of 10 mutually exclusive and totally comprehensive classification categories of Caesarean section introduced by Michael Robson in 2001 for easy comparison and improvement of obstetrics.⁴ In 2011 the World Health Organization (WHO) conducted a systematic review that identified 27 different systems to classify CS. These classifications looked at who (woman-based), why (indication-based), when (urgency-based), as well as where, how and by whom a caesarean section (CS) was performed.⁵ This review recommended Robson's system as a global standard for assessing, monitoring and comparing CS rates within healthcare facilities.⁶

The present study was conducted to find out frequency and indications for CS and analyse CS rate and its distribution according to Robson's ten group classification. This might help in adopting suitable measures to reduce CS rate.

METHODS

This study is a prospective case series conducted in the Department of Obstetrics and Gynecology, Deen Dayal Upadhyay Hospital, Hari Nagar New Delhi, from August 2018 to May 2019 on 8099 pregnant women of more than 28 weeks of gestation excluding pregnant women of less than 28 weeks' gestation. A Pre-structured proforma was used to collect all relevant information. Patient who underwent CS and vaginal delivery were classified according to Robson's criteria and data was collected.

Statistical Analysis

Data analysis was done using SPSS version 21.0.

RESULTS

Total number of deliveries were 8099, out of which 2924 (36.11 %) were caesarean deliveries and 5175 (63.89 %) were vaginal deliveries. The overall CS rate was 36.11 %. Primary CS was (55.27 %) whereas previous 1 CS was (39.70 %) and more than 1 was (5.03 %).

Out of 2924 cases 233 cases (7.97 %) fall in < 20 years' age group. 1129 cases (38.6 %) were between 21 - 25 years, 1234 cases (42.22 %) cases were in the age group of 26 - 30 years, 296 cases (10.12 %) cases were in the age group of 31 - 35 years, 32 cases (1.09 %) were in the age group of > 35 years. (Table 1)

Age Groups (Years)	Number (N)	Percent (%)
< 20	233	7.97
21 - 25	1129	38.6
26 - 30	1234	42.22
31 - 35	296	10.12
> 35	32	1.09
Total	2924	100

Table 1. Age Wise Distribution of Cases of Caesarean Section

Among 2924 cases, 1795 (61.39 %) cases were unbooked and 1129 (38.61 %) cases were booked. Majority of the CS 2590 (88.57 %) were done as emergency procedure. Only 334 (11.42 %) cases had elective CS. Out of 2924, 1769 (60.50 %) were multiparous and 1155 (39.50 %) were Nulliparous. CS at < 37 weeks was 7.49 % whereas majority were in the 37 – 40 weeks of gestation (79.42 %). (Table 2)

Gestation Age (Weeks)	Number (N)	Percent (%)
< 37 weeks	219	7.49
37 - 40 weeks	2322	79.42
> 40 weeks	383	13.09
Total	2924	100

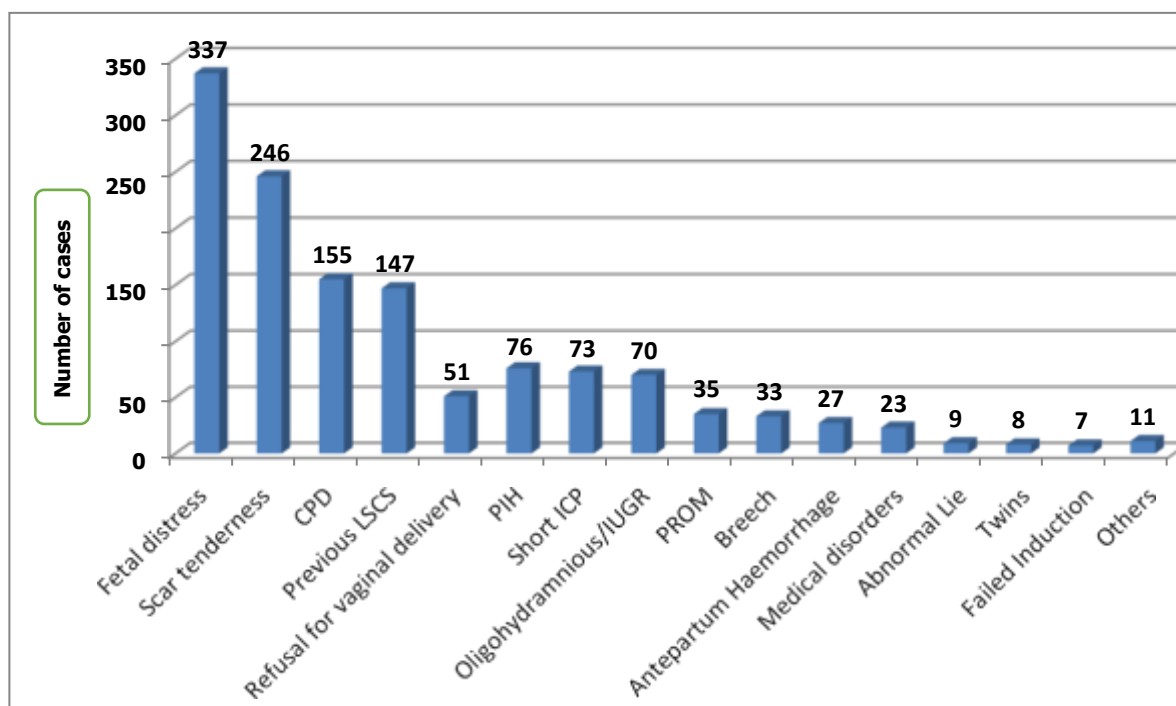
Table 2. Distribution of Cases of Caesarean Section According to Gestation Age

