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Analysis Of The Rate of Lower Segment Caesarean Section As Per Robson's 10 Group Classification at IIMS & R, Lucknow: A Retrospective Study

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ABSTRACT

Background: The global rise in caesarean section (CS) rates, surpassing the WHO-recommended threshold of 10–15%, has prompted a critical need for standardized assessment. Robson's 10-Group Classification System (TGCS) offers a structured approach to evaluate and compare CS rates across different obstetric populations.

Objective: To analyze the frequency and indications of lower segment caesarean sections (LSCS) at IIMS&R, Lucknow, using Robson's TGCS over a two-year period and to identify target groups for intervention to reduce CS rates.

Methods: This was a retrospective study conducted in the Department of Obstetrics and Gynaecology, IIMS&R, from January 2018 to December 2019. Data from delivery records of women with viable pregnancies were collected and categorized into Robson's 10 groups. Statistical analysis was conducted using SPSS v16.

Results: Among 1,128 deliveries reviewed, the overall CS rate was 36%. The largest contributors to the CS rate were Group 5 (previous CS, single cephalic, ≥37 weeks) with 34.4%, Group 2 (nulliparous, single cephalic, ≥37 weeks, induced or pre-labour CS) with 20.0%, and Group 3 (multiparous without previous CS, single cephalic, ≥37 weeks in spontaneous labour) with 17.5%. These three groups collectively accounted for 71.9% of all CSs.

Conclusion: Robson's TGCS is an effective tool for identifying high-risk groups contributing to the rising CS rate. Targeted interventions in Groups 2 and 5, particularly promoting vaginal birth after caesarean (VBAC) and refining induction protocols, could help reduce unnecessary CSs.

Keywords: *Analysis, Lower Segment, Caesarean Section, Robson's 10 Group Classification, Vbac*

1. INTRODUCTION

The increasing global trend in caesarean section (CS) rates has emerged as a public health concern, prompting efforts to regulate and optimize obstetric practices. According to the World Health Organization (WHO), the ideal CS rate should range between 10–15%, beyond which no additional health benefits are observed for mothers or infants [1]. Nevertheless, recent Indian data indicate that institutional CS rates are often higher, frequently exceeding 20% [2,3].

A primary concern is the cascade effect: once a woman undergoes a primary CS, her likelihood of repeat CS in subsequent pregnancies increases, thus perpetuating the overall rate. Repeated CSs heighten the risk of complications such as placenta previa, placenta accreta spectrum, and uterine rupture [2].

In response, WHO has endorsed the Robson 10-Group Classification System (TGCS), which categorizes all obstetric admissions based on five core parameters: parity, gestational age, onset of labour, fetal presentation, and history of previous CS. This classification allows healthcare institutions to analyze CS rates within distinct, mutually exclusive groups and identify targets for policy change and clinical intervention [4,5].

As per WHOrecommendation lower segment caesarean section (LSCS) should be around 10 to 15 % ' Incidence of CS is on increase globally both elective as well as emergency. ACOG recommends 15 % of LSCS2. ACOGalso recommends vaginal delivery rate of 37% with previous LSCS, which is one of the methods to reduce the rate of CS. According to a study in India as of total institutional delivery, CS contribute 20 %.As per previous year data it was around 18.7 %3,4 *. This shows the increase in rate of CS per year. It is a matter of concern because each CS of a woman, increases her chances of CS in next pregnancy, and also put her to an increased risk of low lying placenta, placenta accrete and percreta [6,7].

This study aimed to utilize Robson's TGCS to assess the LSCS rate at IIMS&R, Lucknow, over a two-year period and to compare findings with other national and international studies. By identifying the groups that contribute most significantly to CS rates, we aim to propose targeted, evidence-based interventions for CS reduction without compromising maternal or fetal outcomes.

Robson classification

In 2015, WHO proposed the use of the Robson classification (also known as the 10-group classification) as a global standard for assessing,monitoring and comparing caesarean section rates both within healthcare facilities and between them. The system classifies all women into one of 10 categories that are mutually exclusive and, as a set, totally comprehensive. The categories are based on 5 basic obstetric characteristics that are routinely collected in all maternities (parity, number of foetuses, previous caesarean section, onset of labour, gestational age, and fetal presentation).

WHO expects that this classification will help healthcare facilities to:

o Identify and analyse the groups of women which contribute most and least to overall caesarean section rates

o Compare practice in these groups of women with other units who have more desirable results and consider changes in practice

o Assess the effectiveness of strategies or interventions targeted at optimizing the use of caesarean section

o Assess the quality of care and of clinical management practices by analysing outcomes by groups of women

o Assess the quality of the data collected and raise staff awareness about the importance of this data, its interpretation and use.

