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Assessment Of Caesarean Section Rates Using Robson Ten Group Classification System In Vmkv Medical College And Hospital

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ABSTRACT

Background and Objectives: Caesarean section (CS) is a crucial surgical intervention for maternal and fetal well-being when medically indicated. However, its rising global trend has become a public health concern. The World Health Organization (WHO) has recommended that CS rates should not exceed 15%. The Robson Ten Group Classification System (RTGCS) serves as an effective tool for analyzing CS rates and implementing measures to reduce unnecessary procedures. This study aims to assess the CS rate in VMKV Medical College and Hospital using the RTGCS and identify contributing factors.

Methods: This cross-sectional, hospital-based observational study was conducted in the Department of Obstetrics and Gynecology at VMKV Medical College and Hospital over 1.5 years (November 2022 to May 2024). A total of 500 pregnant women who delivered via normal vaginal delivery (NVD) or CS were classified into ten groups based on RTGCS. Data analysis was performed using SPSS v16, with qualitative variables expressed in frequencies and percentages and quantitative variables in mean and standard deviation. Statistical significance was set at $p<0.05$.

Results: The majority of deliveries occurred in the 21-25 age group (51.8%), followed by 26-30 years (36.8%). CS rate was 32.2%, with the highest contribution from Group 5 (previous CS, single cephalic, ≥37 weeks) at 48.4%. Maternal outcomes were predominantly good (97.8%), with postpartum hemorrhage (PPH) observed in 2.2% of cases. Fetal complications were minimal, with transient tachypnea of the newborn (TTN) at 1.19%, meconium-stained liquor (MSL) at 0.79%, and respiratory distress syndrome (RDS) at 0.6%.

Conclusion: The study highlights an increasing trend in CS, primarily due to repeat cesarean deliveries (Group 5). The Robson classification provides an effective means to monitor and evaluate CS trends. Implementing targeted strategies to reduce unnecessary CS procedures, especially in low-risk pregnancies, can help optimize maternal and neonatal outcomes.

Keywords: *Caesarean section, Robson Ten Group Classification System, Maternal health, Cesarean delivery trends, Obstetric outcomes.*

1. INTRODUCTION

Cesarean section is delivering a baby through a surgical incision in abdomen and uterus of the mother. According to World Health Organisation (WHO), a cesarean section is a surgical procedure that can save the life of a mother and baby when undertaken for medical reasons. Cesarean section is a lifesaving procedure done either to save the mother or the fetus, sometimes both. Though it is a common surgical procedure, there are both short term and long -term risks associated with it. Thus the procedure should be used only in complicated pregnancies.[1]

The global increase in caesarean section rate is of public health concern. For this an appropriate classification to identify the groups of women undergoing cesarean section and investigation of the underlying reasons for trends is essential so that appropriate effective measures to reduce cesarean section rates can be implemented. However, the past decade has witnessed an enormous surge in C- section rates globally, the average rate being 27% in both developed and developing countries during year 2013.[1]

WHO has advocated caesarean rate of not more than 15%.[2] CS leads not only to immediate complications but may also be associated with long term risk affecting the health of the woman and her baby in subsequent pregnancies.[3] It has been observed that the increased rate in CSs often due to the fact that many of them are not medically indicated, thus posing unnecessary threats to the mother and neonate. [4]

The ten-group classification proposed by Robson has been used to critically analyse the rate of CS in a tertiary care hospital and provide a proposition so that the overall rate may be minimized. This classification has been endorsed by world health organization (WHO) and international federation of gynecology and obstetrics (FIGO) as a global standard for evaluation and comparison of CS rates within heath care institutions. [5]

Cesarean section is an important indicator of access to and quality of maternal health services. Globally the cesarean delivery rate is rising continuously. The world health organization recommends Robsons ten group Classification system as a global standard, for assessing, monitoring and comparing Cesarean section rates at all levels.

2. MATERIALS AND METHODS

It was a Cross sectional, hospital based observational study conducted at VMKV Medical College and Hospitals, Department of Obstetrics and gynaecology for a period of 1 ½ Years (November 2022 to May 2024).By this minimum sample size is 500 patients. All pregnant women delivered in VMKV Medical College and Hospital either by NVD or by cesarean section are included.

