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Original Research Article

Determination of caesarean section rate and its trend analysis in a tertiary care tribal preponderant state using Robson's classification

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ABSTRACT

Background: There are certain conditions during delivery where vaginal delivery becomes unsafe. To overcome this situation, caesarean section (CS) is necessary for the safety of the mother and baby. The incidence of CS is rising to improve the outcome of mother and baby; it is a life-saving surgical tool in the process of delivering the baby. Efforts are being made to decrease the rate of CS without adversely affecting the outcome of the mother and baby. Robson's classification for the indication of CS is an excellent method to audit for the indication of the surgery. However, this classification does not include some important indications like placenta previa, which is on the rise in the present day.
Methods: This study was a hospital-based prospective observational study that enrolled 2066 pregnant females, conducted from October 2023 to September 2024 in a tertiary health centre.
Results: Delivery by vaginal route and CS was 4561 during one year period, 2066 women was delivered by CS accounting an incidence of 45.29%. The majority of patients were in the age group of 20-30 years (75.9%), 82.1% were from rural areas, and the majority of women were unbooked (70%), 57.4% were multiparous, and 51.3% of the patients belonged to the tribal community.
Conclusions: Standardisation of CS indication parameters, regular CS audits, and application of Robson classification for every woman undergoing a CS will be helpful to keep a check on rising CS rates.

Keywords: Robson's classification, Caesarean section, Audit

INTRODUCTION

Caesarean section (CS) is the delivery of the foetus through an open abdominal incision (laparotomy) and an incision in the uterus (hysterotomy). The first documented caesarean occurred in 1020 AD, and since then, the procedure has evolved tremendously.[1] CS is being used as a life-saving surgical tool when complications arise in the process of giving birth.[2] In India, the rate of CS deliveries has been continuously rising.[3] Overall, the rate of CS is increasing from a 7% rate in 1990 to 21% in 2023, which has exceeded the acceptable CS rate, which is only 10-15% according to WHO.[4] The case of non-medical indications like "maternal request" has also contributed to its increasing rate.[5] A variety of reasons have improved the safety of caesarean deliveries, thereby leading to a further increase in caesarean rates. A few reasons for the rise in CS rates could be summed up as: advanced maternal age, increasing body mass index, and assisted reproductive technologies have given rise to more complications in pregnancy and labor. Medicolegal expectations of a perfect perinatal outcome have undoubtedly influenced obstetric care. Robsons categorizes delivery by CS depending on the woman's pregnancy state rather than medical indications. Obstetric factors taken into consideration are: parity of the woman, previous mode of delivery, Presentation of the foetus in the present pregnancy, along

with the number of foetuses and duration of pregnancy in weeks.[2]

The Robson classification system is considered useful for studying, evaluating, monitoring, and comparing CS rates within and between healthcare facilities shown in (Table 1).[6]

Table 1: Robson`s ten-group classification.

Groups	Obstetrical population
1	Nulliparous, single, cephalic, >37 weeks in spontaneous labor
2	Nulliparous, single, cephalic, >37 weeks, induced or CS before labor
2 A	Labor induced
2 B	Pre-labor CS
3	Multiparous (excluding previous CS), single, cephalic, >37 weeks in the spontaneous labor
4	Multiparous (excluding previous CS), single, cephalic, >37 weeks, induced or CS before labor
4 A	Labor induced
4 B	Pre-labor CS
5	Previous CS, single cephalic, >37 weeks
5.1	With one previous CS
5.2	With 2 or more previous CSs
6	All nulliparous breech
7	All multiparous breech (including previous CS)
8	All multiple pregnancies (including previous CS)
9	All abnormal lies (including the previous CS)
10	All single, cephalic <37 weeks (including previous CS)

METHODS

This was a cross-sectional observational study which was conducted among 2066 pregnant females attending the emergency ward of the obstetrics and gynaecology department of RIMS, Ranchi, for a period of 12 months from October 2023 to September 2024 and those who fulfilled the inclusion criteria. This study was approved by the institution's ethics committee memo no. 388 IEC RIMS.

Sample recruitment and sample procedure

All pregnant females of >28 weeks gestation with live foetus in the active stage of labour and decided for LSCS due to any of the indications mentioned in RTGCS, were included in the study after having proper consent. While patients who refused LSCS, who can be taken for vaginal/instrumental delivery for maternal or foetal indication, intrauterine death, and diagnosed congenital anomalous baby were excluded from the study.

Data collection procedure

Pregnant women who fulfilled the inclusion criteria were included in the study. They were interviewed based on a questionnaire, which included personal information, tribe, obstetrics history, and any past medical or surgical history. Detailed obstetrical examinations were done which included per abdominal examination, and per vaginal examination. The patients were observed till she was discharged from the hospital. Indications for CS were recorded and analysed using Robson classification.

Data analysis

All the subject data were collected in the standardised data collection and entered into an MS-excel sheet. Analysis was done using SPSS version 20. An appropriate statistical test was applied according to qualitative and quantitative data. Data analysis was done.