Group	Description
1	Nulliparous, single cephalic, ≥37 weeks, in spontaneous labour.
2	Nulliparous, single cephalic, ≥37 weeks, induced or CS before labour.
3	Multiparous (excluding previous CS), single cephalic, ≥37 weeks, in spontaneous labour.
4	Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labour.
5	Previous CS, single cephalic, ≥37 weeks.
6	All nulliparous breeches.
7	All multiparous breeches (including previous CS).
8	All multiparous breeches (including previous CS).

9	All Abnormal lies (including previous CS).
10	All Single cephalic,less then37 weeks (including previous CS).

CS, Caeserean section.

As per the WHO Robson's Classification Manual 7

The CS rate in each group are as follows:

Group 1	21.2%
Group 2	74.0%
Group 3	4.5%
Group 4	47.5%
Group 5	83.3%
Group 8	76.1%
Group 10	46.8%

The contributions of Groups 1, 2 and 5 add up to 66.9% of all CS

All abnormal lies are considered as absolute indication for caesarean section.

2. REVIEW OF LITERATURE

Few studies have been done previously also describing and analyzing the es rate on the basis of Robson's classification.

Mother Article: In October 2020

Study title: **The ten group Robson classification: a retrospective study to identify strategies to optimize caesarean section rate**. By Spandana S et al in Kerala. They concluded that-Modified Robson's classification is easily implantable and an effective method for ongoing surveillance. As per her study the cs rate was 50.47%. CS rate was mainly contributed by group 5 (18.10%); group 2 (13.96%) and group 1 (5.71%) group5 [5]

In January 2018: Retrospective study of caesarean section by using the Robson's ten group classification system by Manoj Bhatt et al from Bhavnagar, Gujarat. And they found total cs rate at their institute was 31 %. After evaluation each group of Robson's criteria they have shown different measures to reduce the cs rate [8].

The study conducted on A four year audit of deliveries by caesarean section at a medical college hospital in Central India by Malini Bharadwaj and Jyoti Nath Modi from India.

In this study the delivery records were analyzed retrospectively from January 2008 to December 2011. The rates and indications for deliveries by caesarean section were analyzed [4]

The result showed the total number of deliveries in the three year period was 4084. Of these, 1965 deliveries were caesarean deliveries (48.1%). Year wise, a rising trend in caesarean section rate was noted: 40.8% in 2008; 46% in 2009; 48.7% in 2010 and 56.5% in 2011. The leading indication for caesarean section was fetal distress (35%). Theothers major indications were previous caesarean delivery (26%), CephaloPelvic Disproportion (10.4%), Malposition/malpresentation (8.2%), prolonged labour (7.8%), Hypertensive disorders of Pregnancy (2.2), Antepartum haemorrhage (2%) and Obstructed labour (1.7%). The proportion of CS done for previous caesarean section steadily increased over the four years and a falling trend was noticed for CS done for prolonged labour.

And the conclusion is that the rate of caesarean section needs to be closely monitored and audited so as to take measures for reducing the caesarean rates.

2. Second study was on analysis of Cesarean Section Rate using Robson’s Ten Group Classification System and comparing the Trend at a Tertiary Hospital for 2 Years at mysore medical college Karnataka [6].

It aims to classify the cesarean section (CS) in different groups of Robson’s ten-group classification system (TGCS) and comparing the rate and relative size of groups with that of previous year at the tertiary hospital.

The total deliveries during 2014 were 12,930 and in 2013 were 15,182. The number of CSs during 2014 was 3,793 and in 2013 it was 3,917. Cesarean section rate in 2014 was 29.33% while in 2013 it was 25.8%.

The CS rate has come down to half in group I (nulliparous, single, cephalic ≥ 37 weeks, in spontaneous labor) and to one-fourth in group III [multiparous (excluding previous CS) single, cephalic ≥ 37 weeks, in spontaneous labor] in 2014 and the clinical significance is that the study showed reduction in CSrate by half in group I and by one-third in group III in 2014 in our institution. This was probably due to the increased awareness among the staff of the institute by the previous year study about higher CS rate.

3.Next study is on A cross sectional study of 1000 lower segment cesarean section in obstetrics and gynaecology department of P. D. UMedical College, Rajkot, Gujarat, India by Dolly Chavda, Kamal Goswamand Kavita Dudhrejiya from India.

