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EVALUATE THE TRENDS OF CAESAREAN SECTION THROUGH ROBSON CRITERIA IN A TERTIARY CARE HOSPITAL IN NORTHERN INDIA

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Abstract
Introduction: The percentage of caesarean deliveries across India increased from 17.2 to 21.5% from 2015 to 2021. Robson classification was proposed to assess the strategies aimed to decrease the caesarean section rate and thereby improve the clinical practices and quality of care in various health care facilities.
Aim and Objectives: To evaluate the indications of Cesarean Section and classify the caesarean section based on Robson criteria to address the cause of rising caesarean section in our setup.
Material and Methods: A retrospective case study conducted in the Department of Obstetrics and Gynecology, Autonomous State Medical College, Firozabad on pregnant women undergoing cesarean section between January 2023 to December 2023. The parameters were considered according to the classification system and their perinatal outcomes were observed.
Observations: 741 antenatal women with mean age 25.54 ± 3.77 years underwent caesarean section during the study duration. When analysed as per Robson's criteria, the maximum study population was grouped under group 5 comprising 39.95% cases, which was the most common indication for caesarean section in this particular study. Robson's group 10, had maximum number of newborns admitted to NICU with mean birth weight of 2.01 ± 0.28 kg and APGAR ≤7 at 1 min was observed 71.43% of babies admitted.
Conclusion: Judicious use of caesarean section is the need of the hour and Robson's criteria can be used as an auditing tool to control the increasing number of caesarean sections being performed around the world.
Keywords: Caesarean Section, Robson's criteria, neonatal outcomes

INTRODUCTION

Herbert Spencer, in 1925, a professor of obstetrics at University College London, speculated "Caesarean as being too grand to have been first performed on ordinary mortals" and hypothesized it "the greatest of all operations, in that it directly affects two lives.[1]"

However, for most of its history, it saved only one of them and mothers didn't routinely survive the procedure until the 20th century. Before then, Caesarean was generally deployed as a last-ditch measure to save the baby once the mother was dying or already dead.

However, the maternal mortality related to caesarean section has dropped to 0.1% by the end of the year 1950 and currently, it is estimated to be between 0.00581% and 0.0061% (5.81–6.1 per 100,000 procedures).[2] This drop is so much that some obstetricians now consider caesarean sections to be the "easier option".

The percentage of caesarean deliveries across India increased from 17.2 to 21.5% between National Family Health Survey-4 (2015-16) and National Family Health Survey-5 (2019-21).[3]

Munro Kerr in 1960 quoted, "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."

This upward trend of caesarean section rate is expected to be tabulated as there has been no reliable and internationally standardized data enabling a global comparison for the indications of caesarean sections in the past and this became a matter of international public health concern as it increases the caesarean section related maternal morbidity and mortality.

As advised by WHO guidelines and US Healthy initiative 2000, the caesarean section rate should not be beyond 15%.[4] American College of Obstetricians and Gynaecologists, recommended clinical guidelines to restrict the number of caesarean deliveries which are non-medically indicated and induction of labour before 39 weeks period of gestation.

Standardization of classification of caesarean section through Robson criteria as proposed by MS Robson (2001), has been appreciated by World Health Organization in 2014 and The International Federation of Gynaecology and Obstetrics in 2016.[4,5]

Robson's criteria to classify caesarean section is based on four obstetric concepts: category of pregnancy, previous obstetric history, course of pregnancy and gestational age. The ten Robson categories are mutually exclusive, totally inclusive, and can be applied prospectively, since each woman admitted for delivery can be classified immediately on the basis of a few variables that are generally routinely recorded. This provides a framework for monitoring and auditing Caesarean Section rates.

According to WHO, Robson classification shall aid in optimisation of the caesarean section, assessment of the strategies aimed to decrease the caesarean section rate and

thereby improve the clinical practices and quality of care in various health care facilities. This also aids in institution-specific monitoring and auditing and offers a standardised comparison method not only between institutions, but also countries, and time-points as well.

So, this study is an attempt to classify the caesarean section based on this system and address the cause of rising caesarean section in our scenario.

