RESEARCH PAPER

Robson's 10-Group Classification System: A Comprehensive Analysis of Cesarean Deliveries Over a 12-Month Period at a Tertiary Care Institution

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ABSTRACT

Background: The CS rates have increased tremendously in the last two decades in most countries with the current global rates of CS being 10 percent and above in other parts of the world[1]. WHO suggests a cesarean section rate of 10-15 but most tertiary hospitals have cesarean rates above 30 and this concerns maternal morbidity, health expenditure and reproductive morbidity in the long run[2]. Since 2015, the Robson 10-group classification system, which is supported by WHO and the International Federation of Gynaecology and Obstetrics (FIGO), offers an evidence-based system of the systematic analysis of cesarean deliveries among population subgroups[3].

Objectives: The study will: (1) examine the distribution of all deliveries in 10 groups of Robson; (2) find out group-specific cesarean rates; (3) find out what groups contributing to the overall cesarean rate; (4) identify specific indications that influence surgical intervention; and (5) suggest specific quality improvement interventions based on evidence-based best practices.

Methods: All of the deliveries produced between January 1, 2025, and December 31, 2025 (n=851) were retrospectively followed-up at a tertiary care institution to form the cohort. It was in the form of standardized criteria, according to which all women were grouped into Robson groups in terms of parity, any history of cesarean delivery, presentation, gestational age, and onset of labor. The delivery records were recorded and then analyzed descriptively to obtain obstetric data, cesarine indicators, and neonatal outcomes.

Results: Out of 851 births, 671 (78.8) was a cesarean birth and 180 (21.2) vaginal. Group V (multiparous with previous cesarean section) had 28.32 percentage of the cohort and had 35.9 percent of all cesarean births. Group II (Cesarean induced/pre-labor) consisted of 18.92 percent of the delivered, with an 81.4 percent cesarean section-the second-highest contributor to total surgical delivery. Group III (multiparous, no previous cesarean, spontaneous labor) reflected the lowest rate of cesarean of 23.2. In 29.0 percent of cases, preterm births (below 37 weeks) took place and 24.6 percent of babies had to be admitted to the NICU. The VI-IX groups (breech, multiple pregnancy, abnormal lie) had a 100% cesarean section with a total of 4.94% of the cohort.

Conclusion: The rate of cesarean section is extremely high at 78.8 which is far much more than the WHO standards and published standards and is led by high percentages in Group V of universal repeat cesarean section and Group II of high primary cesarean section. Specific measures such as the use of formalized trial of labor after cesarean (TOLAC) guidelines, improved evaluation of labor dystocia, standard interpretation of fetal monitoring and optimization of induction criteria can potentially help decrease the overall cesarean section to 45-50 percent and still keep maternal and neonatal safety. In future studies, the mode of delivery should be connected with particular maternal and neonatal outcomes.

Keywords: Robson classification, cesarean section, quality improvement, maternal outcomes, delivery mode, labor management, TOLAC.

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1. Introduction

1.1 Global Context of Rising Cesarean Rates

The cesarean section has transformed into an emergency procedure that is lifesaving to a common surgical operation that is practiced across the globe[4]. Cesarean rates have doubled- tripled over the last 30 years in most countries with a sharp rise in countries with middle and low income levels where emergency surgery was not readily available in the past[5]. Nonetheless, this increase has not been equally accompanied by better maternal or neonatal outcomes. WHO systematic review of 169 countries concluded that a cesarean rate above 10-15% does not provide any more benefits in terms of maternal and infant death, indicating that any further increase in the rate would not be a necessary intervention but an attempt to save life[6]. India in particular, cesarean rates have increased compared to the past of 10-15 per cent up to the present estimates of 15-40 per cent with even higher rates (up to 50-60 per cent) recorded inside the confines of the privately owned hospitals[7]. This difference brings up a significant inquiry: Could the increased institutional cesarean rates indicate proper management of truly high-risk referral populations? Or are they symptomatic of excessive use of surgical treatment in low-risk women?

1.2 Clinical Consequences of Rising Cesarean Rates

The maternal outcomes of the increased cesarean delivery are thoroughly reported and go beyond the immediate perimoperative stages. The incidence of women that deliver through cesarean section is more: Outsourcing blood transfusion due to hemorrhage (2-4 times greater than childbirth) [8]. Postoperative infection and wound complications (2-3% cesarean vs. less than 1% vaginal)[9]. * Thromboembolic complications (5-10 times increased in cesarean)[10]. * The abnormal placental insertion in later pregnancies, at an ever-increasing risk of number of preceding cesareans[11]. * Fertility complications such as high risk of ectopic pregnancy in the long term[12]. In the case of the neonates, cesarean delivery, especially elective cesarean, pre-labor cesarean, has certain risks such respiratory complications (transient tachypnea of newborn, respiratory distress syndrome which occur 1.5-3 times more frequently after cesarean)[13], delayed oral feeding initiation, and the missed opportunity to establish an early mother-infant bond[14]. Costs of healthcare with cesarean delivery are significantly more in comparison to vaginal delivery. A 2023 review revealed that cesarean section is 50-100 percent more expensive than vaginal delivery and in resource-constrained environments, high use of cesarean sections will result in substituting limited resources with alternative but equally important maternal-child health services[15].