The Background states that Though WHO [1] recommends a rate of 10-15% caesarean section for a given hospital, there has been a rising trend worldwide. We estimated the recent incidence of caesarean section in Obstetrics and Gynaecology Department, P.D.U. Medical College, Rajkot (Gujarat and correlated these rates with the socioeconomic, demographic, and health variables. And the result showed that the Caesarean section rate of the present study is 19.9%. Most common indication of LSCS was scarred uterus 39.9%.followed by fetal distress 19.1%, malpresentation 18.6%, and failed induction 7.3%. Maternal morbidities and mortalities in emergency LSCS in compare to elective LSCS. Analysis based on Robson's ten-group showed that group 5 (Previous CS, single cephalic,>37 weeks) made the greatest contribution to total CS rate.

4.Another study is on lower Segment Caesarean Section in Second Stage of Labor: Comparison of Patwardhan Method with Conventional Pushing Method (A 3-year Study) by Nihar R Bhoi, Lalmohan Nayak, Mitanjali Sethy, Kumudini Pradhan, Prakash Mishra, Tusar Mahapatra and Prosun Bera [2]

The aim of this study is to compare the maternal morbidities in Patwardhan technique vs "Push" and "Pull" method when LSCS done in second stage of labor and the result is that

during this time period there were 17,748 deliveries, out of which 6,223 cases underwent cesarean delivery with a cesarean rate of 35.06%, and a total of 420 pregnancies satisfied inclusion criteria. The differences in maternal age and gestational age at delivery were not considered to be statistically significant.

In our study the age of mother and gestational age at delivery were comparable in both the groups. And in the present study mean duration of labor was 16.86 hours (95% CI 16.38–17.39) in group I and in group II it was 16.81 hours (95% CI 16.52–17.10) (p = 0.85), that showed no significant difference among both the groups. Almost all cases in our study were referred cases from peripheral hospitals after trial of labor and was concluded that Extensionof the uterine incision is common when LSCS is done in second stage of labor. Since the lower uterine segment is thinned out, when the hand is forcibly introduced to deliver the deeply impacted head there is every risk of extension of uterine incision. Use of Patwardhan's technique is very useful to prevent this maternal injury and it does not increase neonatal morbidity. Hence Patwardhan technique is the ideal maneuver for delivery of baby while doing LSCS in second stage of labor.

3. OBJECTIVES OF STUDY

1.To analyze frequency and indication of LSCS at our institution

2.Calculate group wise percentage of patient as per Robson's classification.

3.To analyze measures by which we can reduce rate of CS at our institute.

4. MATERIAL AND METHOD

Study design: A retrospective study

Study population: All patients delivered at our institution during the period of January 2018 to December 2019 (2 years)

Study place: IIMSR Obstetrics and Gynaecology department

Inclusion criteria: All pregnant women who had delivered a viable foetus from January 2018 to December 2019

Exclusion criteria: All pregnant women giving birth to nonviablefetus(less than 28 weeks of period of gestation)

A case record form developed that included confinement number, age, gravida, parity, gestational age, maternal complications and type of delivery and used to collect the data.

Consent: Waiver of Consent

5. STATISTICAL ANALYSIS

As per the statistician, in SPSS version 16, data will be fed in excel sheet and will be analyzed.

