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ANALYSIS OF CAESAREAN SECTION RATE ACCORDING TO MODIFIED ROBSON'S CLASSIFICATION AT TERTIARY CARE CENTRE IN JAIPUR, RAJASTHAN, INDIA

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ABSTRACT: According to WHO guidelines and US Healthy initiative 2000, the cesarean section rate should not be beyond 15 %. The aim of this study is to analyze cesarean section rate at tertiary care centre according to Modified Robson's classification. **Methods:** The present study was carried out retrospectively at Department of Obstetrics & Gynecology, SMS Medical College, Jaipur, Rajasthan from May 2023 to Nov2023. All women delivered during this period were classified according to modified Robson's classification. For each group, the cesarean section rate within the group and its contribution to overall cesarean section rate were calculated and results were noted as per Modified Robson's criteria. **Results:** Highest contribution to the total CS rate was made by Group 5 (previous cesarean, singleton, cephalic, > or equal to 37 weeks), accounting for 40.65% of all CSs, with CS rate of 95.83%. High CS rates were also observed in Group 6 (nulliparous breech) and Group 7 (multiparous breech) having a 100% CS rate. Group 2 (Nulliparous, singleton, cephalic, > or equal to 37 weeks) had a higher CS rate (48.33%) than Group 1. Group 3 & 4 (Multiparous, singleton, cephalic, > or equal to 37 weeks) had relatively lower CS rates (19.53% & 30.56%, respectively). **Conclusions:** Modified Robson's classification is easily implementable and effectively utilized in analyzing cesarean sections rate to guide us to form strategies to avoid unnecessary sections.

INTRODUCTION: There has been a dramatic increase in the cesarean section rate globally. In some areas it has reached beyond 40%. In India CS rates is increasing steadily and there is wide variation in CS rates between private and public health sector^{1, 2}. According to WHO guidelines and US Healthy initiative 2000, the cesarean section rate should not be beyond 15%³.

However, there was an upward trend of cesarean section rate as there were no reliable and internationally standardized data enabling a global comparison for the indications of cesarean sections. There is need for an internationally accepted classification system for cesarean section that would allow meaningful and relevant comparison of CS rates.

The increasing rate of cesarean section is a matter of international public health concern as it increases the cesarean section related maternal morbidity^{4, 5, 6}. The 10 group Modified Robson classification of cesarean section has been appreciated by WHO in 2014 and FIGO in 2016^{3, 5}. According to the Indian Council of Medical

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Research1 (ICMR) task force study, CS rate has increased from 21.8% in 1993-94 to 28.1% in 2005-06 ¹⁴. This classification system allows us to of cesarean section rate according to characteristics of pregnancy ⁷. According to WHO, this classification will aid in optimization of the cesarean section use and assess the strategies aimed to decrease the cesarean section rate and thus improve the clinical practices and quality of care in various health care facilities. This study was an attempt to classify the caesarean section based on this classification system to know and analyze the cause of rising caesarean section in our set up.

The Objectives of the Study were:

- ❖ To classify the cesarean section according to their causes.
- ❖ To identify and audit the rising causes of cesarean section in our scenario.
- ❖ To standardize the indications of cesarean section.

METHODS: The present study was carried out retrospectively at Department of Obstetrics & Gynecology, SMS Medical College, Jaipur, Rajasthan from May 2023 to Nov2023. All data was retrieved and statistically analyzed. The Relevant obstetric data was collected from labour room delivery register like gestational age, parity, number of fetuses, presentation of fetus, whether patient presented with spontaneous labour or was induced. Women were classified according to Modified Robson classification.

For each group, the Caesarean Section rate within the group and its contribution to overall CS rate was calculated and analyzed using simple statistical measures & descriptive statistical analysis was done.

Inclusion Criteria: Patients delivered by caesarean section during the given period (May 2023 to Nov 2023) were recorded and classified according to Modified Robson’s 10 group classification system **Table 3**.

Exclusion Criteria: Term or Preterm normal or instrumental vaginally delivered patients.