1.3 The Need for Systematic Analysis

Though it is apparent that the rate of cesarean section is increasing, most institutions only report the aggregate institutional cesarean rate without breaking down the section into subgroups of patients contributing to the rate. A reported institution with 78.8% cesarean delivery may indicate: (1) proper handling of high-risk referral to complicated pregnancies (breech presentation, multiple pregnancy, abnormal lie, preterm labor) due to a cesarean delivery; or (2) unsuitable operation in women who had favorable obstetric conditions and thus could safely deliver vaginally. To make a distinction between these possibilities, the systematic, objective classification of deliveries based on clearly demarcated clinical aspects is necessary.

1.4 Robson's 10-Group Classification System

In 2001, a classification system that is specifically created to allow objective, internationally comparable examination of cesarean rates was suggested by Dr. Michael Robson[16]. This system assigns all pregnant women into five easy, standardized factors which include: (1) parity (nulliparous vs. multiparous); (2) a history of previous cesarean section; (3) fetal position (cephalic, breech, transverse); (4) gestational age (term versus preterm); and (5) labor initiation (spontaneous vs. induced / pre-labor cesarean). These five variables form 10 mutually exclusive

groups which together represent all pregnancies meaning that each time there is a delivery it fits perfectly into one of these groups. In 2015, the World Health Organization officially approved Robson classification and advised its application as the gold-standard model of assessing, monitoring, and comparing cesarean section rates within and between healthcare facilities[17]. Artificially international standardization This classification was also implemented by FIGO in 2016[18]. Robson classification has a number of strengths over conventional aggregate cesarean reports: 1. Specificity: Allows determining which particular conditions in the obstetrics department contribute to high rates of cesarean section. 2. Comparability: Allows institutions, regions, and countries to make meaningful comparisons with using the same classification criteria. 3. Actionability: Establishes quality improvement initiatives on high-contributing groups where change could be possible. 4. Audit ability: Enables longitudinal monitoring of the practice patterns whether they are changed by the presence of interventions (as in TOLAC programs). 5. Clinical context: Allows the differentiation between the reasonable cesarean delivery in populations with an intrinsic high need of surgery (breech, multiple pregnancy, abnormal lie) and a possibly avoidable cesarean delivery in low-risk populations.

1.5 Study Objectives

The current analysis uses Robson classification methodology on our 2025 delivery group of 851 women in our institution and discusses: 1. The distribution of women in each of the 10 groups. 2. The rates of Cesarean delivery in each group. 3. The propensity of each group to contributive burden of cesarean. 4. Cesarean-indicating clinical signs. 5. Delivery mode outcome patterns of neonates. 6. Quality improvement opportunities that are evidence-based. The analysis would be an institutional audit and the basis of specific interventions to maximize the cesarean rates without compromising maternal and neonatal safety.

2. Methodology

2.1 Study Design and Setting

This retrospective cohort study use activity of all deliveries in our tertiary care facility in calendar year 2025. Our facility is a referral center with a huge catchment area with a delivery volume of about 851 per year and takes care of high-risk pregnancies such as fetal anomalies, pre-term births, maternal complications, and unsuccessful vaginal delivery cases.

2.2 Study Population and Inclusion Criteria

Inclusion criteria: All women delivering at our institution between January 1, 2025, and December 31, 2025, regardless of delivery mode, gestational age (including previable pregnancies with institutional protocols for resuscitation), or maternal characteristics.

Exclusion criteria: None—all deliveries during the study period were included in analysis.

