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ANALYSIS OF CESAREAN SECTION RATE USING ROBSON'S TEN GROUP CLASSIFICATION SYSTEM IN NORTH INDIA

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Abstract
Rising cesarean section rates all over the world are a subject of concern. Objective: To analyze Cesarean Sections (CSs) trends and evaluate them according to Robson's Ten Groups Classification System (TGCS). Methods: The study was conducted in the Department of Obstetrics and Gynecology, FHMC, Agra, India. This was a retrospective study conducted for one year from January 2017 to 31 December 2017. Total 430 women were delivered in the tertiary care center FHMC & Hospital during the study period. Data was collected in a predesigned proforma from each subject regarding maternal characteristics and pregnancy-related information and further divided into Ten groups of Robson's criteria based on obstetrics information. Results: A total of 227 women were delivered via cesarean section showing a CS rate of 52.79% for the same year. About one-fourth were at >37 weeks with single gestation having a cephalic presentation with a history of the previous cesarean (group 5). Among all groups maximum cesarean section rates were found 100% in group 9, followed by 97.19% in group 5, and 82.14% in group 2. The maximum percentage contribution made by each group to the overall cesarean section rate by group 5 (i.e. 24.16%). Previous cesarean section (20.4%) and fetal distress (19.8%) were found to be the most common indications leading to cesarean section. Conclusion: As per Robson's Ten-Group Classification, Group-5 was found to be the most contributing among deliveries done. Previous cesarean section and fetal distress were the most common indications of cesarean section.

Keywords: *Robson's Ten-Group Classification, Cesarean section*

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I. Introduction:

Rising cesarean section rates all over the world are a subject of concern. In 1960 Munro Kerr wrote, "I fear that today more than ever before there is a danger of abdominal delivery being regarded as the legitimate method of dealing with every obstetrical abnormality." There has been an increase in the cesarean section rates over the last five decades. It has increased from a rate of 5% in the 1940s and 1950s to 15% in the 1970 and 1980s. However, there has been a dramatic increase in the cesarean section rate globally, even beyond 30% in some areas. As advised by WHO guidelines and US Healthy initiative 2000, the cesarean section rate should not be beyond 15 %.**[1]** In India, the cesarean section rates were 21.8%, in 1993-94 has increased to 28.1% in 2017 **[2]**. According to WHO cesarean section rates should not be more than 15% as cesarean section rates above this are not associated with additional reduction in maternal and neonatal mortality and morbidity **[3]**.

The rates vary from hospital to hospital as well as country to country. Some factors play role in the increasing trend of cesarean section rates such as increasing incidence of elderly gravida, multifetal pregnancies after infertility treatment, electronic fetal monitoring, increase in several women with previous cesarean deliveries, increase in hospital deliveries, etc. In a systematic review conducted by WHO 2011 on the various classification systems, it was found that Robson's classification, in particular, was best for auditing, analyzing, and comparing cesarean section rates across different settings and to implement different strategies to optimize cesarean section rates **[5,6]**.

Robson proposed a new classification system in 2001, the Robson's ten group classification system allows analysis according to characteristics of pregnancy **[7]**. This classification of cesarean section has been appreciated by WHO in 2014 and FIGO in 2016. **[1,8,9]**

The basic obstetric characteristics used were: -

1. Single or multiple pregnancies.
2. Nulliparous or multiparous or multiparous with previous cesarean section.
3. Cephalic, breech, or other malpresentation.
4. Spontaneous or induced labor.
5. Term or preterm birth.

Using these characteristics Robson's classified all women who delivered in the hospital into 10 groups. (Table 1) with this background, there is an urgent need to understand various causes responsible for growing CS rates and to plan strategies to overcome them to prevent the long-term complications following one or more cesarean sections. So, we attempted to classify the cesarean section based on Robson's criteria and tried to identify causes for reduction of cesarean section rate with their proper interventions.

II. Methods: -

The study was conducted in the Department of Obstetrics and Gynecology, FHMC, Agra, Uttar Pradesh, India. This was a retrospective study conducted for one year from January 2017 to 31 December 2017. All women delivered during this period in the institution were included in the study while term normal or instrumental vaginally delivered women were excluded.

These study subjects were further divided into 10 groups of Robson's criteria based on obstetrics information like parity (with or without previous CS), mode of previous delivery, gestational age, the onset of labor i.e. spontaneous or induced, abnormal lie, presentation, etc. All data was retrieved in a predesigned proforma and entered mentioning the total number of deliveries in each group, the total number of CS in each group, the relative size of each group, CS Rate and Contribution made by each group to CS rate. (Table 2)

The first column contained Ten groups of Robson criteria based on obstetrics information. The second column represented the size of each group in the form of a percentage, calculated by dividing the number of women in each group by a total number of delivered women i.e delivered in the year 2017 in the tertiary care center FHMC & Hospital.

The third column provided the rate of CS in each group calculated by dividing the number of caesareans in each group by the number of women in that group. The fourth column provided an absolute contribution of each group to the overall rate of cesarean section and was calculated by dividing the number of cesarean deliveries in each group by the total no. of women population delivered in the year 2017 in the hospital.