RESULTS

Delivery by vaginal route and CS was 4561 during one year period, 2066 women was delivered by CS accounting an incidence of 45.29%. The trend analysis over one year shows the different numbers of CS done in a particular month (Figure 1). The month of August shows the highest number of CS done, which is 218 out of 518 deliveries. In the given sample size, the majority of patients were in the age group of 20-30 years (75.9%). 82.1% were from rural areas, and the majority of women were unbooked (70%). 57.4% were multiparous, and 42.6% were primigravida. 71.8% belong to the lower class. We attended 71.3% of referred cases from peripheral institutes and secondary centres (Table 2).

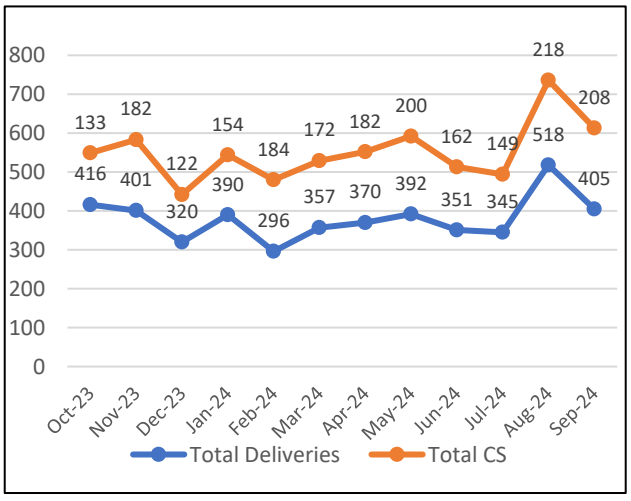

Figure 1: Summary of total deliveries (inclusive of vaginal and caesarean deliveries), and total CS, trend of CS over 1 year.

Jharkhand, being a tribal state, shows 51.3% of the patients belong to the tribal community, while 48.7% were non-tribal (Table 2).

In this study, group 5.1 was the highest contributor to the overall CS rate, contributing 34.36% of all CS and 15.56% to all deliveries. Based on Robson's classification, Group 1 contributed absolutely 7.73%, whereas the relative contribution was 17.08%. This was followed by group 2A, which was the third highest contributor, contributing 9.43% to overall CS and 4.27% to all deliveries. Group 4B was the fourth-highest contributor, contributing 8.61% to overall CS and 3.90% to all deliveries.

Remaining (2, 3, 4A, 6, 7, 8, 9, and 10) contributed absolutely 10.26%, relative contribution 22.65% (Table 3). Main indication for performing CS was foetal compromise (foetal distress, MSL in early labour) and previous CS. In group 3, 9, 10, CS was done for absolute indication, viz, obstructed labour, malpresentation, placenta previa, respectively. In groups 1, 2, 4, and 5, indications for CS were relative, viz foetal distress, non-progress of labour, and previous uterine scar, respectively (Table 4).

Table 2: Sociodemographic variables.

Variables		N (%)
Age (in years)	<20	149 (7.2)
	20-30	1568 (75.9)
	>30	349 (16.9)
Parity	Primipara	881 (42.6)
	Multipara	1185 (57.4)
Tribe	Tribal	1059 (51.30)
	Non-tribal	1007 (48.7)
Household	Urban	370 (17.9)
	Rural	1696 (82.1)
ANC booking	Booked	619.8 (30)
	Unbooked	1446 (70)
Referral	Referred	1474 (71.3)
	Not referred	592 (28.7)
Socioeconomic status	Lower	1483 (71.8)
	Lower middle	455 (22.1)
	Upper middle	128 (6.2)

Table 3: Proportion of each Robson`s group, group CS rate, absolute contribution and relative contribution.

Groups	Number of women in group	Number of CS in the group	Group CS rate (N1)	Absolute contribution (N2)	Relative contribution (N3)
1	1076	353	32.8%	7.73%	17.08%
2A	356	195	54.77%	4.27%	9.43%
2B	294	108	36.73%	2.36%	5.22%
3	487	92	18.89%	2.01%	4.45%
4A	206	55	26.69%	1.20%	2.66%
4B	318	178	55.97%	3.90%	8.61%
5.1	855	710	83.04%	15.56%	34.36%
5.2	162	162	100%	3.55%	7.84%
6	86	22	25%	0.48%	1.06%
7	75	50	66%	1.09%	2.42%
8	49	12	24.48%	0.26%	0.58%
9	35	15	42.85%	0.32%	0.72%
10	562	114	20.28%	2.49%	5.51%

N1 (Group CS rate)-no. CS in defined group/no. of women in particular group×100; N2 (Absolute contributor)-no. of CS in defined group/no. of women delivered particular group×100; N3 (Relative contributor)-no. of CS in defined group/ no. CS in particular group×100.

Table 4: Indication of CS in Robson`s ten-group classification.

Indication of CS	Number of women in different Robson`s group												Total
	1	2A	2B	3	4A	4B	5.1	5.2	6	7	8	9	10	
Previous 1 CS+scar tenderness/ dehiscence							466							466
Previous ≥ 2 CS								162						162
Primi breech									22					22
Meconium-stained liquor in the early stage of labor	194	92	24	12	17	60	33				5		34	471

Continued.