Out of total 2924 cases 90.62 %, 8.21 % and 1.17 % were cephalic presentation, breech and other presentations respectively. 32 cases were twin pregnancy out of 2924 and rest were singleton. Out of total 2924 caesarean sections majority of CS (55.26 %) were done before labour where no trial was given. Only 20.83 % was induced whereas 23.91 % was in spontaneous labour.

Among the indications, repeat CS (44.74 %) was the commonest cause followed by foetal distress (16.82 %), 9.37 % and 8.21 % cases were due to failed induction and breech respectively. Antepartum haemorrhage included placenta Previa, abruption placentae, placenta accreta (Table 3).

Indications for LSCS	Number of Cases	Percent (%)
Previous LSCS	1308	44.74
Foetal distress / MSL / NRCTG	492	16.82
Failed induction	274	9.37
Breech	240	8.21
PIH	118	4.03
IUGR with Oligohydramniotic	107	3.65
CPD	105	3.59
Non Progress of Labour	97	3.31
Antepartum Haemorrhage	61	2.09
2 nd stage Arrest	47	1.62
Abnormal lie	34	1.16
Others	41	1.41
Total	2924	100

Table 3. Distribution of Caesarean Section Cases According to Indications



Graph 1. Indications Contributing to Caesarean Section in Previous CS

Group No.	Robson's Criteria	Total (N)	Relative Size of Each Group (%)	No. of Vaginal Delivery	No. of LSCS	CS Rate of Each Group (%)	Contribution To Overall LSCS (%)
1	Nulliparous, single cephalic > 37 Weeks in spontaneous labor	2160	26.66	1816	345	15.97	11.79
2	Nulliparous, single cephalic > 37 Weeks induced or CS before labor	1297	16.01	660	633	48.80	21.64
3	Multiparous (excluding previous CS),single cephalic, > 37 Weeks in spontaneous labor	1729	21.34	1620	104	6.01	3.55
4	Multiparous (excluding previous CS),single cephalic, > 37 weeks induced or CS before labor	800	9.87	585	209	26.12	7.16
5	Previous CS, single cephalic, > 37 weeks	1168	14.42	50	1132	96.92	38.72
6	All nulliparous breeches	161	1.98	23	138	85.71	4.73
7	All multiparous breeches (including previous CS)	140	1.72	38	102	72.85	3.48
8	All multiple pregnancies (including previous CS)	110	1.35	78	32	29.09	1.09
9	All abnormal lies (including previous CS)	34	0.41	0	34	100	1.16
10	All single cephalic, < 37weeks (including previous CS)	500	6.17	305	195	39.00	6.67
	Total	8099	100	5175	2924	36.11	100

Table 4. Distribution of Caesarean Section Rates in Study Sample According to Robson's Classification

