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AN AUDIT OF PRETERM CAESAREAN SECTION AT A TERTIARY CARE CENTRE IN SOUTH GUJARAT

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ABSTRACT

Background: Preterm birth is delivery before 37 completed weeks, that is before 36+6/7 weeks. According to American College of Obstetricians and Gynecologists(2012b) birth occurring between 34 and 36 completed weeks are considered late preterm. There are several reasons for performing preterm Caesarean sections. Medical indications include fetal distress, placental abnormalities, maternal complications such as preeclampsia or placenta previa, and conditions that threaten the well-being of the mother or fetus. Other factors, such as previous Caesarean sections, multiple pregnancies, and breech presentation, can also contribute to the decision to perform a preterm CS.12 Preterm birth is a global challenge affecting both developed and developing countries. According to the World Health Organization (WHO), approximately 15 million babies are born preterm each year, accounting for about 11% of all live births worldwide.11 The prevalence of preterm births varies across regions, with higher rates observed in sub-Saharan Africa and South Asia. These variations may be influenced by socioeconomic factors, access to healthcare, and the quality of antenatal care.11This study examines the maternal and fetal factors influencing the decision-making process for preterm cesarean sections (CS). Maternal health conditions, including preeclampsia and gestational diabetes, can necessitate early delivery when the risks of continued pregnancy outweigh potential complications. Additionally, maternal preferences, psychosocial factors, and effective communication with healthcare providers are critical in shared decision-making. Fetal indications such as non-reassuring heart rate patterns and intrauterine growth restriction (IUGR) further underscore the importance of timely delivery to optimize fetal outcomes. Understanding these factors is essential for improving maternal and fetal health decisions in preterm deliveries.

KEYWORDS : Preterm CS, Preterm CS rates, Indication of preterm CS, Factors, Timing of CS, Fetal outcome, maternal outcome.

INTRODUCTION

It is typically recommended when vaginal delivery poses risks to the health and safety of the mother or the baby.The factors contributing to the increasing CS rates, particularly in the context of preterm births, is crucial. Preterm birth, defined as delivery before 37 weeks of gestation, is associated with higher neonatal morbidity and mortality. The rising incidence of preterm births necessitates a focus on understanding contributing factors and improving outcomes. However, the increasing number of preterm CS raises concerns about appropriateness and outcomes.[1–3]

Cesarean sections (CS) can lead to immediate and long-term complications.[5,6]includes Increased risk of maternal morbidity and mortality, Postpartum hemorrhage, need for blood transfusion, extended hospitalization, Postpartum infections, Retained placenta, Adherent placenta.

To address the rising rates of CS while ensuring the safety of both mothers and infants, it is crucial to implement strategies that optimize CS rates and improve the quality of care provided. In 2015, the World Health Organization (WHO) and in 2016, the International Federation of Gynecology and Obstetrics (FIGO) recommended the adoption of the Robson Classification (also known as the Ten Group Classification) as a global standard for assessing, monitoring, and comparing CS rates.[1,7,8] The utilization of the Robson Classification system in auditing and monitoring cesarean section (CS) rates offers several advantages. It provides a standardized approach for comparing CS rates across healthcare facilities, allowing targeted interventions to reduce unnecessary procedures. The system helps identify high CS rate groups, address disparities, and develop evidence-based strategies. Effective implementation involves comprehensive data collection, accuracy in classification, and utilizing information for improving clinical practices. Adopting the Robson Classification system enables healthcare facilities to gain insights, identify areas for improvement, and optimize CS utilization, particularly for preterm births[8].

Materials And Methodology

Study Design: Cross-sectional Study involving record review
Study Place: New Civil Hospital
Study Duration: 12 Months for data collection +2 months for analysis + 2 months for writing

Inclusion Criteria

Pregnant women between 28- 37 weeks undergoing Caesarean section

Exclusion Criteria

Pregnant women undergoing Caesarean section at term gestation.

Pregnant women between 28 to 37 weeks gestation who had vaginal delivery.

Sample size: 60

Sampling Technique: Deliberate- i.e. consecutive consenting pregnant women undergoing preterm cesarean section in Obstetrics and Gynecology Department during the study period were enrolled after counseling.

Methodology

An observational study was conducted collecting data from

medical records of 60 consecutive consenting women in post-natal ward who had undergone preterm CS in a tertiary care centre over a period of 12 months after HREC approval. Medical records review were done to note socio-demographic data, Obstetric history and significant medical history.

The findings of general examination, abdominal examination, antenatal investigations including USG findings before CS was also noted from medical records.