III. Result:

Total 430 women were delivered in the tertiary care center FHMC & Hospital during the study period. Out of these, 227 women were delivered via cesarean section, and 203 women via normal vaginal route estimated cesarean section rate 52.79% for the same year. In our study most of the patients, 24.8% were at >37 wks with single gestation having a cephalic presentation with a history of the previous cesarean (group 5) followed by nulliparous females at term having single gestation with a cephalic presentation in spontaneous labor accounted for 24.42% (group 1) and group 3 with 22.79% of the total delivered women. **[Table 2]**

The least number group were those with all abnormal lies including previous cesarean section but excluding breeches (group 9) i.e. 0.930% followed by all multiparous breaches including the previous cesarean section (group 7) i.e. 1.86% and all multiple pregnancies including the previous cesarean section (group 8) i.e 2.33%. Among all groups maximum cesarean section rates were found 100% in group 9, followed by 97.19% in group 5, and 82.14% in group 2 i.e. nulliparous women with single cephalic >37 weeks with induced labor or cesarean section (CS) before labor. On analyzing the percentage contribution made by each group to the overall cesarean section rate, it was found that maximum (i.e. 24.16%) by the women classified in group 5. **[Table 2]**

In the multiparous group, the cesarean rate was more in group 4 (i.e. induced labor or elective cesarean section before labor compared to group 3 spontaneous labor followed by cesarean section, i.e 25% v/s 7.14% with a size of group 22.79% and 5.58% respectively.

IV. Discussion:

The cesarean section rates vary from country to country and in various institutes. The cesarean section rate calculated in our study for our institute was 52.79% which is higher than other studies conducted in India and WHO criteria. [**1,4**] Women in group 1 who went into spontaneous labor with the size of group 24.42% had a cesarean rate of 52.38%. on the other hand, a similar group with induced labor (group 2) had a higher cesarean rate i.e 82.14%.

In the study conducted by **Koteshwara S [10],** the cesarean rate in these groups was (group 1) 16.4% and (group 2) 80.23%with the size of group 42.66% and 15.10% respectively. **Dhodapkar SB et al. [11]** from India were found to have Group-1, Group-5, and Group-2 as the most prevalent groups accounting for 33.3%, 19.7%, and 14.6% cases respectively. While **Khan MA et al.[12]**, observed Group-5 and Group-2 be the most common. According to them, Group-5, Group-2, and Group-10 were the most contributing group to overall CS rates. While in the finding of **Tan JKH et al. study [13]** Group-5, Group-2, and Group-10 to be the commonest contributors to CS rates. All these studies are highlighting the trends according to their institutional practices regarding the handling of delivery cases. Reason for higher cesarean rate in group 1 in our study compared to other studies because the patients in the nearby areas land in spontaneous labor, given a trial at home or elsewhere for vaginal delivery under the supervision of dais and local practitioner and they usually come after augmentation of labor by dais and local practitioners.

In the multiparous group also the cesarean rate was more in group 4 (i.e. induced labor or elective cesarean section before labor v/s group 3 spontaneous labor followed by cesarean section i.e 25% v/s 7.14% with a size of group 22.79% and 5.58% respectively and in **Koteshwara S study [10]** it was 36.02% for group 4 (size of group 3.2%) and 9.18% for group 3 (size of group 18.24%) while in **Jacob KJ et al. [14]** study, the major contribution to overall CS is by group 8 (women with previous CS) followed by Group 2b (primi, term, cephalic, induced labor). The study conducted by **Ray A et al [15]** has shown that women with previous CS contribute maximum to overall CS rates followed by term primigravida who are induced or underwent CS before labor (group 2 of original Robson's classification).

ACOG recently recommended clinical guidelines to restrict the number of cesarean deliveries which are non-medically indicated and induction of labor before 39 weeks of gestation**.[16]** Hence, there is a need of the hour to limit the induction of labor and it should be strictly evidence-based and critically evaluated beforehand. This will not only decrease the cesarean section in nulliparous but will also eventually decrease cesarean section in multiparous with previous cesarean section. Although our study is a sincere effort to address the trend of Cesarean sections and evaluate according to Robson's Ten-Group Classification. limitation of this study was that it was a single-center study with comparatively short sample size.

V. Recommendations:

As per Robson's Ten-Group Classification, Group-10 and Group-5 were found to be the most contributing among deliveries done. Previous cesarean section and fetal distress were the most common indications of cesarean section. Robson's 10-group classification provides an easy way of collecting information about the Cesarean section rates and applying the classification helps to identify broad categories of women who can be targeted to reduce raising CS rate. By further analyzing causes for CS in the major groups contributing to CS and formulating specific protocols like having a strict Vaginal birth after CS protocol, and protocols for reducing primary CS we can reduce CS rate. WHO proposes the Robson classification system as a global standard for assessing, monitoring, and comparing cesarean section rates within healthcare facilities over time, and between facilities.

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TABLES & FIGURES:

Table 1: Robson's Classification of Cesarean Section [1,6]

Group	Clinical Characteristics
1	Nulliparous, single, cephalic, >37 weeks in spontaneous labor.
2	Nulliparous, single, cephalic,>37 weeks induced or cesarean section before labor.
3	Multiparous, single, cephalic, >37 weeks in spontaneous labor. (Excludes previous cesarean section)
4	Multiparous, single, cephalic, >37 weeks induced or cesarean section before labor. (Excludes previous cesarean section)
5	Previous cesarean section, single, cephalic, >37 weeks
6	Nulliparous, single, breech.
7	Multiparous, single, breech (including previous cesarean section)
8	Multiple pregnancies (with or without previous cesarean section).
9	Single, oblique/transverse lies (with or without previous cesarean section but excluding breech).
10	Single, cephalic <36 weeks (including previous cesarean section).

Table 2: Cesarean section rate and contribution made by each group

Classification	Size of group	CS Rate of each group	Contribution of each group
I	24.42%	52.38%	12.79%
II	6.51%	82.14%	5.35%
III	22.79%	7.14%	1.63%
IV	5.58%	25.0%	1.395%
V	24.88%	97.19%	24.16%
VI	2.56%	54.54%	1.395%
VII	1.86%	50%	.930%
VIII	2.33%	50%	1.162%
IX	0.930%	100%	.930%
X	8.139%	37.42%	3.023%