Commonest cause for the repeat C-section was foetal distress (25.76 %) followed by scar tenderness (18.81 %) and Cephalopelvic disproportion (CPD) (11.85 %). (Graph 1). The maximum relative contribution to CS rate was from group 5, 38.72 % with CS rate of 96.92 %. The next contribution for CS was by group 2 with relative contribution to CS of 21.64 % with CS rate being 48.80 %. The third contribution to CS was from nulliparous group 1 with relative contribution of 11.79 % and CS rate was of 15.97 %. The CS rate and relative contribution to CS rate was lower in nulliparous group 1 compared to group 2. Relative contribution for CS from multiparous group 3 and group 4 was 3.55 % and 7.16 %. (Table 4)

DISCUSSION

In our study, the overall caesarean section (CS) rate was 36.11 %, comparable to that of Preetkamal et al.⁷ who reported Cesarean rate to be 33.20 %. This result contrasts with that of Singh G et al.⁸ where he found 51.1 % CS rate. In our study CS rate for un-booked cases were higher (61.39

%) than the booked cases (38.61 %) which contrasts to study by Kambo et al.⁹ (60 % booked cases). This could be explained by last minute referrals, unavailability of section and transfusion facilities at the primary booking Centre. Majority of the CS (88.58 %) were performed as emergency cases which was comparable with findings of Jawa A et al.¹⁰ (74.6 %). Majority of cases 80.82 % cases belonged to 21 - 30 years.

This can be explained due to maximum fertility in this age group. Those of 20 years and below were 7.97 % which was similar to the findings of Jawa A et al.¹⁰ In our study majority of CS (79.42 %) were at term pregnancy and 7.49 % were < 37 weeks consistent with study by Das RK et al.¹¹ where 84.84 % were > 37 weeks and 9.93 % were < 37 weeks. The maximum number of CS was in multiparous (60.50 %) and 39.43 % in primigravidae in agreement with the study by Gupta M et al.¹² whereas CS in multiparous was 53.82 % and 46.18 % in nulliparous. Previous CS was the commonest indication (44.74 %) of CS similar to study by Chayda D et al.¹³ The incidence of CS can be minimized by preventing primary CS and practising trial of labour of Vaginal Birth After Caesarean (VBAC). Few studies found

that VBAC with a well-defined protocol was found to be safe for the mother and infant. However, Mc Mahon MJ et al.¹⁴ noted higher maternal and foetal morbidity with VBAC compared to elective CS. Foetal distress was the second commonest indication (16.82 %) almost similar to study by Jawa A et al.¹⁰ where it was 16.06 %. Precise interpretation of foetal heart tracing and use of foetal PH might be effective in reducing CS rate. Failed induction constituted 9.37 % third common indication which was in agreement with the study by Chayda D et al.¹³ This can be reduced by giving adequate trial of labour and avoiding unnecessary inductions, early diagnosis of inadequate progress of labour, timely amniotomy, and increased involvement of senior staff. Breech presentation was the fourth most common indication (8.21 %). Practice of external cephalic version reduces the likelihood of CS. The policy of selective and planned vaginal delivery for breech was recommended by Danielian PJ¹⁵ with no increase in infant morbidity.

Pregnancy-induced Hypertension (PIH) which includes pre-eclampsia (3 %) and eclampsia (1.03 %) constituted total 4.03 % cases which was comparable to study done by Gupta M et al.¹² Early management can prevent complications, detected through good antenatal care. Analysis and interpretation of CS rate according to Robson's guidelines (quoted) and classification:

Groups 1 and 2

Groups 1 and 2 usually account for 35 - 40 % of all deliveries; Group 1 should be larger than Group 2, usually 2:1 and a CS rate for Group 1 less than 10 % is desirable. The CS rate for Group 3 should be 20 - 35 %.

Group 1 and group 2 included 42.67 % women in the present study. Group 1 was 1.6 times larger than group 2. The lower ratio indicates higher induction and Prelabour CS. The CS rate for group 1 was 11.79 % which was higher than Robsons guidelines⁵¹ but was in agreement with Shirsath A et al.¹⁶ (19.6 %). The higher CS rate in group 1 was probably for non-reassuring FHR pattern. Thus in group 1 CS rate can be reduced by not just taking non-reassuring FHR on Non-Stress test as the only criteria for foetal distress as NST carries 50 % false positive rate. The contribution of group 1 and 2 to overall CS rate in was 33.43 % in agreement with Pereira MN et al. 2016¹⁷ In group 2 CS rate should be 20 - 35 % but in our study it is 48.80 %. This indicates poor success rates for induction or poor choice of women to induce and consequently a high rate of CS in group 2. This also suggests that women with induced labour had higher probability of surgical delivery as compared to spontaneous labour. Therefore, indications for induction of labour needs to be strictly followed.

