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Original Research Article

A STUDY ON THE INDICATIONS FOR CAESAREAN SECTIONS IN NULLIPAROUS WOMEN IN A TEACHING HOSPITAL IN WARANGAL

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ABSTRACT

Background: Caesarean section (CS) has shown increasing trends across the globe recently, with primary cesarean deliveries among nulliparous women being one of the important contributors to the rise in numbers. Therefore, a thorough understanding of CS in nulliparous women is crucial for developing strategies to reduce the burden of CS. The current study aimed to analyze the frequency and indications for caesarean sections among nulliparous women in a teaching hospital in Warangal, Telangana.

Materials and Methods: This prospective cross-sectional study was conducted at CKM Government Maternity Hospital, Warangal. A total of n=1004 nulliparous women who underwent caesarean section were included using a convenience sampling method. Participants were followed throughout their hospital course, and data regarding demographic characteristics, labour details, and primary indications for caesarean section were collected and analyzed using descriptive statistics.

Results: Among the total n=1853 primiparous deliveries, n=1004 were delivered by caesarean section, yielding a CS rate of 54.18%. Fetal distress (32.9%) was the most common indication, followed by suspected cephalopelvic disproportion (16.5%) and meconium staining of liquor (14.7%). A significant proportion of fetal distress diagnoses were based on non-reassuring cardiotocography patterns. Preterm birth, hypertensive disorders of pregnancy, and induction of labour were significantly associated with Special Newborn Care Unit admissions.

Conclusion: This study demonstrates that a high caesarean section rate among nulliparous women is predominantly driven by intrapartum indications. Regular audit of indications and adherence to evidence-based labour management protocols may help reduce unnecessary primary caesarean sections.

Keywords: Caesarean section, Nulliparous women, Indications, Fetal distress, Teaching hospital, Warangal.

INTRODUCTION

Caesarean section (CS) is a commonly performed surgical procedure in Obstetric practice. It is considered a life-saving intervention when vaginal delivery is not possible or poses a considerable risk to the mother or fetus. However, in recent decades, the prevalence of caesarean deliveries all over the world has increased tremendously, leaving questions regarding the appropriateness of the indications and the potential short and long-term outcomes in terms of maternal and neonatal health.[1] The World Health Organization (WHO) has suggested that a higher rate of CS in a population of more than 10-15% was not associated with decreased maternal or neonatal mortality; therefore, cautious evaluation for indication must be done in each case.[2] The nulliparous women are one of the most frequent groups that need to be considered when examining the rates of caesarean section. Since these women do

not have an obstetric history, the mode of delivery in their first pregnancy is the decisive factor in further obstetric outcomes. There is a likelihood of repeating the caesarean section and additional adverse effects that may occur, such as placenta accreta, uterine rupture, and surgical morbidity in these cases.[3] A first delivery caesarean section to a nulliparous woman usually sets a precedent for the succeeding childbirths and plays a major role in the overall increase in the caesarean section rate.[4]

Many factors have been attributed to the rising rate of caesarean in nulliparous women, including the changes in obstetric practice, enhanced fetal surveillance, medico-legal considerations, maternal request, and changing demographic profiles like advanced maternal age.[5] The common indications for CS are fetal distress, non-progression of labour, cephalopelvic disproportion, malpresentations, hypertensive disorders of pregnancy, and labour induction failure.[6] The interpretation of these indications can vary between institutions and practitioners, especially in tertiary care teaching hospitals, where clinical decision-making is liable to be influenced by training requirements and availability of resources.[7] The rates of caesarean section in India have been significantly rising over the last 20 years, and a significant difference is observed between the public and the privately operated health care facilities, as well as regional differences.[8] Teaching hospitals that provide education are usually referred to as tertiary care hospitals where high-risk pregnancies are referred, and this could be a potential reason why the caesarean rates are high in these institutions. Meanwhile, these institutions are very instrumental in forming the future practice of obstetrics, and it is important to consistently audit the indications of caesarean section to make sure that there is evidence-based and prudent application of surgical intervention.[9] Warangal, being one of the major districts in Telangana, and its government-run hospitals, cater to a diverse population of obstetrics, both urban and rural populations. In this area, a teaching hospital such as ours deals with a large population of nulliparous women, and most of them have different socio-economic and clinical characteristics. An examination for the indications of caesarean section among the nulliparous women in this environment is an effective understanding of the current obstetric practice, trends of referral, and the possible mode of intervention to mitigate unnecessary primary caesarean sections.[10] Knowledge of the distribution and relative role of various indications of caesarean section in nulliparous women can assist in establishing modifiable variables, advantageous vaginal delivery in situations of feasibility, and institutional policy to optimize maternal and infant outcomes. Thus, the current research was conducted to examine the indications of caesarean section among the nulliparous women giving birth in a teaching hospital in Warangal.

