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Evaluation of Caesarean Section Rate Using Robson's 10 Group Classification in a Tertiary Care Centre

*Dr.Ashmita Jawa[1],Dr.Swati Garg[2],Dr.Tanushree Bora[3]
[1,2,3](Department of Obstetrics &Gynecology,Mahatma Gandhi Medical College & Hospital, Jaipur, India)
**Corresponding author: *Dr.Ashmita Jawa[1]*

Abstract:
Introduction: *Over the past few decades, there has been a rise in the rates of caesarean section in both the developing and developed nations. The reasons for this are multifactorial including changes in women's preferences, a growing number of females who have previously had a caesarean delivery and technological advances which aid in early identification of a compromised fetus.*
Material &Methods: *This retrospective study aimed to analyze the rate of LSCS in our institution and was conducted over a period of six months - December 2015 to May 2016 at Mahatma Gandhi Medical College & Hospital, Jaipur. The total number of patients who delivered in our hospital during the defined study period was recorded and categorized as per the WHO accepted Robson's 10-group classification. A statistical analysis of various parameters was done to identify the leading group contributing to the caesarean section rate.*
Result: *The total number of women delivered over the study period was 1645, out of which caesarean sections (CS) were 523. The overall caesarean rate calculated was 31.8%. Previous LSCS was the leading indication to the CS rate.*
Conclusion: *Individualization of the indication and obstetric audits can help in reducing both maternal and peri-natal morbidity & mortality. Every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate.*
Keywords:*Caesarean section, Robson's criteria, Previous LSCS, Obstetric audits*

I. Introduction

Lower Segment Caesarean Section(LSCS) is the most commonly performed obstetric operation worldwide. Since 1985, the international healthcare community has considered the ideal rate for caesarean sections to be between 10% and 15%.[1] Since then, a rising trend of caesarean sections has been noted with the advent of electronic fetal monitoring, increased ante-partum surveillance, better operative techniques, availability of tertiary care neonatal facilities and a change in the physician & women's preference for a planned caesarean section. When medically justified, a caesarean section (CS) can effectively prevent maternal and perinatal mortality and morbidity. [1]High caesarean rates are an issue of international public health concern as it increases the CS related morbidity.[2,3,4] As with any surgery, caesarean sections are associated with short term and long term risks which can extend many years beyond the current delivery and affect the health of the woman, her child, and future pregnancies. CS may be associated with an increased risk of abdominal pain, hysterectomy, ureter and vesical injury, neonatal respiratory morbidity, fetal death, placenta accreta/ percreta, and uterine rupture in future pregnancies.[3,4] These risks are higher in women with limited access to comprehensive obstetric care. In recent years, governments and clinicians have expressed concern about the rise in the numbers of caesarean section births and the potential negative consequences on maternal and infant health.

There is currently no internationally accepted classification system for caesarean section that would allow meaningful and relevant comparisons of CS rates across different facilities, cities or regions. Among the existing systems used to classify caesarean sections. WHO proposes the Robson classification system as a global standard for assessing, monitoring and comparing caesarean section rates within healthcare facilities over time, and between facilities.[1]

Ensuring access to cesarean delivery is an essential strategy for meeting the Millennium Development Goals[5] and the forthcoming Sustainable Development Goals[6] for reducing child and maternal mortality.

Country estimates suggest that women in high burden countries especially in rural areas, lack access to this critical intervention at delivery. On the other hand, some countries have coverage exceeding 15 per cent, which suggests potential overuse of this procedure, exposing women to unnecessary risks associated with major surgery.This study aims to analyze the rates of LSCS in our institution in modern day obstetrics according to Robson's Ten Group Classification and to gather information in a standardized, uniform & reproducible way that is critical for the institution as we seek to optimize the use of caesarean section; assess & improve the quality of care.

II. Material & Methods

The present study was carried out retrospectively over a period of six months- from December 2015 to May 2016 in the department of Obstetrics and Gynecology, Mahatma Gandhi Medical College & Hospital, Jaipur, India; a tertiary care institute which cares for over 3000 institutional deliveries per year. All cases of institutional deliveries during the defined study period were recorded & categorized according to the WHO accepted Robson's 10 group classification. The Robson Ten-Group Classification System, proposed by MS Robson in the year 2001 allows critical analysis according to characteristics of pregnancy by classifying all women into one of 10 categories that are mutually exclusive and, as a set, totally comprehensive **(Table I).**[1]
The parameters noted were parity (with / without previous CS); onset of labor (spontaneous/ induced/ pre-labor CS); gestational age, fetal presentation, number of fetuses. The study was performed after gaining approval from the institutional ethics committee.

Table I- Robson' 10-Group Classification:[1]

Sr.No	Robson 's 10-group classification
1	Nulliparous, single cephalic, >37 wks in spontaneous labor
2	Nulliparous, single cephalic, >37 wks, induced or CS before labor
3	Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labor
4	Multiparous (excluding previous CS), single cephalic,>37 weeks, induced or CS before labor
5	Previous CS, single cephalic, >37 weeks
6	All nulliparous breeches
7	All multiparous breeches (including previous CS)
8	All multiple pregnancies (including previous CS)
9	All abnormal lies (including previous CS)
10	All single cephalic, <36 wks (including previous CS)

Reference - WHO Statement on Caesarean Section Rates; 2015, WHO reference number: WHO/RHR/15.02.Available at http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/; Accessed on 15 July 2016.