Aim and Objectives:

To evaluate the indications of Cesarean Section and classify the caesarean section based on Robson criteria to address the cause of rising caesarean section in our setup.

Material and Methods:

This was a retrospective case study conducted in the Department of Obstetrics and Gynecology, Autonomous State Medical College, Firozabad on pregnant women undergoing cesarean section during the period from January 2023 to December 2023. After obtaining approval from Institutional Ethical Committee and informed written consent, the parameters (parity, period of gestation, fetal presentation, number of fetus and onset of labor) were considered according to the classification system and their perinatal outcomes were observed. Patients who refused to give consent and those who delivered vaginally were excluded from the study. The data collected was analyzed using SPSS version 20.0.

Observations:

The mean age among the study population was 25.54 ± 3.77 years with minimum of 19 years and maximum of 39 years. 741 caesarean sections were analysed from a total of 3052 deliveries which denotes percentage of caesarean section was 24.28 percent.

Majority of the antenatal women who underwent caesarean section were primigravidas contributing 44.53% to the study population. Maximum study population belonged to lower socio-economic status (82.32%) against upper class (0.94%) and 75.98% of the pregnancies were unbooked.

Table 1: Demographic Variables among the Study Population

Demographic variables	No. of Subjects	Percentage (%)
Age (years)		
≤ 20	62	8.36
21 – 30	614	82.86
> 30	65	8.77
Gravida Status		
Primigravida	330	44.53
Second gravida	279	37.65
Third gravida	101	13.63
Fourth gravida and above	31	4.18
Socio-economic status		
Upper	7	0.94
Upper middle	8	1.08
Middle	42	5.66
Lower middle	74	9.98
Lower	610	82.32
Booking status		
Booked	178	24.02
Unbooked	563	75.98

When analysed as per Robson's criteria, out of the 741 study population, the maximum study population was grouped under group 5 (previous Caesarean Section) comprising 39.95% of the entire study population, which was the most common indication for caesarean section in this particular case study. Table 2 shows the classification of caesarean sections based on Robson's criteria and tabulates the percentage of study population that contributes to each group.

44.53% of the study population belonged to primigravidas, 22.81% among them went into spontaneous labour and 10.25% were induced, but underwent caesarean section due to obstetric indications like foetal distress, cephalo-pelvic disproportion, second stage arrest/ deep transverse arrest, non-progress of labour and others.

Table 2: Distribution of Caesarean Section as per Robson's Criteria

Robson's Group	Classification	No. of Subjects	Percentage (%)
I	Nulliparous women with single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour	169	22.81
II	Nulliparous women with single cephalic pregnancy, ≥ 37 weeks gestation who either had labour induced or were delivered by caesarean section before labour	93	12.55
III	Multiparous women without a previous uterine scar, with single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour	29	3.91
IV	Multiparous women without a previous uterine scar, with single cephalic pregnancy, ≥ 37 weeks gestation who either had labour induced or were delivered by caesarean section before labour	26	3.51
V	All multiparous women with at least one previous uterine scar, with single cephalic pregnancy, ≥ 37 weeks gestation	296	39.95
VI	All nulliparous women with a single breech pregnancy	35	4.72

VII	All multiparous women with a single breech pregnancy, including women with previous uterine scars	10	1.35
VIII	All women with multiple pregnancies, including women with previous uterine scars	8	1.08
IX	All women with a single pregnancy with transverse or oblique lie, including women with previous uterine scars	18	2.43
X	All women with a single cephalic pregnancy < 37 weeks of gestation including previous scars	57	7.69