MATERIALS AND METHODS

This prospective, cross-sectional, observational study was conducted at CKM Government Maternity Hospital, Warangal, Telangana, a tertiary care teaching hospital that serves as a major referral center for obstetric cases from urban and rural areas. The study period extended from January 2021 to December 2022. Ethical permission was obtained from the institutional ethical committee, duly following protocol for human research. Written consent was obtained from all the participants of the study after explaining the nature of the study and possible outcomes in the vernacular language. The method of sample collection was a convenience sampling technique, with all eligible nulliparous women being analyzed based on the inclusion and exclusion criteria.

Inclusion Criteria

1. Nulliparous pregnant women
2. Nulliparous pregnant women who are to undergo a caesarean section
3. Women admitted and delivered at CKM Government Maternity Hospital during the study period
4. Women who provided informed written consent.

Exclusion Criteria

1. Multiparous women
2. Women who delivered vaginally
3. Women who declined consent

The study involved N=1853 primiparous women, out of which n=1004 nulliparous women delivered using the caesarean section. The size of the sample was established by the number of eligible nulliparous women who had a caesarean section during the period that the study was conducted.

Data Collection: After enrolment, participants were followed up throughout their treatment period in the hospital. A pre-tested and pre-designed proforma was used to gather data. Data recorded involved maternal age, gestational age, antenatal risk factors, the onset and development of labour, the fetal status, and the indications that led to the choice to deliver using a caesarean section.

The indications for caesarean section were categorized into major ones, which were fetal distress, non-progress of labour, malpresentation, hypertensive disorders of pregnancy, unsuccessful induction of labour, cephalopelvic disproportion, and other maternal or fetal indications. The final indication was taken note of and was noted by the obstetrician.

Outcome Measures: The main outcome measure was the distribution of various indicators for cesarean section among nulliparous women. Secondary observations included emergency versus elective cesarean section and different obstetric risk factors that are related to the caesarean delivery.

Statistical Analysis: All the available data were refined, segregated, and uploaded to an MS Excel

spreadsheet and analyzed by Statistical Package of Social Sciences (SPSS) version 25 in Windows format. The continuous variables were represented as mean, standard deviation, frequency, and percentages. Categorical variables were calculated by the Chi-square test for significance between two groups. Values of p (<0.05) were considered significant.

RESULTS

The baseline demographic profile of the cohort in the study is given in [Table 1]. Analysis of the table showed that a total of N=1853 primiparous deliveries were recorded in the duration of the study, out of which N=1004 were delivered by caesarean section. The result in the overall caesarean section rate of 54.18% among nulliparous women. This showed that more than half of first-time mothers required cesarean delivery in this cohort, which indicates the high burden of primary caesarean sections. The age range was 19 – 32 years, and the mean maternal age of the cohort was 23.8 ± 3.5 years. The majority of women belong to the 21–25-year age group, followed by those aged 18–20 years. This reflects the typical reproductive age distribution in the region.

The primary indicators of cesarean section are depicted in [Table 2]. The most frequent signal of caesarean section was fetal distress in 32.9% of cases. The second common reason was suspected cephalopelvic disproportion (CPD) in 16.5% cases. The third reason was meconium staining of liquor (MSL) in 14.7% of cases. These three Indications alone were considered almost 64% of the primary caesarean sections, highlighting the dominant role of intrapartum fetal and labour-related concerns in decision-making. Other significant indications were failed induction of labour 8.8%, severe oligohydramnios 7.6%, and malpresentation 5.5% of cases. A direct primary indication of less importance was hypertensive disorders of pregnancy in 2.9% as the direct primary indication, though their indirect impact was evident in further analyses.