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 no higher than 3 %. The CS rate in Group 4 should be below 20 %.

Group 3 and group 4 included 31.21 % women in the present study. Group 3 was more than two times larger than

group 4. The CS rates in group 3 were 6.01 % which was in accordance with Shirsath A et al.¹⁶ (4.8 %). The CS rate in our study in group 4 was 26.12 % higher than Shirsath A et al.¹⁶ (6.6 %) reflecting a high maternal request for CS or due to previously traumatic or prolonged labour or tubal ligation. There has been much concern about the appropriate management of the first stage of labour, when the active phase actually begins and therefore when to intervene by using modified WHO Partograph.

Group 5

Group 5 comprised of not more than 10 % of women. With good perinatal outcomes, a CS rate of 50 - 60 % in Group 5 was excellent.

"The proportion of women in group 5 was slightly more (14.42 %) than the suggested limit. The CS rate in group 5 were 96.92 % almost similar to Kansara V et al.¹⁸ (98.3 %). Women with previous CS that is group 5 made the highest contribution of 38.72 % to overall CS similar to most of the studies across India like those by Wanjari SA et al.¹⁹ (32.8 %), Shirsath A¹⁶ (54.5 %).

The option to decrease the CS rate in group 5 was trial of labour after caesarean section (TOLAC). This depends also on facilities available in hospital e.g., emergency operation theatre for CS, blood bank and judgment of the obstetrician. Groups 1, 2, and 5 usually account for two-thirds of all caesarean deliveries. In the present study group 1, 2 and 5 were responsible for 57.09 % of all the CS. These three groups should be the focus of attention to lower the overall CS rate.

Group 6 and 7

Groups 6 and 7 included 3 - 4 % of all women, and Group 6 was usually twice the size of Group 7.

The present study had 3.07 % women in group 6 and group 7 combined. Group 6 was 1.15 times the size of group 7 because breeches were more frequent in nulliparous than multiparous women. The CS rate in group 6 and 7 were 85.71 % and 72.85 % respectively which was in agreement with Samba et al.²⁰ who reported 69 % CS rates for all breech presentations. Teaching of skills for External cephalic version (ECV) and assisted breech delivery and their reinforcement would help to decrease the need for CS.

Group 8 and 9

Group 8 included 1.5 - 2 % of women. Group 9 comprised of 0.2 - 0.6 % women with a CS rate of 100 %

In the present study group 8 and 9 each comprised of 1.35 % and 0.41 % respectively of the study population. All women in group 9 (100 %) were delivered by CS which was comparable with the study of Varija T et al.²¹ who found 100 % CS rate in group 9.

Group 10

Group 10 included approximately 5 % of women. The CS rate in Group 10 was usually around 30 %.

The size of group 10 in the present study was 6.17 % slightly more than the recommendation. The reason was ours is a tertiary / referral hospital where many high risk pregnancies e.g. foetal growth restriction, pre eclampsia, Eclampsia, preterm PROM etc. needing preterm CS.

Overall

"The total number of caesareans and normal deliveries should be the sum of the number of each event in Robson groups 1 to 10 combined."

The results of the present study were in agreement with this observation. The proportion of women in certain group varied slightly from that suggested by Robson due to the type of health facility dealing with more of high-risk cases. Dhodapkar SB et al.²² also had slightly different proportions due to similar reasons.

This was an attempt to find the relevant groups contributing to the increasing caesarean rate over time.

CONCLUSIONS

Robson's 10 - group classification provides an easy way to identify broad categories of women to be targeted to reduce CS rate and to formulate strategies. CS rate can be reduced by decreasing the rate of primary CS, conducting TOLAC as per protocols, strict implementation of induction protocols and precise interpretation of foetal heart rate tracings.

Limitations

Pregnant women studied here might not reflect the same situation in the rest of the country because of underreporting of home vaginal deliveries, the CS rate may have been overestimated also. Analysis of elective caesarean on maternal request or planned CS for specific conditions (example - placenta previa) or pre-existing medical conditions were not accounted by this classification which are its limitations. It does not account for differences within populations that were due to regional variation, wealth disparity, or other factors.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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