The indication for preterm Cesarean section was noted, various intra operative and post operative complications during their hospital stay were noted.

Neonatal outcome in terms of their APGAR score, birth weight, need for NICU admission, indication of NICU admission were also noted.

Statistical Analysis

Data was coded and recorded in MS Excel spreadsheet program. SPSS v25 (IBM Corp.) was used for data analysis. Descriptive statistics: means/standard deviations and medians/IQRs for continuous variables, and frequencies and percentages for categorical variables was done. Data was presented in a graphical manner wherever appropriate for data visualization using histograms/box-and-whisker plots/column charts for continuous data and bar charts/pie charts for categorical data.

Statistical significance was kept at $p < 0.05$.

RESULTS

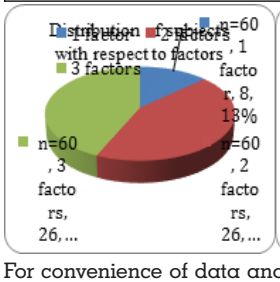
During the study,we had 315 preterm deliveries at our centre,of which 60 underwent preterm CS.**The preterm CS rate of around 20 percent** could be explained by availability of NICU facilities and improved chance of neonatal survival contributing to the CS threshold in these preterm expectant mothers Contribution of preterm CS to overall CS was 7% in our study.

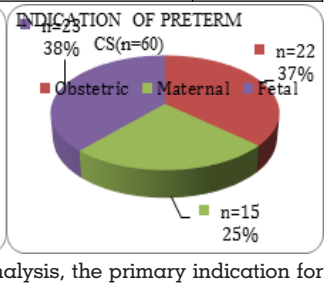
1. Baseline Characteristics & Current Antenatal Period Details

Age (Completed years)	**No. of Subjects(n=60)**	**Percentage**
<20	2	3.30%
20-29	46	76.70%
30-39	11	18.30%
>39	1	1.70%
Parity	No. of Subjects(n=60)	Percentage
Nulliparous	40	66.70%
Primiparous	16	26.70%
Multiparous	4	6.70%
Mode of previous delivery	No. of Subjects(n=20)	Percentage
Vaginal	6	30%
Cesarean section	14	70%
History of Significant Medical Illness	No. of Subjects(n=60)	Percentage
None	40	66.70%
Anemia requiring blood transfusion	5	8.30%
Hypertension	6	10%
Diabetes mellitus	2	1.60%
Sickle cell disease	3	5.00%
Hypothyroidism	2	3.30%
Asthma	1	3.40%
Cyanotic Heart Disease	1	1.60%
Registration status	No. of Subjects(n=60)	Percentage
Registered	30	50%
Referred	17	28.30%
Emergency	13	21.60%
Gestational Age by LMP	No. of Subjects(n=60)	Percentage
<30 weeks	1	1.60%
30-34weeks	20	33.30%
34-36weeks	25	41.60%
36-36+6	14	23.30%

2. Indication Of Preterm CS

FACTORS	**Frequency**
Obstetric Indication (n=38)	
PPROM	11
Antepartum Hemorrhage (n=11)	
Abruption	4
Placenta Previa	7
In established labour with other factors	8
CS Scar Tenderness	3
Prolonged Labour	3
Un favorable cervix with another factor	2
Maternal Indication(n=40)	
Previous 1 CS with other factors	12
Negative consent for Trial of Labour in previous CS who were otherwise eligible for VBAC	6
Previous 2 CS	4
Maternal medical disease (other than Hypertension) (n=4)	
Maternal Eisenmenger syndrome with breathlessness and cyanosis	1
Sickle cell crisis (Physician advice for termination of pregnancy)	3
Sickle cell disease with Pulmonary Hypertension	1
Hypertension (n= 13)13)	
Acute Kidney Injury due to hypertension with Diabetic Keto-acidosis	1
Hypertensive Crisis	3
Uncontrolled Severe PET	2
Eclampsia	1
Hypertension with other factors	5
Grade 3 retinopathy	1
Fetal Indication(n=54)	
IUGR (n=21)	
IUGR with other factors	13
IUGR with AEDF	6
IUGR with REDF	2
Fetal distress(n=19)	
Tachycardia	6
Bradycardia	8
MSL	5
Malpresentation(n=8)	
Breech	5
Shoulder	3
Twins	6





For convenience of data analysis, the primary indication for CS was taken into consideration, according to that obstetric indication as primary factor in 37%(n=22),maternal in25%(n=15) and fetal in 38%(n=23).