III. Results

The total number of women delivered over the study period were 1645, out of which CS deliveries were 523. Overall, caesarean rate calculated for our institution in the specified period was ***31.8%***. On analysis of data according to Robson's classification,caesarean rates of each group were calculated to determine their contribution to the overall CS rate **(Tables II,III).**

Group 5 (previous CS group) made the greatest contribution (7.5%) to the total CS rate. Group 2 (Nullipara, Term, elective CS or after failed induction) had the second highest contribution (6.7%) to the CS rate & Group 10 [All single cephalic, <36 wks (including previous CS)] then placed third at 5.9% to the overall CS rate. There was a 100% caesarean rate in Robson group no.9 i.e. all abnormal lies (7/7 cases), inclusive of all other lies apart from longitudinal lie (i.e. vertex and breech).

IV. Discussion

There has been a steady increase in the rates of CS in both developed and developing countries.[8,9]In our study, the overall caesarean rates were 31.8%, much higher than the "ideal rate" for CS as considered by the WHO - between 10% -15%. New studies reveal that when caesarean section rates rise towards 10% across a population, the no. of maternal and newborn deaths decreases. But when the rate goes above 10%, there is no evidence that mortality rates improve.[1] Despite this, cesarean delivery rates in many countries are substantially higher.[10,11]

Table II-Caesarean Section rate in each group:

Sr.No	Robson's 10-group classification	Total Number of deliveries in each group	No. of women delivering by CS in each group	CS rate in each group (%)
1	Nulliparous, single cephalic, >37 wks in spontaneous labor	271	40	14.8
2	Nulliparous, single cephalic, >37 wks, induced or CS before labor	261	110	42.1
3	Multiparous (excluding previous CS), singlecephalic, >37 weeks in spontaneous labor	399	29	7.3
4	Multiparous (excluding previous CS), singlecephalic,>37 weeks, induced or CS before labor	176	46	26.1
5	Previous CS, single cephalic, >37 weeks	151	123	81.5
6	All nulliparous breeches	38	30	78.9
7	All multiparous breeches (including previous CS)	57	30	52.6
8	All multiple pregnancies (including previous CS)	21	11	52.4
9	All abnormal lies (including previous CS)	7	7	100
10	All single cephalic, <36 wks (including previous CS)	264	97	36.7

Table III- Relative size and its contribution to caesarean rate in the study population:

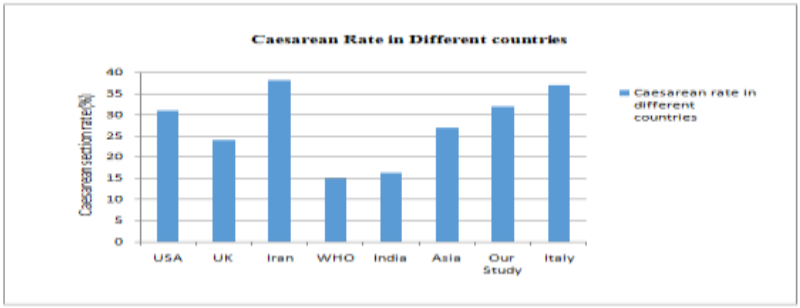
Sr.No	Robson 's 10-group classification	Relative size of group (%)	Contribution made by each group to overall CS rate of 31.8% (%)
1	Nulliparous, single cephalic, >37 wks in spontaneous labor	16.5 (271/1645)	2.4 (40/1645)
2	Nulliparous, single cephalic, >37 wks, induced or CS before labor	15.9 (261/1645)	6.7 (110/1645)
3	Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labor	24.3 (399/1645)	1.8 (29/1645)
4	Multiparous (excluding previous CS), single cephalic,>37 weeks, induced or CS before labor	10.7 (176/1645)	2.8 (46/1645)
5	Previous CS, single cephalic, >37 weeks	9.2 (151/1645)	7.5 (123/1645)
6	All nulliparous breeches	2.3 (38/1645)	1.8 (30/1645)
7	All multiparous breeches (including previous CS)	3.5 (57/1645)	1.8 (30/1645)
8	All multiple pregnancies (including previous CS)	1.3 (21/1645)	0.7 (11/1645)
9	All abnormal lies (including previous CS)	0.4 (7/1645)	0.4 (7/1645)
10	All single cephalic, <36 wks (including previous CS)	16.0 (264/1645)	5.9 (97/1645)

The increase has been a global phenomenon, and marked differences in CS rates across nations persist. The CS rate reported in India for the year 2013-2014 is 16.4%[7]; this is near the ideal range proposed by the WHO, suggesting a rise in access to comprehensive healthcare. This change has been welcome over the past decade when the CS rate for India was a meagre 8.5% for the year 2005-2006.[7]