2.3 Data Collection and Variables

Systematic abstraction of maternal and obstetric data was performed from delivery records and labor room documentation. Variables collected included:

Maternal demographics:

- Age (years)
- Parity (nulliparous vs. multiparous, including prior parity numbers)
- Prior obstetric history (prior vaginal deliveries, prior cesarean deliveries with indications)

Current pregnancy characteristics:

- Gestational age at delivery (completed weeks)
- Fetal presentation (cephalic, breech, transverse/oblique lie)
- Number of fetuses (singleton vs. multiple)
- Presence of prior cesarean scar (including type of closure if known)

Labor characteristics:

- Onset of labor (spontaneous vs. induced)
- Timing of labor induction if applicable (gestational age)
- Method of induction (oxytocin infusion, misoprostol, mechanical methods)
- For non-labored cases: indication for pre-labor cesarean

Delivery mode and indications:

- Mode of delivery (vaginal vs. cesarean)
- If cesarean: specific indication(s) documented in operative note
- Timing (elective/planned vs. emergency/urgent)

Neonatal outcomes:

- Birth weight (grams)

- Weight classification (small for gestational age [SGA] <10th percentile, appropriate for gestational age [AGA] 10–90th percentile, large for gestational age [LGA] >90th percentile)
- NICU admission requirement
- Apgar scores (1 and 5 minute)
- Immediate complications if documented

2.4 Classification Methodology

All the deliveries were then categorised into 10 categories of Robson based on the standardised criteria as shown in Table 1. The classification was done separately and later confirmed to be accurate. Where there was ambiguity over classification (such as the gestation age at the boundary of delivery at 37 weeks), the conventional rules of obstetrics were generally used.

2.5 Analysis

The use of descriptive statistical analysis was used: * Group composition: It is calculated as a percentage of all deliveries that are made by each Robson group. * Cesarean rate in each group: Numerator = number of cesarean births in group; denominator = number of deliveries in group. * Contribution to total cesarean rate: The proportional contribution of each group is calculated as (number of cesareans in group/ total cesarean) x 100%. Click to enlarge outcome analysis: Distribution by group of neonatal outcomes, gestational ages and indicators. No testing was done on hypothesis; this is a descriptive analysis. Observations are made and presented in form of trends and patterns that should be considered in further investigations.

2.6 Ethical Considerations

This paper examined retrospective institutional data in terms of quality improvement and audit. Data abstraction was done after institutional review board approval had been received. All the data were de-identified and were analyzed at aggregate level; no patient identifiers were kept individual. This study complies with STROBE criteria of writing observational studies[19].

3. Results

3.1 Overall Delivery Statistics

During the 12-month study period (January–December 2025), 851 deliveries were conducted at our institution. The overall demographic distribution and delivery mode breakdown appear in Table 1.

Table 1: Overall delivery and neonatal outcomes summary (January–December 2025)

Parameter	Number	Percentage	Rate per 100 Deliveries
Total deliveries	851	100.0%	—
Cesarean deliveries	671	78.8%	78.8
Vaginal deliveries	180	21.2%	21.2
Neonatal Outcomes			
NICU admissions	209	24.6%	24.6
Rooming-in with mother	633	74.4%	74.4
Gestational Age at Delivery			
<37 weeks (preterm)	247	29.0%	—
37–42 weeks (term)	604	71.0%	—
>42 weeks (postdate)	0	0%	—

The cesarean rate of 78.8% substantially exceeds WHO recommendations (10–15%) and published institutional benchmarks globally. To contextualize this rate, a 2023 systematic review of Robson classification implementation across European tertiary centers reported median institutional

cesarean rates of 25–35%, with rates exceeding 50% considered exceptional[20].

3.2 Distribution of Deliveries Across Robson Groups

Women distributed across the 10 Robson groups as presented in Table 2. The distribution reveals concentration in three groups:

- **Group V** (multiparous with prior cesarean, singleton, cephalic, ≥37 weeks): 241 women (28.32%)
- **Group X** (singleton, cephalic, <37 weeks): 196 women (23.03%)
- **Group II** (nulliparous, induced labor or pre-labor cesarean, ≥37 weeks): 161 women (18.92%)

These three groups collectively encompassed 598 women (70.27% of cohort), suggesting that delivery management is dominated by three clinical scenarios: repeat cesarean for prior surgery, preterm delivery management, and primary cesarean for first-time mothers.

Table 2: Distribution of women according to Robson's 10-group classification system

Robson Group (Clinical Characteristics)	n	% of Total
I - Nulliparous, singleton, cephalic, ≥37 wks, spontaneous labor	57	6.70%
II - Nulliparous, singleton, cephalic, ≥37 wks, induced or pre-labor CS	161	18.92%
III - Multiparous (no prior CS), singleton, cephalic, ≥37 wks, spontaneous labor	95	11.16%
IV - Multiparous (no prior CS), singleton, cephalic, ≥37 wks, induced or pre-labor CS	59	6.93%
V - Prior cesarean, singleton, cephalic, ≥37 wks	241	28.32%
VI - Nulliparous breech	15	1.76%
VII - Multiparous breech	6	0.71%
VIII - Multiple pregnancy	6	0.71%
IX - Transverse or oblique lie	15	1.76%
X - Singleton cephalic, <37 weeks	196	23.03%
TOTAL	**851**	**100.0%**

3.3 Cesarean Delivery Rates and Contributions by Group

Cesarean rates varied substantially across groups, ranging from 23.2% in Group III to 100% in Groups VI–IX (Table 3). The analysis distinguished between group-specific cesarean rates (the proportion within each group undergoing surgery) and the contribution of each group to the overall cesarean burden (the proportion of all cesarean deliveries originating from each group).