Ethics review-Applied

Funding sources - none

6. EXPECTED OUTCOME

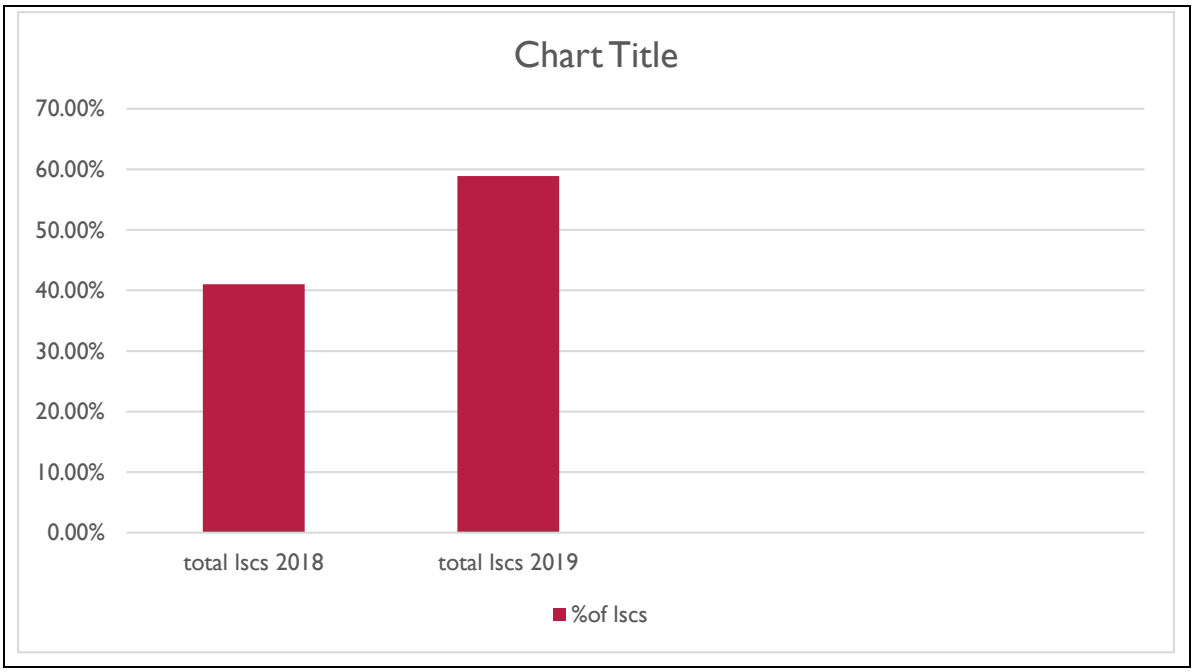
We will be able to analyze the exact rate of es at our institution and indication of cs as per the Robson's classification. Accordingly, we will be able to modify our management towards delivery.

7. RESULT

In our study Delivery record when analysed retrospectively from jan 2018 to dec 2019. The rates and indications for delivery by caesarean section where analysed the result show that total no. of delivery in two years period 1128. In which the percentage of normal vaginal delivery were and among this total no. of caesarean section.