All women were contemporaneously classified using the five obstetric characteristics described in the RTGCS (number of fetuses, parity, fetal presentation, the onset of labor, and gestational age), without requiring the indication for CS

- All categories were totally inclusive and mutually exclusive.
- Robson classification system:
- Class 1: Nullipara, equal to or >37 weeks, single, cephalic, spontaneous labor
- Class 2: Nullipara, equal to or >37 weeks, single, cephalic, induced labor or CS before labor
    i. 2a: induced labor
    ii. 2b: CS before labor
- Class 3: Multipara, equal to or >37 weeks, single, cephalic, spontaneous labor (excludes previous CS)
- Class 4: Multipara, equal to or >37 weeks, single, cephalic, induced or CS before labor (excludes previous CS)
    i. 4a: induced labour
    ii. 4b: CS before labor
- Class 5: Multipara, previous CS, equal to or >37 weeks, single, cephalic
- Class 6: Nullipara, single, breech
- Class 7: Multipara, single, breech (including previous CS)
- Class 8: Multiple pregnancy (with or without previous CS)

- Class 9: Singleton pregnancy, oblique/transverse lie (with or without previous CS)
- Class 10: Singleton, cephalic<37 Weeks including previous CS.

Statistical analysis

Data Entry was done using Microsoft excel 2013 and analysis done using SPSS V 16. Qualitative data was expressed in frequencies and percentages and Quantitative data in mean and standard deviation. Bar diagrams and pie chart were used to represent the data. p value of <0.05 was considered statistically significant.

3. RESULTS

Table 1: Age Distribution

Age	Total no.of NVD in age group(N)	Total no.of CS in age group (N)	Total no.of deliveries in each group	Percentage
<=20	12(3.5%)	9(5.5%)	21	4.2%
21- 25	184(54.2%)	75(46. 58%)	259	51.8%
26- 30	122(35.9%)	62(38. 5%)	184	36.8%
31- 35	20(5.8%)	15(9.3%)	35	7.0%
>35	1(0.29%)	0(0%)	1	0.2%
Total	339(100%)	161(100%)	500	100. 0
Mean Age	25.42±3.21			

This table outlines the distribution of deliveries according to the age of the mothers. It shows the number of normal vaginal deliveries (NVD) and cesarean sections (CS) in each age group, along with the total number of deliveries and the corresponding percentage of the total. The age groups are ≤ 20, 21 - 25, 26 -30, 31 - 35, and >35 years. The data indicate that the largest group of deliveries occurs in the 21 - 25 age range, with 184 NVDs (54.2%) and 75 CSs (46.58%), totaling 259 deliveries, which is 51. 8% of all deliveries. The 26 - 30 age group follows with 122 NVDs (35.9%) and 62 CSs (38. 5%), totaling 184 deliveries (36. 8%).

Table 2: Mode of Previous delivery

Previous History	**Total no.of NVD in each group**		**Total no.of CS in each group**		**Total no.of deliveries in each group**	
	N	%	N	%	N	%
Normal Delivery	210	61.9	11	6.8	221	44.2
LSCS	0	0	94	58.3	94	18.8
Nil	129	38	56	34.7	185	37
Total	339	100	161	100	500	100

This table examines the mode of previous delivery among mothers, showing the number and percentage of NVD and CS for each group. It categorizes the mothers as those with a previous normal delivery, previous LSCS (lower segment cesarean section), or no previous delivery (nil). Mothers with a previous normal delivery had 221 deliveries (44.2%), with 210 NVDs (61.9%) and 11 CSs (6.8%). Those with a previous LSCS had 94 deliveries (18.8%), all being CSs (58.3%). Mothers with no previous delivery had 185 deliveries (37%), with 129 NVDs (38%) and 56 CSs (34. 7%).

Table 3 : Distribution of Study Subjects according to Maternal Outcome

Maternal Outcome	**Frequency**	**Percentage**
Good	489	97.8
PPH	11	2.2
Total	500	100. 0

This table shows the maternal outcomes of the study subjects, categorizing them into Good and PPH (postpartum hemorrhage). The vast majority of maternal outcomes are Good, with 489 cases (97.8%). PPH accounts for 11 cases (2. 2%).