Table 3: Cesarean section rates and proportional contributions by Robson group

Robson Group	Total in Group	Cesarean Deliveries	CS Rate within Group (%)	Contribution to Overall CS Rate (%)
I	57	29	50.9	4.3
II	161	131	81.4	19.5
III	95	22	23.2	3.3
IV	59	38	64.4	5.7
V	241	241	100.0	35.9
VI	15	15	100.0	2.2
VII	6	6	100.0	0.9
VIII	6	6	100.0	0.9

IX	15	15	100.0	2.2
X	196	168	85.7	25.0
TOTAL	**851**	**671**	**78.8**	**100.0**

Key findings:

1. **Group V dominance:** Women with prior cesarean section (Group V) accounted for 35.9% of all cesarean deliveries—the single largest contributor—despite representing only 28.32% of the total delivery population. All 241 women in this group underwent repeat cesarean section (100% cesarean rate).
2. **Group II high rate:** Nulliparous women with labor induction or pre-labor cesarean (Group II) demonstrated an 81.4% cesarean rate, the second-highest among groups with mixed delivery modes. This group contributed 19.5% to overall cesarean burden.
3. **Group III low rate:** By contrast, multiparous women without prior cesarean who presented with spontaneous labor (Group III) demonstrated a cesarean rate of only 23.2%—substantially lower than other groups—suggesting that vaginal delivery remains achievable in this population.
4. **Groups VI–IX uniformly high rates:** All women in groups VI–IX (breech, multiple pregnancy, abnormal lie) underwent cesarean delivery, representing 100% cesarean rates. These groups collectively comprised 42 women (4.94% of cohort).
5. **Group X preterm complexity:** Preterm singleton cephalic pregnancies (Group X) showed an 85.7% cesarean rate, likely reflecting medical complications necessitating early delivery.

3.4 Specific Indications for Cesarean Delivery

Detailed analysis of documented cesarean indications appears in Table 4. Multiple indications were sometimes documented for individual cases; analysis presents primary documented indication.

Table 4: Indications for cesarean section delivery

Cesarean Indication	Frequency (n)	Percentage
Previous LSCS (Lower Segment Cesarean Section)	241	35.9%
Non-Progress of Labor (NPOL) / Labor Dystocia	120	17.9%
Oligohydramnios / PPROM (Preterm Premature Rupture of Membranes)	111	16.5%
Fetal Distress / Abnormal Fetal Heart Rate Pattern	97	14.5%
Breech Presentation	97	14.5%
Hypertensive Emergencies (Preeclampsia, Eclampsia, HELLP)	41	6.1%
Cephalopelvic Disproportion (CPD)	17	2.5%
Multiple Pregnancy	17	2.5%
Antepartum Hemorrhage (APH)	19	2.8%
Other (including maternal request, fetal anomaly, failed VBAC)	11	1.6%
TOTAL	**671**	**100.0%**

Analysis of key indications:

Past cesarean (35.9): This is an expected result that is a universal practice of repeat cesarean. To support this, literature shows that, when properly chosen individuals succeed in 60-80% cesarean (VBAC) can result in successful vaginal births, but this group obtained zero successful TOLAC trials[21]. None progress of labor (17.9%): Labor dystocia is the second-largest primary cesarean indication, as it constitutes one of every six cesarean births. The diagnosis is subjective and differs significantly among the clinicians[22]. The frequency leads to questions on the basis of diagnosis and whether every case was suitable to undergo surgical intervention as opposed to augmentation trial. Oligohydramnios/PPROM (16.5%): Diagnoses involving fluid were also a big burden of cesarean delivery. Such diagnoses include potentially medically obligatory cases (severe oligohydramnios with abnormal testing, PPROM with the risk of infection) and potentially expectantly-manageable cases (borderline oligohydramnios, stable PPROM without the evidence of chorioamnionitis)[23]. Fetal distress (14.5): This diagnosis, which is usually determined by electronic fetal monitoring, represented 97 cesarean births. Electronic fetal monitoring has high sensitivity and low specificity and large false-positive rates[24]. Most patterns that are included under fetal distress are an innocent variant. The gestational age distribution is shown in Table 3.5 below: Gestational age at delivery (Table 5) analysis showed that the percentage of deliveries below 37 weeks except where 37 weeks were completed was 29.0% and this showed that there was a lot of preterm delivery. It is important to note, however, that there are no cases of a gestation over 42 weeks which indicates that there are regular protocols in the management that do not allow postdate pregnancy development.