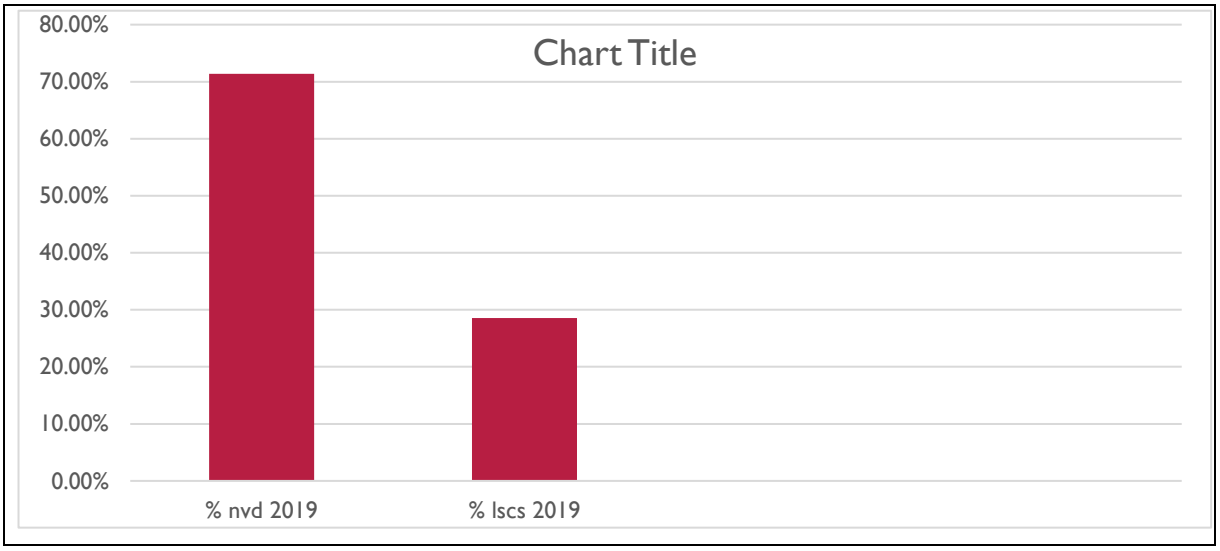
2018

Total % of NVD	58.9%
Total % of LSCS	41.0%



2019

Total % NVD	71.4 %
Total % LSCS	41.0 %

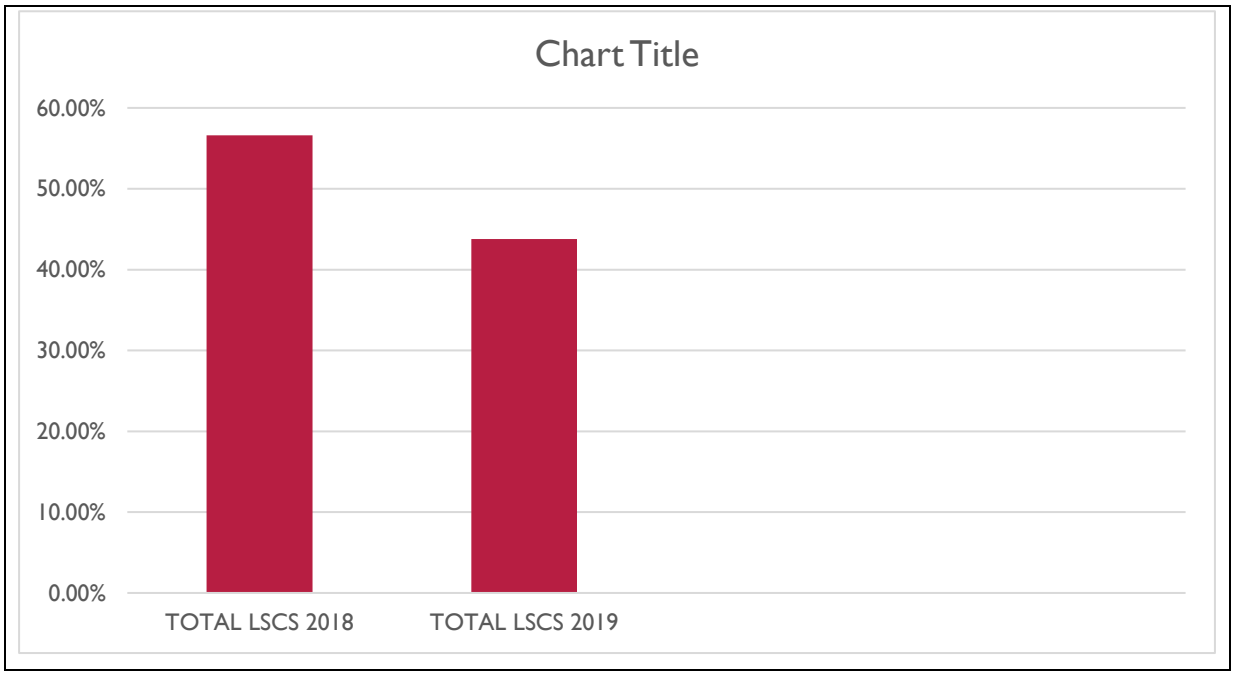


In two year time period from 2018 to 2019, we have group the indications of caesarean section as per robsons criteria. The overall caesarean section rate was 34%.

Multiparous women with previous CS, single, cephalic, term (group 5); nulliparous women, single cephalic, term, with induced labour or pre-labour CS (group 2); women with preterm single cephalic, term (group 10); and single cephalic term multiparous women in spontaneous labour (group 3) were the largest contributors to CS rate accounting for 38%, ,22.3%,8%, and 25.9% respectively. The commonest indication for CS was previous CS (group 5).