The Parameters Considered were according to the classification system are-

- ✚ Parity (with/ without previous CS);
- ✚ Gestational age (>37/<36 weeks)
- ✚ Fetal presentation (CEPAHALIC, BREECH, ABNORMAL LIE)
- ✚ Number of fetus (Singleton, Multiple)
- ✚ Onset of labour (Spontaneous, Induced, prelabour cs)

This modified Robsons Classification includes sub classification of woman having caesarean section after spontaneous onset of labour, after induction of labour and before labour ⁸. Though there has been limitation to this modification also, still it is simple, easily implementable and important tool to monitor Caesarean Section rates **Table 2**.

TABLE 1: ROBSON’S CLASSIFICATION OF CESAREAN SECTION

Groups	Clinical characteristics
1	Nulliparous, singleton, cephalic, ≥37 weeks, spontaneous labour
2	Nulliparous, singleton, cephalic, ≥37 weeks, induced labour or cesarean section before labour
3	Multiparous without previous cesarean section, singleton, cephalic, ≥37 weeks, spontaneous labour
4	Multiparous without previous cesarean singleton, cephalic, ≥37 weeks, induced labour or cesarean section before labour
5	Multiparous with prior cesarean section, singleton, cephalic, ≥37 weeks
6	All nulliparous breeches
7	All multiparous breeches (including previous cesarean section)
8	All multiple pregnancies (including previous cesarean section)
9	All pregnancies with transverse or oblique lie (including those previous cesarean section)
10	Singleton, cephalic, ≤36 weeks (including previous cesarean section)

TABLE 2: MODIFIED ROBSON’S CLASSIFICATION

Serial no.	Major groups	Subgroups
1	Nullipara, singleton cephalic, ≥ 37 weeks spontaneous labour	
2	Nullipara, singleton cephalic, ≥ 37 weeks	Induced Caesarean section before labour

3	Multipara, singleton cephalic, ≥ 37 weeks, spontaneous labour	Induced
4	Multipara, singleton cephalic, ≥ 37 weeks	Caesarean section before labour
5	Previous Caesarean section, singleton cephalic, ≥ 37 weeks	Spontaneous labour
		Induced labour
6	All nulliparous breeches	Caesarean section before labour
		Spontaneous labour
		Induced labour
7	All multiparous breeches(including previous Caesarean section)	Caesarean section before labour
		Spontaneous labour
		Induced labour
8	All multiple pregnancies (including previous Caesarean section)	Caesarean section before labour
		Spontaneous labour
		Induced labour
9	All abnormal lies(including previous Caesarean section but excluding breech)	Caesarean section before labour
		Spontaneous labour
		Induced labour
10	All singleton cephalic, ≤ 36 weeks (including previous Caesarean section)	Caesarean Section before labour
		Spontaneous labour
		Induced labour
		Caesarean section before labour

TABLE 3: CESAREAN SECTION RATE AND CONTRIBUTION MADE BY EACH GROUP

Robsons criteria	Total deliveries in each group	Total number of caesarean section in each group	Relative size of group (%)	Cesarean section rate (%)	Contribution made by each group to total cesarean section rate (%)
1	2100	350	39.53	16.67	16.31
2	240	116	4.51	48.33	5.40
3	1080	211	20.33	19.53	9.84
4	530	162	9.97	30.56	7.55
5	910	872	17.13	95.83	40.65
6	128	128	2.40	100	5.96
7	49	49	0.92	100	2.28
8	150	144	2.82	96	6.71
9	27	27	0.51	100	1.26
10	98	86	1.84	87.75	4.00
Total	5312	2145	100		100