In the Asian countries, the average CS rate reported was 27.3%, lower than that reported in the USA (31.1%).[12,13] Another study from Iran reported an increase from 35% to 40%,[14] while in the United Kingdom & Italy, the CS rates were 24.4% and 36.8% respectively.[15] This study gave the rate of 31.8%, which is lower compared to other reports, but still above the WHO criteria. It may be difficult to contain the rates in tertiary institutes, catering to a large population of referred cases. Also a significant rise in CS could be attributed to electronic foetal monitoring. **(Fig.I)**

Caesarean rates have increased rapidly over the past decade in most of Organisation for Economic Co-operation and Development (OECD) countries, with the average rate across countries going up from 20% in 2000 to 27% in 2011. Among OECD countries, caesarean section rates were highest in Mexico and Turkey (over 45%), followed by Chile, Italy, Portugal and Korea (with rates ranging between 35% and 38%).[16]**(Fig.I)**

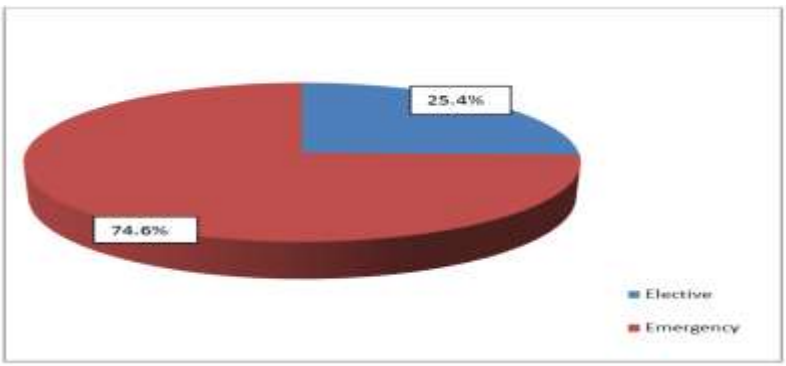
Figure I[1,7,13,14,15,16]



Increases in the first births among older women and the rise in multiple births resulting from assisted reproduction have also contributed to the overall rise in caesarean deliveries.The previous CS group (group 5) made the greatest contribution to the total CS rate contributing to 123 of 151 cases. The reason for the larger contribution of group 5 towards the total CS rate is the larger size of families and repeat high order CS due to an alteration in physician and patient choice and unavoidable obstetric indications in cases of previous ceasarean. It was seen that 26 out of 123 were done due to the indication of repeat third CS, giving an unavoidable fraction. Vaginal Birth After Cesarean (VBAC) was offered to the women who fit in the inclusion criteria as per the American College of Obstetricians &Gynecologists.[17] 19 women refused and chose elective CS, while a majority of women opted for VBAC.

A comparative analysis of international caesarean delivery rates from single hospitals in nine countries in 2005– 2006 reported intrapartum caesarean rates for nulliparae with singleton, cephalic presentations ≥37 weeks with spontaneous labour ranging from 5.7% in Norway to 20.6% in New Zealand.[18] The comparable rate of 16.7% in 2009 in our study population was at the high end of this range.Breech presentation almost uniformly resulted in caesarean section by the 2000's and makes a continued and stable contribution to caesarean section rates.[19]Of the total 1645 cases,74.6% cases were due to emergency indications **(Fig.II)**. Groups 6-10 were smaller groups with high percentages of CS. High percentage in these groups was due to unavoidable obstetric indications. When compared with other studies internationally, almost all studies conveyed comparable results in groups 6-10.[19]

Fig. II - Comparison of Elective and Emergency LSCS



Clinical guidelines aimed at reducing non-medically indicated cesarean delivery and induction of labor under 39 completed weeks have recently been released by the American College of Obstetricians and Gynecologists.[20,21] Efforts to reduce such births include initiatives at the state level to improve the quality of perinatal care, policy changes at the hospital level to disallow elective delivery prior to 39 weeks, and education of the public.[22,23,24]

This was the first time to the authors' knowledge, that caesarean rates in Jaipur, India have been investigated according to the Robson's classification in an attempt to ascertain which clinically relevant groups were contributing to the increasing caesarean rate over time. However, the pregnant women included in the study those who delivered in our institution and might not reflect the situation in the rest of the country, or even reflect on the cesarean rate in the state of Rajasthan, India. It is also possible that caesarean section rate may have been overestimated since vaginal deliveries at home may have been under-reported. Limitations of the study are that this classification system does not account for analysis of elective caesarean on maternal request or planned caesarean section for specific conditions (example-placenta previa) or pre-existing medical conditions.[25] It does not account for differences in cesarean delivery rates within populations that were due to regional variation, wealth disparity, or other factors.

V. Conclusion

Obstetric audits in the institution & practice of evidence-based obstetrics shall help in reducing morbidity associated with caesarean section. Individualization of the indication & careful evaluation can help us limit peri-natal morbidity & mortality. It is important that efforts to reduce the overall CS rate focus on reducing the primary CS rate & judicious use of VBAC be used to decrease rate of repeat CS. Every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate.

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