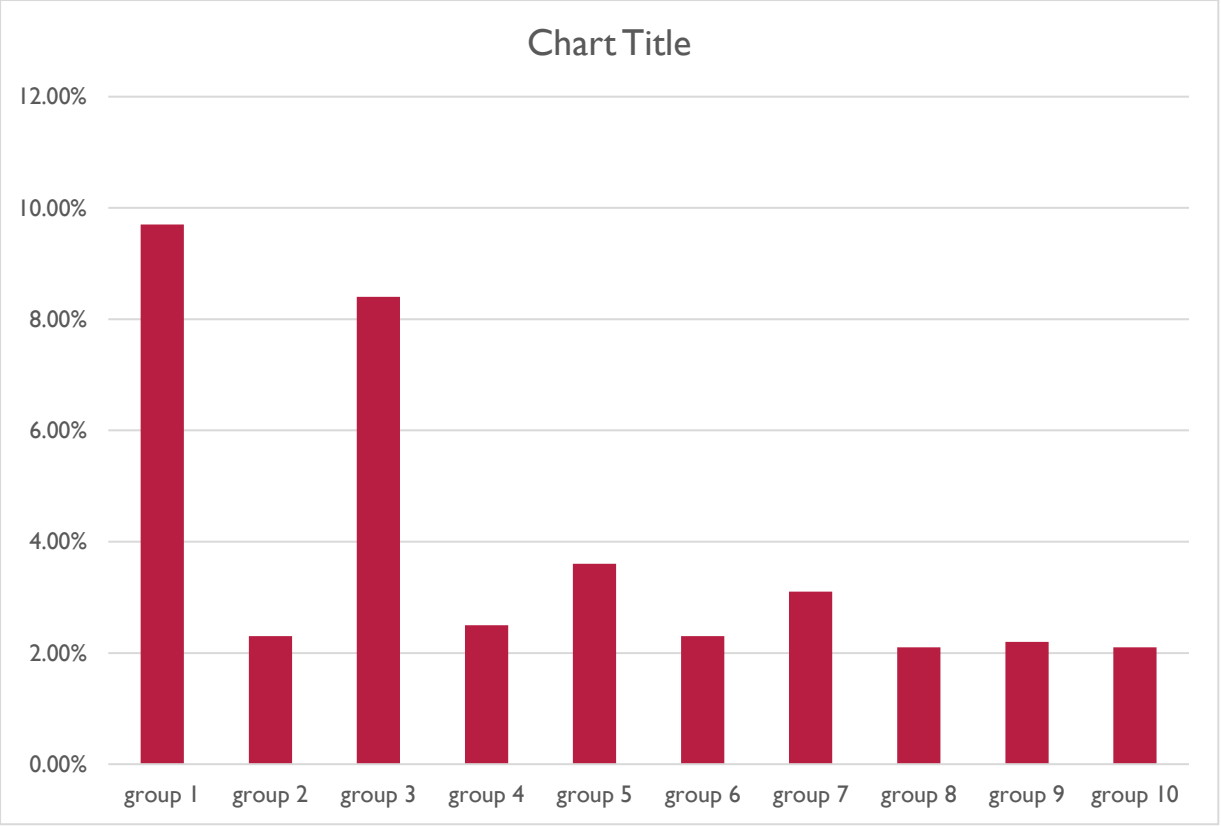
TOTAL % OF LSCS from 2018 to 2019

2018	56.6 %
2019	43.8 %



2018

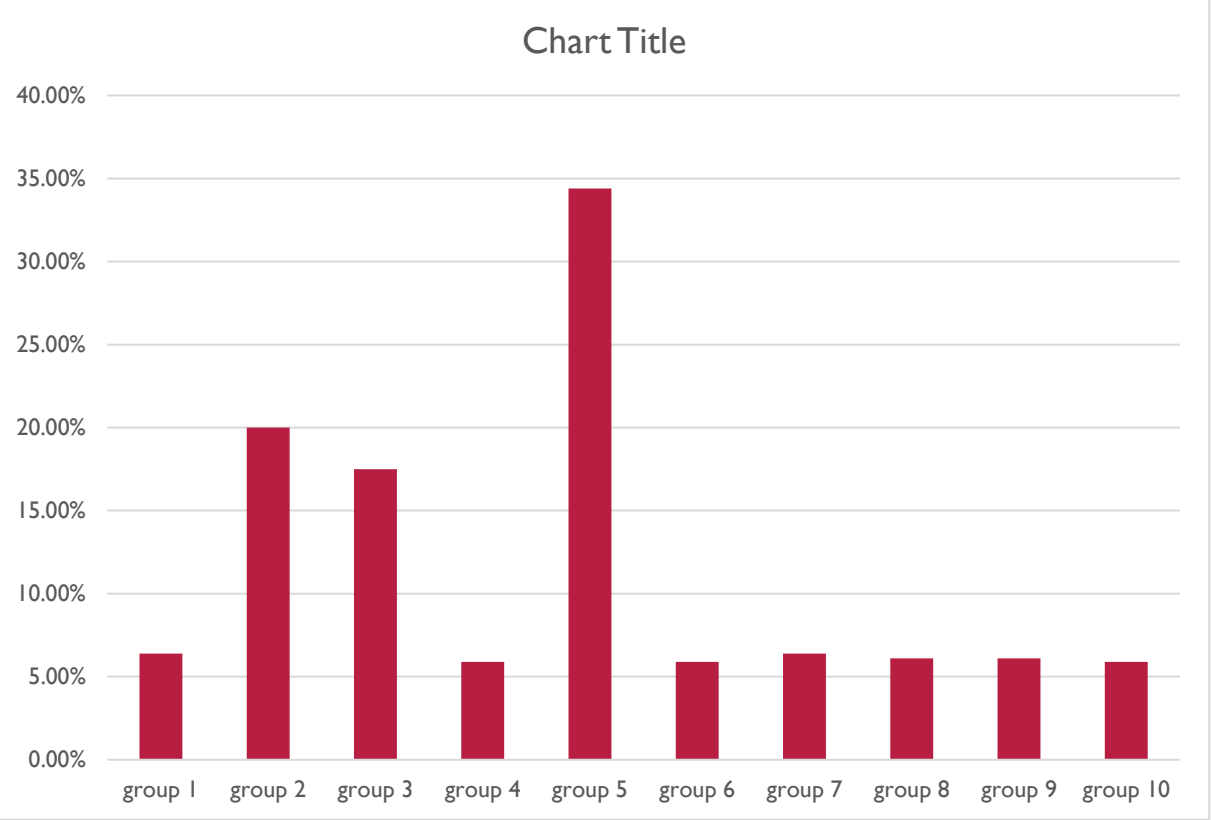
Group – 1	109 / 1128	9.7%
Group – 2	26 / 1128	2.3%
Group – 3	95 / 1128	8.4%
Group – 4	29 / 1128	2.5%
Group – 5	41 / 1128	3.6%
Group – 6	27 / 1128	2.3%
Group – 7	36 / 1128	3.1%
Group – 8	24 / 1128	2.1%
Group – 9	25 / 1128	2.2%
Group – 10	24 / 1128	2.1%