Table 1: Demographic and Baseline Characteristics of the Study Population

Characteristic Total Deliveries (Primiparas)	1853
Caesarean Sections (CS) in Primiparas	1004
Overall CS Rate among Primiparas	54.18%
Maternal Age (Years)	
Mean ± SD in years	23.8 ± 3.5
18 – 20 years	360
21 – 25 years	410
26 – 30 years	234
> 30 years	
All Nulliparous females as per the inclusion criteria	

Table 2: Frequency and Distribution of Primary Indications for Caesarean Section

Primary Indication for CS	Number (n)	Percentage (%)
Fetal Distress	330	32.9
Suspected Cephalopelvic Disproportion (CPD)	166	16.5
Meconium Staining of Liquor (MSL)	148	14.7
Failed Induction of Labour (IOL)	88	8.8
Severe Oligohydramnios	76	7.6
Malpresentation	55	5.5
Second Stage Caesarean	40	4
Hypertensive Disorders of Pregnancy (HDP)	29	2.9
Other Indications	66	6.6
Total	1004	100

[Table 3] gives the pattern of Fetal Distress Diagnosis among the cases of the study. Non-specific or non-reassuring cardiotocography (CTG) patterns were the most commonly mentioned basis for the diagnosis (43%) of the 330 cases of fetal distress. Diagnosis by intermittent auscultation was found in almost a third of the cases (31.5%). This shows a continued reliance on clinical observation in resource-limited or high-volume care areas. Abnormalities of the fetal heart rate, like bradycardia, decelerations, and tachycardia, were uncommon. This distribution indicates that a high number of caesarean operations performed in cases of fetal distress were based on subjective and non-specific monitoring results.

Table 3: Breakdown of Cases with Fetal Distress (n=330)

Method of Diagnosis / Pattern	Number (n)	Percentage (%) *
Non-specific/Non-reassuring CTG Pattern	142	43
Fetal Bradycardia	58	17.6
Decelerations	21	6.4
Fetal Tachycardia	5	1.5
Diagnosis by Intermittent Auscultation	104	31.5
Total	330	100
*Percentages are calculated from the total fetal distress cases (n=330). CTG: Cardiotocograph.		

Suspected Cephalopelvic Disproportion [Figure 1]. Clinical pelvimetry was used to diagnose the majority of women in cases where the CPD was suspected. A smaller proportion was short maternal stature (<145 cm), and poliomyelitis. It showed that CPD diagnosis was mostly clinical-based.

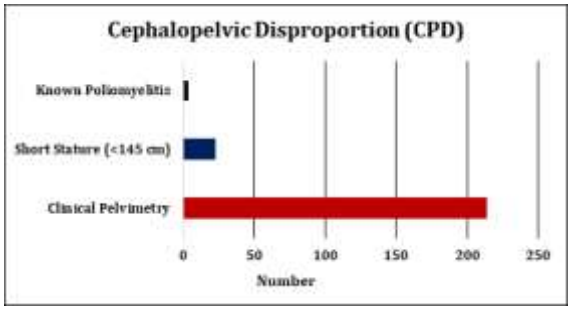

Figure 1: Breakdown of Cases with Suspected Cephalopelvic Disproportion

Meconium Staining of Liquor grading is presented in [Figure 2]. Of the total 148 caesarean sections performed for Meconium Staining of Liquor MSL, Grade 3 meconium was present in nearly two-thirds of cases (66.9%), indicating thick meconium with a higher risk of fetal compromise. Lower grades were less frequent. This suggests that severe meconium staining was a strong determinant for operative intervention in nulliparous women.