3.Primary Factor contributing to Indication of Preterm CS

For convenience of data analysis, the primary indication for

CS was taken into consideration as is presented below:

Primary Factor contributing to Indication of Preterm CS	frequency (n=60)	Percentage
Obstetric Factors (n=22 subjects)		
Antepartum Hemorrhage	11	18.3%
Preterm Premature Rupture of Membranes (PPROM)	7	11.7%
Previous CS scar Tenderness	2[b]	3.3%
Prolonged Labour	2	3.3%
Maternal Factors (n=15 subjects)		
Hypertension and related complications	7[c]	11.7%
Maternal medical indication	4	6.6%
Previous CS with negative consent for trial of labour after previous CS	3	5.0%
Previous 2 CS[a]	1	1.6%
Fetal Factors (n=23 subjects)		
IUGR	8	13.3%
Fetal Distress	7	11.6%
Twins	6	10%
Malpresentation(breech)	2	3.3%

a: Though we had Four subjects with previous 2 CS,

- One underwent CS for previous 2 CS in established labour,
- One had abruption with previous 2 CS (counted in Antepartum Hemorrhage)
- Two had placenta previa with bleeding with previous 2 CS (counted in Antepartum Hemorrhage)

b: Though three subjects had scar tenderness, one had associated placenta praevia with antepartum hemorrhage which was considered as the primary indication for CS in that subject.

c: Though eight subjects had severe hypertension, one had associated twins in labour which was considered as the primary indication for CS in that subject.

All twins were included under fetal factor for data analysis.

4. Indication Of Preterm Cs According To Onset Of Labour Gestational Age At Cs & Antenatal Registration.

INDICATION OF PRETERM CS			
According to timing of CS			
	Obstetric(n=22)	Maternal(n=15)	Fetal(n=23)
Before Onset of labour(n=32)	13	8	11
During Labour(n=28)	9	7	12
According to Gestational Age at the time of Preterm CS			
<30 weeks(n=1)		1	
30-34 weeks(n=19)	8	5	6
34-36 weeks(n=25)	7	6	12
>36 weeks(n=15)	7	3	5
According to antenatal registration status			
Registered(n=30)	9	6	15
Referred(n=17)	5	6	6
Emergency(n=13)	8	3	2

5. Feto-maternal Outcome Of Preterm CS

FETAL OUTCOME		
Baby status	No. of Subjects(n=66)	Percentage
Live Birth	66[a]	100%
Still birth	0	0
Apgar at 1 min	No. of Subjects(n=60)	Percentage
9/10-10/10	11	16.60%
<9/10	55	83.30%
Apgar at 5 mins	No. of Subjects(n=66)	Percentage
9/10-10/10	18	27.20%
<9/10	48	72%
Weight Distribution	No. of Subjects(n=66)	Percentage
>2.5Kg	2	3.30%
1.5-2.5Kg	46	73.30%
1.0-1.5kg	17	23.30%
<1kg	1	1.50%
NICU admission at birth	No. of Subjects(n=66)	Percentage
Required	47	71.20%
Not required	19	28.80%
Reason for NICU admission	No. of Subjects(n=47)	Percentage
Prematurity and weight gain	24	36.30%
Observation	9	13.60%
Phototherapy	9	13.60%
Need for Respiratory Support	5	7.50%
Discharge Status	No. of Subjects(n=66)	Percentage
Discharge	60	90.90%
Death	6	9%
MATERNAL OUTCOME		
OBICU admission	No. of Subjects(n=60)	Percentage
No	32	53.30%
Yes	23	38.30%
Post-Operative Morbidity		
Fever	5	8.30%
Need for Blood Transfusion	13	21.70%
Duration of hospital stay	No. of Subjects(n=60)	Percentage
<4 days	23	38.30%
5-7 days	24	40%
≥ 8 days	13	21.60%
Maternal Outcome	No. of Subjects(n=60)	Percentage
Discharged	59	98.30%
Death	1	1.70%

DISCUSSION

Preterm CS rate:

The preterm CS rate of 19.4 % in our study.

Baseline Socio-demographic Details:

In this study, the majority of participants (76.7%) were aged 20-29, with most subjects were primigravida (66.7%). Preterm C-sections were predominantly performed on primigravida and among those with previous deliveries, 70% had a prior C-section. Most participants (66.7%) had no significant medical history, while 33.3% had conditions like hypertension (10%) and anemia (8.3%).Regarding current pregnancy details, half of the women were registered patients, 41.6% had a C-section between 34-36 weeks, and 46.6% were already in preterm labor at admission. The majority had a BMI of 20-22 and single pregnancies. Investigations revealed that 66.7% had normal amniotic fluid, 80% had mild anemia, and 93.3% had normal platelet counts.