2019

Group – 1	26 / 404	6.4%
Group – 2	81/ 404	20.0%
Group – 3	71 / 404	17.5%
Group – 4	24/ 404	5.9%

Group – 5	139 / 404	34.4%
Group – 6	24 / 404	5.9%
Group – 7	26 / 404	6.4%
Group – 8	25 / 404	6.1%
Group – 9	25 / 404	6.1%
Group – 10	24 / 404	5.9%



8. DISCUSSION

The CS rate is our study was 36% which was a little higher but not significantly greater then WHO recommended CS rate for optimal case, whoever, depending the women into robson's categories made it possible for us to target specific group in which the CS rate needed to be reduced.

The result of similar study from at peoples medical college and research center Bhopal reported overall rate of cs section 48.1%and 34.9% and 25.9% for same groups[group5 &group2]

As per our study these groups also 20.0% and 34.4% % of total CS rate.

This is highly similar to study conducted at mysore medical college which state categories constitute little over 1/3 (733.33%) of total CS rate.

In our study max relative contribution to the total CS rate was group 5 (34.4%), this is significantly higher than WHO recommended rate for optimal care.

CS rate at a population level is an indicator of accessibility, availability and utilization of this facility, and is of use to policymakers an an indicator of maternal/perinatal health. At hospital level however, the rates need to be monitored and the WHO recommends the Robson's 10 group classification system for the same.

The present study revealed a CS rate of 36% over two years, exceeding the WHO-recommended threshold but aligning with

other Indian tertiary care institutions, where rates often range from 30% to 50% [9,10,11]. This reinforces the need for local audits using standardized classification systems like Robson's TGCS.

Group 5 (women with previous CS, single cephalic, ≥37 weeks) was the largest contributor (34.4%)—a finding echoed in studies from Kerala [12], Rajkot [11], and Mysore [13]. The dominance of this group underscores the role of repeat CSs and the need to encourage trial of labour after caesarean (TOLAC), wherever safe and feasible.

Group 2 (nulliparous, single cephalic, ≥37 weeks, induced or pre-labour CS) contributed 20.0%. The rate in this group has also been notably high in other studies [12,14], suggesting overuse of induction or early decision for elective CS. Strategies such as improved criteria for induction, expectant management, and enhanced labour monitoring may reduce CS in this group.

Group 3 (multiparous without prior CS, spontaneous labour) contributed 17.5%, which was unexpectedly high. This suggests potential over-diagnosis of fetal distress or failure to progress, requiring reinforcement of intrapartum monitoring and labour support.

In contrast, some groups like Group 1 (nulliparous, spontaneous labour) and Group 10 (preterm single cephalic) showed relatively lower contributions in this study compared to international standards. In a study by Malini Bharadwaj et al., the most common indication was fetal distress (35%), followed by previous CS (26%) and CPD (10.4%) [14].

A study at Mysore Medical College demonstrated a successful reduction in CS rates through targeted interventions after using TGCS audit tools, particularly in Groups 1 and 3 [13]. This highlights the system's utility beyond categorization—it also supports institutional quality improvement.