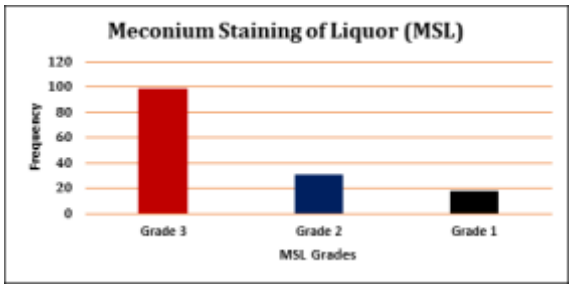

Figure 2: Grading of Meconium Staining of Liquor (MSL) in Primary Indication Cases

Caesarean Sections done in Hypertensive Disorders of Pregnancy are given in [Table 4]. Among women with hypertensive disorders of pregnancy requiring caesarean section, fetal distress was the most common immediate indication in 68% of cases. The second common cause was severe maternal complications, such as abruption, eclampsia, and uncontrolled severe preeclampsia, which accounted for 19.1% of cases. This highlights the dual maternal–fetal contribution of hypertensive disorders to operative delivery.

Table 4: Caesarean Sections in Women with Hypertensive Disorders of Pregnancy (HDP)

Primary Indication within HDP Group	Number (n)	Percentage (%)
Fetal Distress	121	68.0
Abruptio, Eclampsia, Imminent Eclampsia, Severe PE with uncontrolled BP, Severe Oligohydramnios	34	19.1
Other/Unspecified	23	12.9
Total HDP Cases requiring CS	178	100
*Percentage calculated from total HDP-CS cases (n=178). PE: Preeclampsia.		

Caesarean sections following induction of labour are given in [Table 5]. A total of N=237 caesarean sections followed induction of labour in this study. The most commonly used was dinoprostone gel. Fetal distress and MSL were frequent indications following induction, particularly with misoprostol use, suggesting increased uterine activity and fetal compromise as contributory factors. Failed induction accounted for a smaller but consistent proportion across induction methods.

Table 5: Caesarean Sections Following Induction of Labour (IOL)

Induction Method & Primary Indication for CS	Number (n)
All IOL Cases	237
IOL with Dinoprostone Gel (n=181)	
• Fetal Distress	72
• MSL	28
• Failed IOL	5
• Other (Placental Abruption, etc.)	76
IOL with Misoprostol (n=49)	
• Fetal Distress	32
• MSL	12
• Failed IOL	5
IOL with Dinoprostone Gel followed by Misoprostol (n=7)	
• Fetal Distress	3
• MSL	2
• Other	2

Indication for Caesarean Section in the Second Stage of Labour is given in [Figure 3]. Second-stage caesarean sections constituted a small but clinically significant group (n = 40). Second-stage arrest was the most common indication, followed by fetal distress and malpositions. These findings underscore the challenges of labour management and decision-making in advanced labour among nulliparous women.

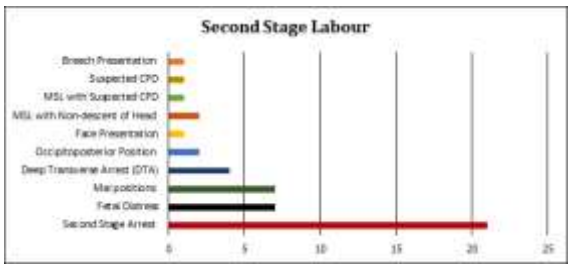

Figure 3: Indications for Caesarean Section in the Second Stage of Labour

Factors associated with SNCU Admission in the cases of study are given in [Table 6]. A total of n=139 neonates required SNCU admission. Preterm gestational age showed a highly significant association ($p < 0.0001$), followed by hypertensive disorders of pregnancy and induction of labour ($p = 0.003$ each). Fetal distress and MSL were frequently associated factors, emphasizing the impact of intrapartum compromise on neonatal outcomes.