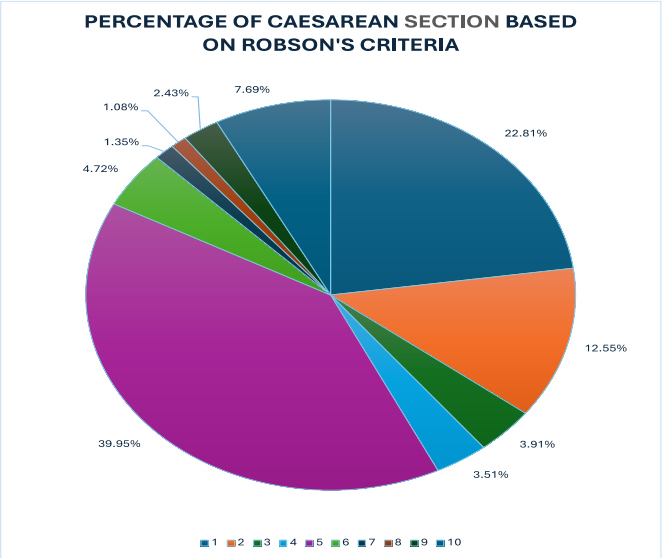
The study population was also grouped according to indications in conventional terms where also previous caesarean section was the commonest indication and contributed maximum to the rate of caesarean section (41.03%) among the study population.

Table 3: Indication of Caesarean Section in Conventional terms

Indication of Caesarean Section in Conventional terms	No. of Subjects	Percentage (%)
Previous LSCS	304	41.03
Prolonged Labour	44	5.94
Premature Rupture of Membranes	23	3.10
Cephalopelvic disproportion	45	6.07
Breech/ Transverse lie/ Oblique lie	63	8.50
Multiple Pregnancies	8	1.08
Placenta Previa/ Placenta Accreta Spectrum	4	0.54
Cord Prolapse	2	0.27
Foetal Distress	117	15.79
Pre-eclampsia/ Eclampsia	39	5.26
Diabetes	8	1.08
Oligohydramnios/ IUGR	23	3.10
Second Stage Arrest/ DTA/ Obstructed labour	36	4.86
Heart Disease	3	0.40
Anomalous uterus	4	0.54
Maternal Request	18	2.43

Foetal distress (15.79%) was the second common indication while cord prolapse, heart disease, congenital anomaly of uterus were the least common indication with percentage score of 0.27%, 0.40% and 0.54% respectively.

Figure 1: Percentage of Caesarean Section as per Robson's Criteria



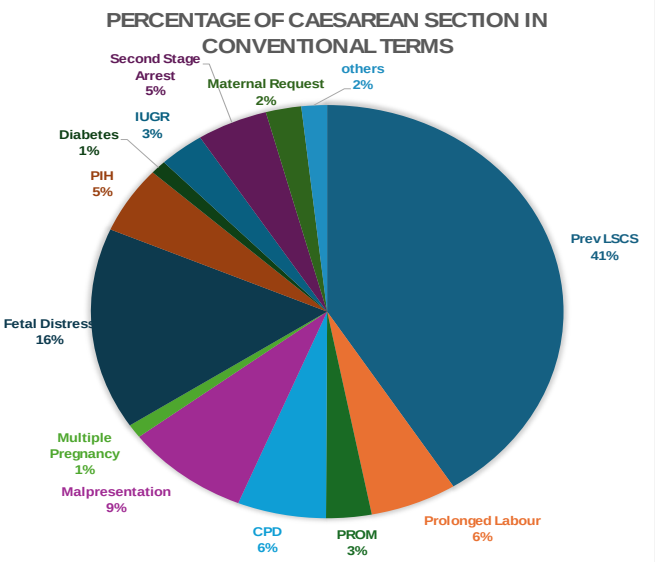


Figure 1 shows the diagrammatic representation of percentage of caesarean section based on ten different Robson's grade and indication of caesarean section in conventional terms.

Table 4: Correlation of Robson's grade with Neonatal Outcome

Robson's Group	Mean Baby Weight (kg)	NICU Admission	Neonatal death	APGAR ≤ 7 at 1 min	APGAR ≤ 7 at 1 min
I	2.97 ± 0.46	21	0	19	10
II	3.03 ± 0.42	14	2	12	3
III	2.99 ± 0.47	4	1	3	2
IV	3.02 ± 0.46	6	0	5	0
V	2.95 ± 0.42	21	4	16	6
VI	2.81 ± 0.39	4	1	3	1

VII	2.93 ± 0.45	1	0	1	0
VIII	2.45 ± 0.51	14	3	11	6
IX	2.54 ± 0.37	10	2	9	5
X	2.01 ± 0.28	28	4	20	8

Robson's group 10, had maximum number of newborns admitted to newborn intensive care unit with mean birth weight of 2.01± 0.28 kg and APGAR ≤ 7 at 1 min was observed 71.43% of babies admitted. Maximum number of neonatal death were observed in group 5 and 10 of Robson's classification. No neonatal death was observed on Robson's group 1, 4 and 7. Also, among all the newborns admitted in neonatal intensive care unit, none had APGAR ≤ 7 at 5 minutes in group 4 and 7.