Contrasting Findings:

While our results are in line with Indian literature, studies from developed countries report lower CS rates in similar Robson groups. This could be attributed to better access to VBAC protocols, standardized induction methods, and litigation-related practices which are different across countries [15,16].

The present study found an overall caesarean section (CS) rate of 36%, exceeding the WHO-recommended threshold of 10–15%. This aligns with recent Indian tertiary care data, where institutional CS rates frequently surpass 30% despite ongoing reduction strategies. Robson's 10-Group Classification System (TGCS) continues to be a valuable audit tool for identifying specific obstetric subgroups contributing most to the CS burden.

In our cohort, Group 5 (previous CS, single cephalic, ≥37 weeks) was the largest contributor (34.4%), mirroring findings from multiple recent Indian and global audits. The persistence of high CS rates in this group underscores the importance of promoting vaginal birth after caesarean (VBAC) through standardized protocols, continuous intrapartum monitoring, and patient counseling. A 2025 multicentric study from South India reported that structured VBAC programs reduced repeat CS rates in Group 5 by nearly 20% without increasing maternal or neonatal complication [17].

Group 2 (nulliparous, single cephalic, ≥37 weeks, induced or pre-labour CS) contributed 20% of our CS rate. Similar to our findings, a 2024 North Indian study identified inappropriate induction timing, limited cervical ripening use, and overdiagnosis of fetal distress as major drivers of high CS rates in this group[18]. Targeted strategies—such as stringent induction criteria, evidence-based labour progression monitoring, and improved use of partograms—have been shown to reduce unnecessary CS in Group 2[19].

Group 3 (multiparous without previous CS, spontaneous labour) accounted for 17.5%—higher than international benchmarks. This may suggest suboptimal labour support and over-intervention, a pattern also reported in a recent 2024 Nepalese study[20]. Strengthening midwifery-led care and implementing real-time labour review protocols may help align these rates with global best practices.

International comparisons reveal that while India's Group 5 and Group 2 rates are substantially higher than in countries like the UK, Australia, and Japan, these nations benefit from more robust VBAC uptake, medicolegal frameworks favouring trial of labour, and lower elective CS rates [21]. Moreover, studies from 2025 highlight that reducing CS rates requires not only clinical interventions but also cultural change within maternity services [22].

Overall, our results reaffirm the utility of TGCS in identifying priority intervention groups. Periodic audits, coupled with institution-specific quality improvement programs targeting Groups 2, 3, and 5, could help safely curb rising CS rates.

Multicentric prospective research incorporating maternal satisfaction, long-term reproductive outcomes, and cost-effectiveness analyses is recommended to refine strategies for CS reduction.

9. CONCLUSION

There is a definite need the to monitor the CS rate in the institution. Thusrobsons classification provides the simple way to gather data about CS rate it helps to identify women into different categories. Using the study we found out the significantly higher rate of CS Deliveries mainly in three group (group 2,5 and 6) this data can help us implement targeted intervention

specific to the group. It is of crucial imp. To make a comprehensive assessment for deciding for CS.

Our study reaffirms that Robson's 10-Group Classification is a pragmatic tool for CS audit and strategy formulation. Groups 5, 2, and 3 were the predominant contributors to the CS rate at IIMS&R. Targeted efforts—such as promoting VBAC in eligible women, refining induction protocols, and enhancing labour management—can reduce unnecessary CS rates.

Hospitals should institutionalize TGCS-based CS audits to identify trends, benchmark performance, and guide clinical decision-making. Future prospective studies with multicentric data are warranted to validate these findings and implement standardized CS reduction strategies.

Strengths and Limitations:

A major strength is the use of TGCS for granular analysis. However, as a retrospective study, it was limited by incomplete documentation and potential under-reporting of clinical variables. The data was also restricted to a single institution, which may limit generalizability.

Probability of missing relevant information due to improper documentation in records. In our study conducted retrospectively from 2018 2019(jan to dec) for a period of 2 year at IIMSR at OBG department LKO to analyse the frequency and indication of LSCS at our Institute and grouping of the patient as per Robson classification and to analyse measures to reduce the rate of caesarean section at our institute.

10. DECLARATIONS

Conflicts of interest: There is no any conflict of interest associated with this study

Consent to participate: There is consent to participate.

Consent for publication: There is consent for the publication of this paper.

Authors' contributions: Author equally contributed the work.

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