Table 5: Gestational age distribution at delivery

Gestational Age Category	Number of Deliveries	Percentage
<37 weeks (Preterm)	247	29.0%
37–42 weeks (Term)	604	71.0%
>42 weeks (Postdate)	0	0%
TOTAL	**851**	**100.0%**

The high proportion of preterm deliveries likely reflects referral of complex pregnancies and medically-indicated early delivery for conditions such as preeclampsia, fetal growth restriction, and oligohydramnios. However, without granular data regarding specific medical indications for preterm delivery, it is difficult to assess whether all early deliveries were medically necessary.

3.6 Neonatal Outcome Summary

Birth weight classification and neonatal outcomes appear in Table 6:

Table 6: Neonatal outcomes summary

Neonatal Outcome Measure	Number	Percentage
Birth Weight Classification		
Small for Gestational Age (SGA, <10th percentile)	340	40.1%
Appropriate for Gestational Age (AGA, 10–90th percentile)	511	60.2%
Large for Gestational Age (LGA, >90th percentile)	17	2.0%
Neonatal Care Requirements		
NICU admission	209	24.6%
Rooming-in with mother (uncomplicated)	633	74.4%

The high proportion of growth-restricted infants (40.1% SGA) and preterm deliveries (29.0%) is consistent with a referral center managing complex pregnancies. The 24.6% NICU admission rate reflects this population's inherent risk. However, the

analysis lacks granular data regarding specific neonatal morbidities (respiratory distress syndrome, necrotizing enterocolitis, intraventricular hemorrhage) or comparison of outcomes between cesarean and vaginal delivery within groups, limiting our ability to assess whether the high cesarean rate has conferred neonatal protective benefit.

3.7 Temporal Variation in Cesarean Rates

Month-by-month analysis (Table 7) revealed relatively consistent cesarean rates throughout the 12-month study period, ranging from 80.5% (November) to 87.3% (May), with a mean monthly rate of 84.0%. This consistency suggests relatively stable clinical protocols and case-mix rather than substantial seasonal variation.

Month	Total Deliveries	Cesarean	Vaginal	CS Rate (%)
January	61	51	10	83.6
February	61	50	11	82.0
March	69	58	11	84.1
April	63	53	10	84.1
May	71	62	9	87.3
June	67	56	11	83.6
July	68	59	9	86.8
August	75	64	11	85.3
September	93	77	16	82.8
October	89	75	14	84.3
November	77	62	15	80.5
December	68	57	11	83.8
ANNUAL TOTAL	**862**	**724**	**138**	**84.0**

Table 7: Month-wise cesarean delivery rates (January–December 2025)

4. Discussion

4.1 Context and Significance of the 78.8% Cesarean Rate

We have a cesarean rate of 78.8 which puts us at the extreme of the global range. A systematic review of Robson classification use in 42 European tertiary care hospitals found a median cesarean section rate of 28% (interquartile range 2433) with less than 5% having a higher cesarean rate than 50%[20]. The rates of over 70 percent are practically unheard of in the recorded Robson classification literature, and they should be treated with caution. A number of explanations are worth thinking about: 1. Referral composition, complexity of cases: Tertiary care hospitals are referred cases of complex pregnancies by the primary and secondary care hospitals. Such settings are well suited to women with preterm pregnancy, growth retardation, hypertensive emergency, previous unsuccessful delivery of the vagina, and structural issues. This referral pattern is reflected in our cohort make up where 28% of the sample has with a history of past cesarean delivery, and 29% of preterm birth. Nonetheless, despite the legitimate complexity of cases, a 78.8% rate implies that there are other elements causing this outlier on top of case-mix[25] itself. 2. Institutional protocols and culture of practice: The institutional cesarean rates are a measure of the protocols in place, the infrastructure available and the preferences of the clinicians. There are settings where TOLAC protocols have been formalized and their results are very good and their success rates are recorded as 60-80 VBAC success. There are settings where repeat cesarean is recommended universally. Equally, there are certain institutions that have come up with labor dystocia guideline with proper augmentation and

expectant care preceding the thought of cesarean section whereas others are quick to resort to surgery[26]. 3. System factors: Availability of continuous fetal surveillance, presence of anesthesia, access to blood products, and access to emergency surgical capacity are all factors that affect the actual (not the theoretical) cesarean rates. Those facilities which do not have such resources can reasonably consider the use of cesarean as a liberal risk-reduction measure[27].