Discussion:

Over the past decade, there has been a drastic rise in the incidence of caesarean section. Several classification systems have been proposed over time to standardize the analysis of the increasing trends. Three most commonly adopted classification system are "based on primary clinical indications", "the degree of urgency or absolute need for caesarean delivery", and "Robson classification" for auditing frameworks of Caesarean Section.[6]

"World Health Organization" endorsed Robson's classification as a "global standard" tool for the monitoring of Caesarean Section.[7] The Robson's classification also known as "Ten Group Classification System (TGCS)", classifies Caesarean Sections in ten groups according to different categories of the pregnancy, past obstetrical record, the course of labour and delivery, and the gestational age of the pregnancy.

Torloni MR et al. (2011), did a systematic review and compared different classifications for Caesarean Section and concluded that Robson's 10 Group classification was optimal for monitoring Caesarean Section. [8]

In our study, the mean age of the study population was 25.54 ± 3.77 years while Parveen et al. (2021), calculated the mean age to be 26.53 ± 5.1 years in his study.[6] Primiparas comprised 44.53% of the study population in our study and this was similar to the study findings of Baser et al. (2021) who reported 47.58% primigravidas in his study.[9]

The overall caesarean section rate in our study was 24.28%. Kant et al. (2018), in his study found the rate of caesarean section 53.86%[10] while Baser et al. (2021) and Jain et al. (2022) tabulated that the caesarean section rate was 28% and 42.13% respectively among their study population.[9,11]

Our data showed that the maximum number of patients were under group-5 (previous Caesarean section) of Robson's criteria (39.95%) and this was consistent with study done by Baser et al. (2021) and Jain et al. (2022) who found group-5 to contribute maximum to the study population that is 32.76% and 38.69% respectively. [9,11] Khan MA et al. (2020), in another local research observed Group-5 and Group-2 to be the most common indication for caesarean section.[12]

In contrast, Parveen et al. (2021), in his study found Group-10, Group-5 and Group-1 to be the most prevalent groups accounting for 50.9%, 14.4%, 11.4% cases respectively.[6] Dhodapkar SB et al. (2015), found Group-1, Group-5 and Group-2 as the most prevalent groups accounting for 33.3%, 19.7% and 14.6% cases respectively.[13]

Total 123 neonates (16.59%) in our study required admission in neonatal intensive care unit and the overall perinatal mortality observed was 2.27% while Baser et al. (2021) in his study reported 20.4% newborns requiring NICU care and the overall perinatal mortality was 1.24%.[9]

Maximum number of neonatal death were observed in group 5 and 10 of Robson's classification in this study. The stillbirth rates were higher in group 3 (13.75%) in study by Baser et al. (2021) who also concluded Group 10 that represented preterm caesarean had highest morbidity and mortality (14.6%) suggesting the need for reducing preterm births as a whole by appropriate antenatal care.[9]

All these studies are highlighting the trends according to their own institutional practices regarding handling of delivery cases.

Conclusion:

Judicious use of caesarean section in nullipara is the need of the hour. We conclude that Robson's criteria can be used as an auditing tool to control the increasing number of caesarean sections being performed around the world. The target group for caesarean section requires more in-depth analysis to identify possible modifiable factors and to apply specific interventions to reduce the Caesarean Section rate. Evaluation of existing management protocols and further studies into indications of Caesarean Section and outcomes in our setting are needed to design tailored strategies and improve outcomes.

Limitations:

Our study being a small study, large randomized control trials are needed to establish criteria for caesarean section. As this was a single center study with a comparatively short sample size, results of this study cannot be generalized.

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