TABLE 4: CESAREAN SECTION RATE AND CONTRIBUTION MADE BY EACH GROUP

Modified Robsons criteria Major group	Sub group	Total deliveries in each group	Total number of cesarean section in each group	Relative size of group (%)	Cesarean section rate (%)	Contribution made by each group to total cesarean section rate (%)
1. Nullipara, singleton cephalic, ≥ 37 weeks, spontaneous labour		2100	350	39.53	16.67	16.31
2. Nullipara, singleton cephalic, ≥ 37 weeks	Induced labour	200	76	3.78	38	3.54
	CS before labour	40	40	0.75	100	1.86
3. Multipara, singleton cephalic, ≥ 37 weeks, spontaneous labour		1080	211	20.33	19.53	9.84
4. Multipara, singleton cephalic, ≥ 37 weeks	Induced labour	480	112	9.04	23.33	5.22
	CS before labour	50	50	0.94	100	2.33
5. Previous Caesarean section, singleton cephalic, ≥ 37 weeks	Spontaneous labour	120	87	2.23	72.50	4.06
	Induced labour	40	35	0.75	87.50	1.63
	CS before labour	750	750	14.12	100	34.97
6. All nulliparous	Spontaneous	10	10	0.19	100	0.23

breeches	labour					
	Induced labour CS before labour	0	0	0	0	0
	Cesarean section before labour	118	118	2.22	100	5.50
7. All multiparous breeches(including previous Caesarean section)	Spontaneous labour	0	0	0	0	0
	Induced labour	0	0	0	0	0
	CS before labour	49	49	0.92	100	100
8. All multiple pregnancies(including previous Caesarean section)	Spontaneous labour	6	0	0.11	0	0
	Induced labour	0	0	0	0	0
	CS before labour	144	144	2.71	100	6.67
9. All abnormal lies(including previous Caesarean section but excluding breech)	Spontaneous labour	0	0	0	0	0
	Induced labour	0	0	0	0	0
	CS before labour	27	27	0.51	100	1.26
10. All singleton cephalic, ≤ 36 weeks(including previous Caesarean section)	Spontaneous labour	30	23	0.56	76.67	1.07
	Induced labour	25	20	0.47	80	0.93
	CS before labour	43	43	0.81	100	2.00
Total		5312	2145	100		100

RESULTS AND OBSERVATION: This retrospective analysis using Robson Ten Group Classification System (TGCS) provides a comprehensive overview of cesarean section (CS) rates and their distribution across different obstetric populations in our hospital. Data was analyzed as shown in **Table 2** and **Table 3**. Out of a total of 5,312 deliveries, 2,145 cesarean sections were performed yielding an overall CS rate of 40.38%.

The highest contribution to the total CS rate was made by Group 5 (previous cesarean, singleton, cephalic, > or equal to 37 weeks), accounting for 40.65% of all CSs, with a striking CS rate of 95.83%, indicating limited success in VBAC (Vaginal Birth After Cesarean) attempts. Group 1 (nulliparous, singleton, cephalic, > or equal to 37 weeks, spontaneous labour) had the highest proportion of deliveries (39.53%), with a CS rate of 16.67%, contributing 16.31% to the total CS rate.

High CS rates were also observed in Group 6 (nulliparous breech) and Group 7 (multiparous breech), with both groups having a 100% CS rate, albeit with lower absolute contributions due to smaller group sizes. Group 10 (singleton cephalic, < or equal to 36 weeks, including previous CS) had a notable CS rate of 87.75%, reflecting the clinical complexity and cautious approach towards preterm deliveries. Group 2 (Nulliparous, singleton, cephalic, > or equal to 37 weeks, induced or CS

before labour) had a higher CS rate (48.33%) than Group 1, particularly among induced labour and CS before labour subgroups. The induced subgroup had a 38% CS rate, whereas CS before labour was 100%, indicating that induction & elective CS in nulliparous women significantly increase surgical deliveries.

Group 3 & 4 (Multiparous, singleton, cephalic, more than or equal to 37 weeks) had relatively lower CS rates (19.53% & 30.56%, respectively) & moderate contributions to total CS (9.84% & 7.55%). Group 8 (All multiple pregnancies) & Group 9 (All abnormal lies) also had a 100% CS rate. Group 8 contributed 6.71% to CS rate, while Group 9 accounted for 1.26%, showing that multiple gestation and abnormal presentations are predominantly managed by CS.