Table 4: Distribution of Study Subjects according to Fetal Complications

Complications	**Total no.of NVD in each group(N)**	**Total no.of CS in each group(N)**	**Total no,of deliveries in each group**	**Total no.of neonates in each group**	**Percentage**
Nil	336(99.1%)	151(93.7%)	487(97.4%)	487	96.8
TTN	0(0%)	3(1.86%)	3(0.6%)	6(TWINS)	1.19
MSL	0(0%)	4(2.48%)	4(0.8%)	4	0.79
Sepsis	0(0%)	3(1.86%)	3(0.6%)	3	0.6
RDS	3(0.88%)	0(0%)	3(0.6%)	3	0.6
Total	339(100%)	161(100%)	500(100%)	503	100. 0

This table categorizes fetal complications during delivery, showing the number and percentage of NVD and CS for each type of complication. Complications include TTN (transient tachypnea of the newborn), MSL (meconium-stained liquor), Sepsis, and RDS (respiratory distress syndrome). Most neonates (487 out of 500, or 97.4%) did not have complications. TTN occurred in 3 cases (0.6%), MSL in 4 cases (0. 8%), Sepsis in 3 ca ses (0. 6%), and RDS in 3 cases (0. 6%).

Table 5: CS rates in each group

ROBSON'S GROUP	**Cesarean section (RATE - 32. 2%)**			
	Elective primary LSCS	**Emergency primary LSCS**	**Repeated LSCS**	**TOTAL**
1	0	27	0	27 (16.7%)
2a	0	15	0	15 (9. 3%)
2b	8	0	0	8 (4. 9%)
3	0	3	0	3(1.8%)

4a	0	4	0	4 (2. 4%)
4b	0	0	0	0
5a	0	0	72	72 (44.7 %)
5b	0	0	6	6(3.7%)
6	3	0	0	3 (1.8%)
7	0	0	6	6 (3.7%)
8	3	0	0	3 (1. 8%)
9	0	0	3	3 (1. 8%)
10	4	0	7	11 (6.8%)
Total	14	53	94	161 (100%)

This table classifies cesarean section (CS) rates according to Robson' s Group, detailing elective primary LSCS, emergency primary LSCS, and repeated LSCS. It shows the number and percentage of CS in each group. Group 5a (previous cesarean section, single cephalic, ≥37 weeks, in spontaneous labor) has the highest rate, accounting for 72 out of 161 CSs (44. 7%). Group 1 (nulliparous, single cephalic, ≥37 weeks, in spontaneous labor) follows with 27 CSs (16.7%).

Table 6: NVD & cesarean section rates in each group of RTGC

Robson Group	**Total no. of deliveries in group**	**Total no. of CS in the group**	**Percentage of CS in the group**	**Total no. of NVD in the group**	**Percentage of NVD in the group**
Group 1	154	27	17.5%	127	82.4%
Group 2a	19	15	78.9%	4	21%
Group 2b	8	8	100%	0	0%
Group 3	194	3	1.5%	191	98.4%
Group 4a	4	4	100%	0	0%
Group 4b	0	0	0%	0	0%
Group 5a	72	72	100%	0	0%
Group 5b	6	6	100%	0	0%
Group 6	3	3	100%	0	0%
Group 7	6	6	100%	0	0%
Group 8	3	3	100%	0	0%
Group 9	3	3	100%	0	0%
Group 10	28	11	39.2 %	17	60.7%
total	500	161		339	

This table classifies cesarean section (CS) rates according to Robson' s Group, detailing NVD and CS in each group. It shows the number and CS rates in each group. Group 2b, group 4a shows higher rate of primary LSCS which can be minimized by

appropriate measures. Group 5, group 6, group 7, group 8 shows 100 percent CS, which can be reduced by adequate training to health care professionals and adequate facilities.

4. DISCUSSION

The age distribution of deliveries in the Present study indicates that the highest percentage of deliveries occurred in the 21-25 year age group (51. 8%), followed by the 26 - 30 year age group (36.8%). This trend is consistent with other studies, such as the one conducted by Gopika Ambat et al [6]., which also found that the majority of deliveries took place within these age groups . Similarly, the study by Jiandani et al [7] highlights a similar age distribution, reinforcing the observation that the peak reproductive age lies between 21 and 30 years. Comparing with the study by Subedi et al [8] at Manipal Teaching Hospital, the age distribution pattern remains similar, with the majority of births occurring in the 21 - 30 year range. This consistency across various studies su ggests a universal trend in reproductive behavior and highlights the importance of focusing healthcare resources on this age demographic to optimize maternal and neonatal health outcomes.

In the primary study, the majority of deliveries occurred at gestational ages greater than 37 weeks (94.4%), with preterm deliveries (<37 weeks) accounting for only 5.6%. This distribution is in line with the findings from studies by Jiandani et al [7]. Women with a history of a previous cesarean section (LSCS) made up 18.8% of the deliveries. This pattern aligns with findings from Santhi V et al[9], who also observed a significant proportion of deliveries involving women with previous cesarean sections, highlighting the increasing trend of repeat cesareans in subsequent pregnancies .