Table 6: Factors Associated with Special Newborn Care Unit (SNCU) Admission

Associated Maternal/Fetal Factor	Number of Admissions (n)	p value
Fetal Distress	46	-
Meconium Staining of Liquor (MSL)	24	-
Severe Oligohydroramnios ± IUGR	17	-
Preterm Gestational Age	49 (out of 96 preterm CS)	<0.0001*
Hypertensive Disorders of Pregnancy (HOP)	33 (out of 178 HDP-CS)	0.003*
Induction of Labour (IOL)	19 (out of 237 IOL-CS)	0.003*
Other Factors (Malposition, APH, Eclampsia, etc.)	40	-
Total SNCU Admissions	139	-
* Significant, IUGR: Intrauterine Growth Restriction; APH: Antepartum Hemorrhage		

DISCUSSION

The present study was done to evaluate the indication of cesarean section in nulliparous women in Warangal, Telangana. The findings of this study showed that the rate of cesarean section was 54.18% among primiparas. This finding exceeds the rates recommended by the World Health Organization and the reported national averages, especially in institutions in the public sector. [2,8] However, our hospital, being a major referral hospital, receives many cases referred from lower centers; therefore, it may not reflect the true incidence of caesarean section in the population. The proportion of primary cesarean section in nulliparous women is important because it has long-term implications for future pregnancies and may contribute to the overall cesarean section burden in subsequent pregnancies. [3,4] The demographic characteristic of the study cohort showed that the majority of women were young, with an average age of 23.8 years. The same age distributions have been documented in the Indian obstetric studies in the past, and this showed that high rates of caesarean section are not limited to older maternal age groups.[11] This reveals that intrapartum factors are playing a greater role in the decision for cesarean section as compared to demographic risk factors alone. The most frequent indication of caesarean section was fetal distress, which explained almost one-third of the cases. This observation is aligned with various other studies previously carried out in tertiary care centers in India and other parts of the world. [7,12] Nevertheless, a critical analysis showed a significant percentage of fetal distress diagnoses were based on a non-reassuring cardiotocography pattern and intermittent auscultation. This is an issue of importance because it may lead to overdiagnosis and interobserver variability.[13] Therefore, fetal heart abnormalities must be confirmed by M-mode and pulsed Doppler fetal echocardiography, which may help reduce unnecessary operative deliveries.

The second most common indication for CS was cephalopelvic disproportion, which was determined by clinical pelvimetry. Similar trends have been reported by earlier studies where CPD was diagnosed intrapartum by the Trial of Labor and failure of progression of labour.[14] Although clinical judgment will always be necessary, standardized labour management protocols and the utilization of partographs can be used to differentiate between true CPD or possibly remediable labour dystocia. Other significant causes of caesarean were meconium staining of liquor and Grade 3 in particular. The thick meconium has been associated with high perinatal morbidity, provoking a decreased threshold for operative delivery.[15] Moreover, it has been suggested that meconium in the absence of fetal heart rate anomalies may not necessarily be an indication for caesarean section in well-monitored settings.[16] A high percentage of caesarean sections in this study was related to the induction of labour, which was mainly because of fetal distress and meconium staining. The same has been noted in large cohort studies, which have found that the caesarean rates have been higher after induction, especially in the nulliparous women with an unfavorable cervix.[17] Proper patient selection and the implementation of evidence-based induction can help to minimize the rate of failed induction and repeat caesarean section. Second-stage caesareans were comparatively fewer, but most of them were through arrest of descent and malpositions. These results indicate difficulty in the technical issues of handling advanced labour among the nulliparous women and emphasise the role of the skilled intrapartum care and proper application of operative vaginal delivery where feasible.[18] There was a significant relationship between neonatal outcomes, in terms of SNCU admissions, and preterm

delivery, hypertensive pregnancy disorders, and labour induction. These associations are well reported in the literature and highlight the interaction between maternal risk factors, obstetric procedures, and neonatal morbidity.[19] Overall, our study highlights the importance of regular audit of caesarean section indication in nulliparous women to promote evidence-based practice and decrease the unnecessary burden of primary caesarean deliveries.

CONCLUSION

The findings indicate that fetal distress, non-progress of labor, and cephalopelvic disproportion were the leading reasons for primary caesarean delivery. A substantial proportion of caesarean sections were performed for potentially modifiable indications, emphasizing the need for careful labor monitoring, adherence to evidence-based guidelines, and timely decision-making. Strengthening antenatal care, improving intrapartum surveillance, and promoting judicious use of caesarean section may help reduce unnecessary primary caesarean rates while ensuring maternal and fetal safety.

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