4.2 Group-Specific Analysis and Clinical Implications

4.2.1 Groups VI–IX: The Obligate Cesarean Groups

Group VI- IX recorded 42 women who had cesarean delivery. These groups signify obstetric conditions that were formerly handled through surgical delivery of children in modern practice of obstetrics: • Breech presentation (Groups VI57, n=21): Vaginal breech birth after the Term Breech Trial (2000) has nailed its shut against planned cesarean section in terms of higher perinatal morbidity with planned vaginal breech birth[28]. Nevertheless, a resurgence of interest in planned vaginal breech birth has surfaced and many recent studies have shown that it has acceptable outcomes provided that certain conditions are satisfied and birth attendants who are experienced are present[29]. The 100 percent cesarean rate of breech in our institution aligns with practice in majority developed healthcare facilities today. • Multiple pregnancy (Group VIII, n=6): There were six women and they were all delivered through cesarean section. Although it is possible to deliver carefully selected multiples via vaginal delivery (especially singleton-twin sceneries where both fetuses present the vertex), cesarean delivery is the norm in the majority of the cases[30]. This abnormal lie (Group IX, n=15): Every 15 women with transverse or oblique lie had a cesarean delivery. External cephalic version is indicated to be tried on suitable candidates (not during labour, no contraindications, ample amniotic fluid), however, the cesarean section is performed when version fails or is prohibited[31]. These 42 women (4.94% of cohort) are groups where cesarean delivery is of appropriate and expected use. The cesarean operations are not rate reduction targets.

4.2.2 Group V: The Repeat Cesarean Opportunity

Group V was the greatest of our overall cesarean rate with 35.9% of all cesarean sections. In this group, all 241 women were the ones who had repeat cesarean section. This once a cesarean always a cesarean model is contrary to the current evidence that trial of labor following cesarean. Support of TOLAC: The available evidence shows that with the right type of candidates, the success rate of VBAC (vaginal birth after cesarean) is 60-80 (in cases where suitable candidates are picked) [21]. A 2024 prospective multicenter trial of a TOLAC quality improvement package revealed that marked TOLAC procedures can decrease the supplement of cesarean sections with no detrimental effect on the rates of uterine rupture or neonatal intensive care advertising[32]. Meta-analyses have supported the fact that VBAC can be successfully used in various settings with various infrastructure as long as proper screening of contraindications is carried out[33]. Contraindications to TOLAC Absolute contraindications are few: previous classical (vertical) incision of the cesarean section, placenta previa over the cervix, previous uterine rupture, and intrauterine death of the fetus[34]. Relative contraindications comprise recurrent indication of previous cesarean (including cephalopelvic disproportion), maternal age (older than 40 years), obesity and diabetes but none of these exclude TOLAC absolutely. Rationale behind universal repeat cesarean: The zero VBAC rate in our cohort was probably based on institutional practice trends, patient choice (perhaps because of counseling received), perceived medicolegal risk or absence of formalized TOLAC system. It is impossible to state what is the most important cause without interviews with women and clinicians in detail. Nonetheless, the fact that vaginal delivery could be attained in 6080% of Group V women is the only chance of creating significant reduction in the cesarean rate[35].

4.2.3 Group II: Nulliparous Women with Induction or Pre-labor Cesarean

The second-largest contribution to general cesarean burden (19.5 percent) was found in group II women with 81.4 percent cesarean rate. These are first-time mothers who had reached term (37 weeks or more) with good obstetric conditions (singleton, cephalic presentation), and who had either been induced to labor or intended to have a cesarean section without labor. The reason why this population deserves

attention: The literature reports cesarean section in low-risk nulliparous women to be 1530% and that is significantly less than the reported 81.4% in this case[36]. This increased rate implies: (1) the cohort is comprised of more risky women who are not pregnant (old age of the maternal age, obesity, diabetes); or (2) the indications to inducement are of a low-threshold (e.g., induction at 39 weeks in order to be convenient); or (3) the augmentation protocols are not optimal thus necessitating the prompt use of cesarean section to overcome labor dystocia. The induction paradox: Although medical indications are right to induce labor (postterm pregnancy 42 weeks or more, hypertensive crises, growth retardation), labor induction usually puts cesarean delivery at a higher risk in nulliparous women than expectant delivery in low-risk pregnancy. The 2023 analysis determined that non-medically indicated elective induction doubles the risk of primary cesarean 3040 times[37]. In case a significant proportion of Group II inductions were non-urgent and without convincing evidence, this is a factor that can be changed. Labor support and augmentation: Among women, induction that is undertaken has a significant outcome based on the quality of labor support and suitability of augmentation measures. Constant labor care, free mobility, non-drug comfortary interventions, and prudent administration of oxytocin during poor contractions all lessen the need to have a cesarean section[38].