The study by Jiandani et al [7] further emphasizes this trend, noting that a history of cesarean delivery significantly influences the likelihood of repeat cesareans due to concerns about uterine rupture and other complications. The decision to perform a repeat cesarean is often influenced by the patient's medical history, the indication for the initial cesarean, and the clinician's assessment of risks. Promoting vaginal birth after cesarean (VBAC) can help reduce the overall cesarean rate and its associated risks. However, successful implementation of VBAC requires thorough patient counseling, careful selection of candidates, and preparedness to handle emergencies during labor. Studies like those by Gopika Ambat et al [6]. highlight the importance of offering VBAC as a safe option for eligible women to minimize the rate of repeat cesareans.

The Present study reports that nearly all deliveries were singleton pregnancies (99.4%), with multi-fetal pregnancies accounting for only 0.6%. This distribution is in line with general population trends observed in studies by Jiandani et al [7]and Subedi et al [8]., where singleton pregnancies also constituted the majority of deliveries.

The maternal outcome data in the Present study reveals that 97.8% of the outcomes were classified as 'good,' with post - partum hemorrhage (PPH) accounting for 2. 2%. This high rate of favorable outcomes is consistent with findings from Jiandani et al [7]. and Gopika Ambat et al [6]., where the majority of maternal outcomes were also positive.

The birth weight distribution in the Present study shows that the majority of neonates weighed b etween 2.5 -3.0 kg (55.6%), with smaller proportions in the <2. 5 kg (18.6%) and >3 kg (25.8%) categories. This distribution is similar to findings in studies by Subedi et al [8]. and Akadri et al., where the majority of birth weights fell within the normal range.

Maintaining optimal birth weights is crucial for neonatal health, and it emphasizes the importance of adequate maternal nutrition, effective prenatal care, and monitoring during pregnancy. The study by Jiandani et al [7]. highlights the role of maternal health interventions in ensuring healthy birth weights, which are essential for reducing neonatal morbidity and mortality .

The Present study reports that the majority of deliveries had no fetal complications (97.4%), with specific complications such as transient tachypnea of the newborn (TTN), meconium -stained liquor (MSL), sepsis, and respiratory distress syndrome (RDS) accounting for the remaining cases. This distribution is supported by findings from Gopika Ambat et al [6]. and Subedi et al [8]., where the majority of newborns also experienced no major complications .

The primary study' s application of Robson's classification reveals that Group 5 (multiparous women with a previous cesarean section) had the highest cesarean section rate (44. 7%), followed by Group 2A (induced labor) with 21%. This pattern is consistent with findings from Santhi V et al [9] , who also reported high cesarean rates in similar Robson groups, highlighting the significant contribution of repeat cesareans to the overall cesarean rate .

Studies by Gopika Ambat et al [6]. and Jiandani et al [7]. further support these findings, emphasizing the importance of understanding the specific contributions of each Robson group to the overall cesarean section rates. Group 5' s high rate underscores the need for strategies to reduce repeat cesareans, such as promoting VBAC where appropriate.

The primary study's analysis of cesarean section rates in each Robson group shows a significant variation, with Group 1 (nulliparous, single cephalic, term spontaneous labor) having the lowest cesarean rate (17. 5%), while Groups 6 (nulliparous breech) and 7 (multiparous breech) had the highest rates at 92.3% and 80.1% respectively. This distribution aligns with the findings of Jiandani et al [7]., who also reported similar trends in cesare an rates across different Robson groups.

Our study has few limitations;

1.This study is conducted in a small group with a sample size of 500 due to which the results cannot be generalised. We need a larger studies in Southern India to truly prove the results.

2.RTGC doesn't include indications for CS, which may be justifiable. One such example is women conceived by Artificial Reproductive Technology. most of them demand CS and the choice of women has to be respected by the treating obstetricians, in the present era of medicolegal issues.

5. CONCLUSION

According to this study, cesarean section rates of VMKV Medical College and Hospital is 32. 2% . out of which Group 5 is the main contributor corresponding to 45 % of total cesarean sections in the hospital. In my study out of 500 deliveries, 161 CS were notes accounting to 32.2 %.the increased CS rate is due to increased pregnancies with uterine scar (repeat LSCS). Primary LSCS cane be minimized by appropriate following of guide lines during induction of labour to reduce CS due to failed induction as much as possible. CS due to uterine scar can be reduced by equiping the hospital with adequate facilities and training staff for VBAC.

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