Indications Of Preterm CS :

We studied the reasons for preterm C-sections and found that most cases had **multiple factors i.e. obstetric, maternal & fetal requiring intervention**. Of 60 subjects, 38 had obstetric, 40 had maternal, and 54 had fetal factors. Eight subjects had one factor, while 26 each had two or three factors. The primary reason was obstetric in 37%(n=22) of cases, maternal in 25%(n=15), and fetal in 38% (n=23) subjects.

The most frequent obstetric reason was **Antepartum hemorrhage (18.3%),** followed by preterm premature rupture of membranes (PPROM) (11.7%) followed by previous CS scar tenderness and prolonged labour contributing the same (3.3%each).Amongst maternal factors, **hypertension and related complications** were the most common (11.7%), while previous cesarean sections accounted for 6.6% and maternal

medical indications for 5% and previous 2 CS 1.6% Among fetal factors, **intrauterine growth restriction (IUGR) (13.3%)** and fetal distress (11.6%) were the leading causes, with twins (10%) and malpresentation (3.3%)also contributing.

Timing Of Preterm CS:
The study highlights that majority of preterm CS occurred before onset of labour (n=13/32, 40%).

Of the preterm CS done before onset of labour, majority were due to obstetric indications, followed by fetal (n=11/32, 30%) and then maternal (n=8/32,25%)

Majority of preterm CS after onset of labour occurred for fetal indication(n=12/28,42%) followed by obstetric indications(n=9/28,32%) and then maternal indications(n=7/28,25%)

There was significant association between timing of preterm CS with respect to onset of labour and obstetric indications i.e. **Majority of patients with obstetric indication(n=22) underwent Preterm CS before onset of labour in my study.(p-value = 0.02)**

The association of maternal & fetal factors contributing to preterm CS with respect to onset of labour was not statistically significant (p-value 0.05 and 0.2 respectively).

Indication of Preterm CS with Gestational age at delivery:
Obstetric indications accounted for majority (45%) indications at 30 to 34 weeks gestation , while fetal indications accounted for 48% indications at 34 to 36 weeks gestation. Maternal indications accounted for almost similar proportion across all gestational ages.

Indication of Preterm CS according to Antenatal registration status:
Distribution of subjects of obstetric and fetal indications in my study with respect to antenatal registration was similar with respect to emergency and registered group (p-value = 0.09 & 0.1) respectively.

Fetal indications accounted for majority of CS (50%) in the registered group Obstetric indications accounted for majority of CS (61.5%) in the emergency group, while Distribution of obstetric, maternal and fetal factors was almost equal in the referred group.

Feto-maternal Outcome:
In this study, 66 babies were born, including six twin pregnancies. All were live births. Apgar scores at 1 minute were less than 9 in 83.3% of the babies, improving slightly to 72% by 5 minutes. Most babies (73.3%) weighed between 1.5-2.5 kg, with 71.2% requiring NICU admission mainly for prematurity, weight gain (36.6%), and respiratory support (7.5%). Birth asphyxia occurred in 5 cases, and there were 6 neonatal deaths due to prematurity and infection.

Regarding maternal outcomes, 23 women (38.3%) needed OBICU admission, 5 had fever, and 13 required blood transfusions. Most (78.3%) were discharged within 7 days, but 1 woman with Eisenmenger syndrome died post-operatively.

Contribution of preterm CS to overall CS was 7% in my study.

CONCLUSION

This study attempts to present insights into the maternal and neonatal outcomes associated with preterm Caesarean sections in a tertiary care center.

The study emphasizes the importance of targeted healthcare interventions (antenatal and intranatal), improved prenatal care, and a comprehensive approach to managing maternal health to improve both maternal and neonatal outcomes in high-risk preterm pregnancies requiring preterm delivery.

This study provides a comprehensive analysis of the indications for preterm cesarean sections (CS), revealing a complex interplay of obstetric, maternal, and fetal factors. The most prevalent indications identified were antepartum hemorrhage and preterm premature rupture of membranes (PPROM) among obstetric factors. Maternal indications included complications from hypertension. Fetal factors, particularly intrauterine growth restriction (IUGR).

This highlights the complexity of preterm CS cases, suggesting that decisions are often not made in isolation but rather in consideration of multiple risks to both maternal and fetal health.. cases, suggesting that decisions are often not made in isolation but rather in consideration of multiple risks to both maternal and fetal health.

Conflict Of Interest: Not available
Financial Support : Not available
Ethical Approval: The study was approved from the Human Resource Ethics Committee of Government Medical College, Surat.

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