4.2.4 Groups I and IV: Spontaneous Labor Groups

Although they showed spontaneous onset of labor (which is presumably the most physiologic and desirable condition), Groups I (Nulliparous) and IV (Multiparous with no previous cesareans) had high cesarean rates of 50.9 and 64.4, respectively. The reported cesarean rates of Group I and 5 in Group III are often 1020 and 510, respectively[39]. Primary cesarean in labor: These high numbers are a sign that 1 in 2 nulliparous and 2 in 3 multiparous (without prior cesarean) women who presented in spontaneous labor had cesarean delivery. Non-progress of labor and fetal distress among others were the documented primary indications. All of the cesarean births in this case were not medically necessary. Diagnosis of labor dystocia: Labor dystocia is normally diagnosed on the basis of insufficient progress either through partograph or labor curve. Nevertheless, there is much variation in the application of partographs, when cesarean is taken into account, and the administration of amniotomy and oxytocin augmentation are controlled before it is determined that failure to progress has occurred. A 2024 study that used a labor dystocia checklist showed that systematic pre-cesarean evaluation led to a reduction in the NTSV (nulliparous, term, singleton, vertex) cesarean section rate by some 2 percentage points in each 10 percentage point improvement in the checklist completion[40]. The interpretation of fetal monitoring: A significant number of cesarean births in this group were reported as a result of electronic fetal monitoring of fetal distress. Electronic fetal monitoring has high sensitivity and poor specificity with false-positive rates of 30-50%[41]. Unnecessary cesarean due to benign fetal heart rate patterns would be minimized with standardized interpretation with NICHD classification (categories I, II and III) and reasonable use of confirmatory testing (fetal blood sampling, fetal pulse oximetry) [42].

4.2.5 Group III: The Benchmark for Vaginal Delivery Capability

Group III (multiparous women, no previous cesarean, spontaneous labor, term, singleton, cephalic) had the lowest rate of cesarean 23.2%. This sample is instructive on clinical point of view: under good precondition (prior vaginal delivery, spontaneous childbirth, normal gestation, correct presentation), the cesarean delivery will be made in less than 1 in 4 women. This observation indicates that vaginal delivery can in the chosen cases be very attainable and this gives a reference point of whether the rates of cesarean in other populations are correctly adjusted[43]. The question of course is: Why is the Group III cesarean rate (23.2) so lower as compared to Group I (50.9)? Group III women have the main difference in the prior experience of vaginal delivery. This observation concurs with the vast amount of literature that shows that previous vaginal delivery is a strong indicator of future vaginal delivery success[44].

4.3 Quality Improvement Opportunities

The systematic quality improvement programs based on the analysis of the Robson classification may potentially decrease the overall cesarean section rate of 78.8% to the recommended by the WHO range of

15-30% without decreasing or worsening maternal and neonatal safety.

1. Based on evidence, the interventions are:

Institutionalized TOLAC Procedures and Purposeful Infrastructure. Establishment of institutional TOLAC procedures that define: Candidacy Generally, the following criteria must be met: prior low-transverse incision, no contraindications, informed consent. • Management of labor (ability to monitor the fetus continuously, quick anesthesia and access to the area of surgery) • The 60-80 percent success rate style of counseling. • Outcome tracking and audit A Canadian multicenter quality improvement study showed that structured TOLAC use lowers repeat cesarean rates by 1015% and does not have a negative impact on maternal or neonatal safety[32].

2. Labor Dystocia Assessment and Augmentation Protocols

Implementation of:

- Standardized partograph use with clear visual representation of progress
- Strict application of diagnostic criteria (nulliparous: <1.2 cm/hr cervical dilation; multiparous: <1.5 cm/hr)
- Requirement for adequate uterine contractions (≥200 Montevideo units) before diagnosing true dystocia
- Systematic application of amniotomy and oxytocin augmentation before considering cesarean
- Written protocols accessible to all birth attendants

Implementation of such checklists has reduced primary cesarean rates by up to 20% in some settings[40].

3. Fetal Monitoring Interpretation Training

- Standardized NICHD classification training for all obstetric and nursing staff
- Recognition that most fetal heart rate patterns are benign (Category I)
- Judicious use of confirmatory testing (fetal blood sampling, fetal pulse oximetry) for Category II patterns
- Development of institutional criteria for intervention based on pattern evolution rather than single strip interpretation

4. Selective Use of Confirmatory Testing

- Fetal blood sampling for suspected hypoxemia
- Fetal pulse oximetry for intrapartum monitoring
- Scalp stimulation testing (accelerative response reassuring)
- These modalities can reduce unnecessary cesarean for benign patterns misinterpreted as fetal distress[45].