Indication of CS	Number of women in different Robson`s group													Total
	1	2A	2B	3	4A	4B	5.1	5.2	6	7	8	9	10	
Fetal distress/non-reassuring CTG	50	25	28	18	24	52	26			21	7		44	295
Obstructed labour				32	14									46
Placenta previa						10	28						36	74
Placenta accreta spectrum						11	05							16
Cephalopelvic disproportion	40						23							63
Failed induction		44												44
Non-progress of labour	54	14		12						9				89
Cord prolapses										9				9
Transverse lie/ oblique lie												15		15
IUGR/abnormal doppler study		8	16	8		27	14			11				84
Severe oligohydramnios		12	28	6		10	13							69
Not willing for trial of labor	15						102							117
Decompensated heart disease			12	4	8									24

DISCUSSION

Rajendra institute of medical sciences is a tertiary care centre that caters to the needs of the maximum population of Jharkhand and nearby districts of states like West Bengal, Odisha, and Bihar. The CS rate of our institution in the given study period has been 45.29%, which is much higher than the WHO-recommended rate of 10-15%.[4] This rate is also higher than what was observed in the years 2019 to 2021 in India, a rate of 21.5%.[7] Our study can be compared with a study done by Jogia and Mehta in Gujarat in 2020, in which the caesarean rate was 41.49%.[8] Another study done by Yadav et al in Agra, observed a caesarean rate of 26.22%.[9] The highest CS rate was observed in the state of Telangana 60.7%, while the lowest was observed in Nagaland-5.2%, according to 2019-2021 data.[10]

Maximum number of patients belonged to the age group of 20-30 years, which can be compared to a study by Parveen et al.[11] The 82.1% of the population belonged to rural areas, while 17.9% of the population were from urban areas. This shows that patients from interior and far-away rural locations prefer to choose a government institute, where obstetrical care is free of cost. Contrary to our study, a study by Parveen et al shows that the majority (69.5%) of women are from urban areas.[11]

Only 30% of cases were booked cases, either in RIMS or elsewhere, while a huge number of cases were unbooked (70%). This indirectly reflects the fear and hesitations of women to approach healthcare facilities and their unawareness of government programmes. In the national family health survey (NFHS-5) (2019-2021), India factsheet that the percentage of women having at least 4 ANC visits was 58.1%.[7] The 57.4% of the females were multiparous while 42.6% were primigravida. This is comparable with the data of Baser et al which shows 47.58% of primigravida and 52.42% were multiparous.[12] Due to a lack of awareness and illiteracy in our state, the number of unbooked patients exceeds the national figure.

Around 51.3% of patients belonged to tribal group, while 48.7% of women were from various non-ethnic groups.

Around 71.3% of the women were referred from different centres. This shows a strong referral system in our state leading to less maternal mortality and morbidity. The 71.8% of patients in our study belonged to lower socioeconomic class.

Our study shows that the highest contributor to overall CS is group 5.1 (34.36%), this could be due to decreasing number of labor trials given to previous caesarean patients. This also evident in study by Jamwal et al which shows a CS rate of the 40.3% in group 5 and 29.2% in the group 2.[13]

Group 1 was 2nd highest contributor of CS rate (17.08%), followed by group 2 A, which showed a CS rate of 9.43%, and then group 4 B, which showed 8.61% of CSs. In contrast to a study by Wahane et al in which group 1 contributed 24.5% to total CS rate, whereas group 5 contributed 21.27%.[14]

The main indication in our study for CS was previous CS and foetal compromise, like foetal distress, and MSL in early labor. Absolute indications were present only in three groups: group 3 (obstructed labor), group 9 (malpresentation), and group 10 (placenta previa). While in other groups, non-absolute indications were the leading causes for a CS, like in group 5- previous CS, group 1-foetal distress, and groups 2 and 4-non-progress of labour. Pravina et al in their study mentioned that previous CS, foetal distress, failed induction, arrest of labor, and malpresentation were the main indications for CS.[15] Our study can be compared with the one done by Ahmed et al where the most common indication was the previous one CS (29.18%), followed by foetal distress (21.5%).[16]

Limitations

Robson classification does not include important indications for CS, viz. placenta praevia, medical disorders in mother, foetal indications, especially meconium-stained liquor, maternal request, and methods employed for induction of labour. The duration of the study is short, which also limits the data analysis in a broader perspective.

CONCLUSION

RTGS is a confirmed, women-based, WHO-recommended method of classifying CS s in the modern world. RTGS can be easily applied by clinicians in classifying and auditing CS. There is an overwhelming, unopposed increase in CS nowadays, which demands introspection. This progressive increase in CS rate has led to an increase in the incidence of PAS, which is a life-threatening condition. In one-half of a patient undergoing primary caesarean indication, foetal imperilment is the leading one among them (e. g., RG1-primigravida group, having the highest incidence of foetal distress). This can be curtailed by doing foetal blood sampling, which is not done in our institute. Around half of the patients who undergo CS are observed to be multigravida with a previous uterine scar, which implies a reluctance in TOLAC. Consumer protection act could be one of the reasons for avoiding the trial of labour in women with a previous uterine scar.

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