The dominance of Group 5 in CS contribution highlights the need for structured VBAC protocols and counseling. Interventions targeting primary cesarean prevention (Group 1 and 2) may help reduce the cascading effect into Group 5. High rates in breech and preterm groups reflect adherence to current obstetric guidelines favoring CS in such scenarios.

DISCUSSION: Standardization and classification of cesarean deliveries was done in our department according to the Modified Robson's criteria. This

was an attempt to see which clinically relevant groups contributed most to the cesarean deliveries. As we observed in present study, the rate of cesarean section in our hospital (40.38%) is quite higher than what has been considered by WHO (15%). The cesarean section rate depicted in year 2013-2014 in India was 16.4%⁷. This rose to 18% in 2015-16 when a health survey was conducted by Nation Family Health Survey. The average cesarean rate in Asian countries (27.3%) was much lower when compared with USA (31.1%)^{2,8} Vogel et al analyzed the contributions of specific groups through Robson's 10 group classification system in 2 WHO multi- country surveys and concluded the proportion of women with previous caesarean section has increased along with the caesarean section rate in these women as we see in present study⁹. Similarly, the use of induction and pre-labour caesarean caesarean section and caesarean section after induction in multiparous has also increased according to them.

In our study the highest contribution to the total CS rate was made by Group 5 (previous cesarean, singleton, cephalic, > or equal to 37 weeks), accounting for 40.65% of all CSs this was much lower than study done by Pratima mittal *et al* study done in 2017 in north India¹⁵.

In present study also group 2 and 4 had an increased caesarean section rate when compared with 1 and 3 respectively same findings were seen in study done by prtiamittal *et al*.¹⁵ Hence, the need of the hour is to firstly limit induction of labour. It should be strictly evidence based. Secondly, we should critically evaluate on daily basis the indication of primary caesarean section. This will not only decrease the caesarean section in nulliparous but will also eventually decrease caesarean section in multiparous with previous caesarean section. The hospital where this study was conducted was a tertiary care centre where there is large number of referred high risk cases. There is an increase in trend of cesarean section on maternal request.

Main advantage of Modified Robson's classification is its simplicity, robustness, reproducibility and flexibility. It is clinically relevant and suitable even for low resource settings. Indication based CS classification are variable,

subjective, lack clarity, deficient of relevant obstetric history and thus does not allow valid comparisons. Limitation of this study were that it does not allow analysis of CS by demand and those for specific indication like placenta previa. It does not account for preexisting medical, surgical condition or fetal distress, indication and methods used for IOL and degree of prematurity, all of which may influence the rate of CS.

However, we need to reduce the number of cesarean sections in primiparas and make judicious use of vaginal birth after cesarean deliveries but not at the cost of health of mother and baby. ACOG recently recommended clinical guidelines to restrict the number of cesarean deliveries which are nonmedically indicated and induction of labour before 39 weeks of gestation¹⁰.

Efforts to reduce such births should include awareness to public, reducing unindicated induction before 39 weeks certain changes and standardization in the departmental policies. Increasingly sedentary lifestyle and poor tolerance to pain are adding to CSMR ratio. Authors should judiciously make use of vaginal birth after cesarean deliveries but not at the cost of maternal or fetal health. Standardization of indication of cesarean deliveries, regular audits and definite protocols in hospital will aid in curbing the cesarean section rate in hospital. This will definitely aid in decreased maternal morbidity associated with cesarean delivery rates, reduce the hospital stay and in turn improve the economy. At the same time, one should make every effort to provide the cesarean delivery to the woman in clinically indicated.

CONCLUSION: Modified Robson's classification is easily implementable, can be effectively utilized in analyzing delivering women and determinate contributors to caesarean sections to guide the health care providers to form strategies to avoid unnecessary sections. At the same time, one should make every effort to provide the cesarean delivery to the woman in clinically indicated need rather than to achieve a specific rate.

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