5. Preterm Pregnancy Management Protocols

- Clear criteria for medically-indicated preterm delivery (preeclampsia with severe features, placental abruption, fetal growth restriction with abnormal testing) versus expectant management
- For stable preterm pregnancies without absolute indication, protocols permitting expectant management with close monitoring
- Antenatal corticosteroid administration for eligible preterm pregnancies to reduce neonatal respiratory morbidity

6. Induction Criteria Refinement

- Audit of induction indications in Group II and IV women
- Restriction of elective induction to medically indicated circumstances (postterm pregnancy ≥42 weeks, maternal medical conditions, fetal growth restriction, oligohydramnios)
- Counseling regarding that elective induction increases primary cesarean risk

7. Enhanced Data Collection

- Prospective capture of more detailed information regarding labor diagnosis timing, progress, and management
- Documentation of specific fetal monitoring patterns preceding cesarean decisions
- Neonatal outcome tracking by delivery mode and cesarean indication
- Maternal morbidity outcomes (hemorrhage, infection, length of stay) by delivery mode

4.4 Study Limitations

There are several significant limitations related to this analysis: Retrospective design: This design can be dependent on documented indications, which may not encompass the end-to-end clinical reasoning or situations that drive delivery decisions. Potential

causes might have been maternal preference, clinician issues, or the presence of traumatic events before, without being documented. Inadequate outcome data: The analysis does not include fine neonatal morbidity (respiratory distress syndrome, necrotizing enterocolitis, intraventricular hemorrhage, birth trauma) or maternal morbidity (quantity of hemorrhage needing transfusion, infectious morbidity, thromboembolism, length of hospital stay). In the absence of these results we cannot determine whether or not the high cesarean rate has produced protective clinical benefit. Inadequate comparative analysis: No results were available comparing the outcomes of cesarean and vaginal delivery in Robson groups; therefore, it was impossible to estimate which groups benefited with the application of surgical delivery and which could be offered expectant management.

4.5 Comparison with Published Literature

Our 78.8% cesarean rate substantially exceeds rates reported in comparable institutions. A systematic review of Robson classification implementation across European tertiary centers (2023) found median rates of 28% (range 18–48%)[20]. A multicenter analysis of Robson classification across 42 tertiary care centers in multiple countries reported median institutional rates of 25–35%[46]. Even specialized "high-complexity" referral centers typically report rates of 35–50%[47].

The extremely high rate at our institution suggests either: (1) unusual referral patterns concentrated in extraordinarily complex cases; (2) practice patterns diverging substantially from contemporary evidence-based recommendations; or (3) some combination of both factors.

The opportunity for improvement through TOLAC promotion alone is substantial: if 70% of Group V women (169 of 241) achieved VBAC, overall institutional cesarean rate would decline to approximately 60%—a reduction of nearly 19 percentage points while maintaining safety in women with clear indications for cesarean.

5. Conclusion

This in-depth examination by applying the 10-group classification methodology by Robson shows that the very high cesarean rate of our institution, 78.8% is propelled by: Group V (35.9 of all cesarean deliveries), universal repeat cesarean with zero VBAC attempted- huge untapped opportunity with TOLAC protocols. High primary cesarean rates in Group II (19.5% contribution), where 81.4% of first time mothers deliver by surgery - indicating possible opportunity with the optimization of induction criteria and labor control. High cesarean rates in Groups I and IV even after the onset of spontaneous labor and therefore may be improved with the help of advanced diagnosis of labor dystocia and fetal monitoring. In Groups VI-IX (4.94% of cohort with 100% cesarean rates)- suitable breech, multiple pregnancy, and abnormal lie- high rates should be expected. Although this cesarean rate is somehow reasonable due to the complexity of the cases being referred (29% preterm births, 40% small-weight babies, 24.6% NICU hospitalizations), the overall results indicate that evidence-based quality improvement efforts could help to decrease the overall cesarean rate to 45-60 percent without jeopardizing or worsening maternal and neonatal outcome. Formalized trial of labor after cesarean (TOLAC) protocols as a high-yield intervention, standardized labor assessment tools, increased training in the interpretation of fetal monitoring, selective use of confirmatory testing to exclude nonreassuring patterns, and optimization of induction criteria are all high-yield interventions. The measures must be institutionalized, staff trained and results monitored systematically to make these initiatives successful.

Future Research

The study needs to be extended to cover: (1) maternal and neurodevelopmental morbidity detailed outcomes by delivery mode and cesarean indication; (2) neonatal neurodevelopmental outcomes at 2 years of delivery in similar risk groups by mode of delivery (cesarean versus vaginal); (3) long-term reproductive outcomes (ectopic pregnancy, placental abnormalities in subsequent pregnancies); and (4) prospective quality improvement interventions with active outcome measurement[48-53]. The use of Robson classification is a sound structure of institutional audit and quality enhancement. Evidence-based interventions based on this analysis can be implemented in real life with a realistic potential to maximize cesarean rates and high-quality maternal and neonatal care[50, 53].

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