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Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Review Article

Patterns and factors influencing caesarean delivery in first-time mothers at a tertiary care hospital: A comprehensive study

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Abstract

Background: A caesarean section is one of the most common surgeries done in day-to-day obstetrical practice. With advances in surgical techniques, anesthesia, there have been many developments in the technique and precision. In the present times, due to advanced maternal age at first pregnancy and many other associated maternal and fetal complications, the mode of delivery through a caesarean section has increased drastically. This study explores the patterns, outcomes, and factors influencing caesarean deliveries in first-time mothers at Saveetha Medical College's Obstetrics and Gynecology Department.

Materials and Methods: Employing a retrospective observational design, this study analyzed the medical records of 500 first-time mothers who had caesarean deliveries at Saveetha Medical College's Obstetrics and Gynecology Department from January to December 2023. The data collection focused on gathering demographic information, medical history, caesarean indications, and postoperative outcomes. Statistical analysis was conducted using SPSS version 26.0 to identify trends and correlations.

Results: The incidence of caesarean sections was 60%, with 32% of these being primiparous mothers, Demographic analysis showed a higher prevalence among women over 30 and those in urban areas. Common indications included fetal distress (40%), prolonged labour and failed induction (25%) and cephalopelvic disproportion (15%). Postoperative complications were observed in 10% of cases, with notable differences in recovery times and patient satisfaction, highlighting the need for improved postoperative care protocols.

Conclusion: This study aims to enhance the understanding of caesarean section trends at a tertiary care centre. It provides valuable insights into the complex decision-making process for caesarean deliveries among first-time mothers. Studying the trends in first-time caesarean sections is crucial because it can impact the mode of delivery in subsequent pregnancies. An increase in first-time caesarean sections indirectly leads to more second-time caesarean sections, as there is often a reluctance to attempt a trial of labour after caesarean (TOLAC) and opt for vaginal birth after caesarean (VBAC). Additionally, the surgical risks and delivery time increase significantly.

Keywords: Caesarean section, Fetal distress, Pregnancy, Cephalopelvic disproportion.

Received: 13-10-2024; **Accepted:** 09-11-2024; **Available Online**: 28-05-2025

1. Introduction

The rising incidence of caesarean sections, particularly among first-time mothers, has become a significant area of focus in maternal healthcare research. While caesarean deliveries can be life-saving in certain situations, they also pose risks and consequences for the health of both the mother and the newborn.[1] This study investigates the patterns, outcomes and influencing factors linked with caesarean deliveries in primiparous women at a large tertiary care facility.

The number of caesarean sections performed worldwide has increased significantly in many countries over the last few decades.[2] This rise is influenced by demographics, clinical practices, institutional policies, and sociocultural factors rather than just medical necessity. Understanding these trends is critical because a caesarean section can have long-term effects on maternal health, future pregnancies and infant outcomes.[3]

Preliminary observations at the tertiary care centre indicate that the caesarean section rate is comparable to or higher than the national norm.[4] This is particularly intriguing

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https://doi.org/10.18231/j.ijogr.2025.032

because this institution caters to a broad community and acts as a referral hub for high-risk pregnancies, which may be more likely to require a caesarean section.[5,6]

The study of primiparous caesarean sections emphasises the importance of reducing unnecessary caesarean sections and promoting vaginal deliveries when possible. By encouraging vaginal births, the likelihood of successful future pregnancies with vaginal deliveries can be increased, leading to better overall health for both the mother and the baby. This approach also helps to avoid the complications associated with repeat caesarean sections, such as adhesions, bowel and bladder injuries, and longer recovery times. Additionally, it reduces the risks of uterine rupture associated with attempting labour after a trial of labor after caesarean section (TOLAC) and increases the chances of having a vaginal birth after Caesarean (VBAC).

The study's objectives were to investigate the incidence of caesarean section in primiparous women attending Saveetha Medical College and to understand the risk factors, indications and intraoperative and postoperative complications encountered. The study focused on first-time mothers to gain insights into the decision-making process and difficulties involved in the first delivery experience, which can serve as a model for later pregnancies. The findings are expected to offer vital information for ongoing conversations about improving maternal and newborn care while addressing the global issue of increased caesarean rates.

2. Materials and Methods

2.1. Study design

This study employed a retrospective observational design to investigate the incidence of caesarean sections among primiparous women. The research focused on identifying associated risk factors, the reasons for surgery and the intraoperative and postoperative complications experienced by the patients.

2.2. Study setting

The study was conducted at Saveetha Medical College's Obstetrics and Gynecology Department, which provides comprehensive antenatal care and delivery services.

2.3. Study population

This population comprised all primiparous antenatal women who attended Saveetha Medical College for delivery during the specified study period.

2.4. Sample size

This research used 500 primiparous antenatal women as the sample. The sample was chosen based on the number of expected deliveries at the institution within the study timeframe, ensuring a robust dataset for analysis.

2.5. Data collection

The data were collected retrospectively from hospital records covering January 2023 to December 2023. It included detailed demographic information, medical histories, indications for caesarean delivery, incidence rates of caesarean sections, risk factors, co-morbid conditions and records of intraoperative and postoperative outcomes.

2.6. Data analysis

The collected data were analysed statistically to identify patterns and correlations between demographic factors and medical outcomes. The analysis included descriptive statistics to calculate the incidence rates and logistic regression. This will help assess the impact of various risk factors on the likelihood of undergoing a caesarean section. All analyses were done using SPSS version 26.0.

3. Results

The study found that the incidence of caesarean section among primiparous women attending Saveetha Medical College was n= 160 (32%) the below Pi diagram shows the same distribution.(**Figure 1**)

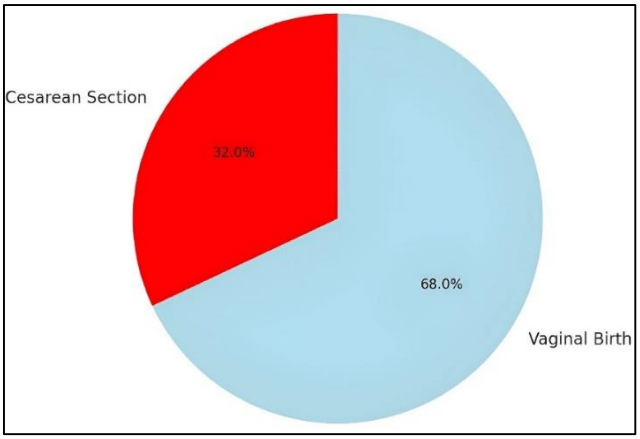

Figure 1: Incidence of caesarean section

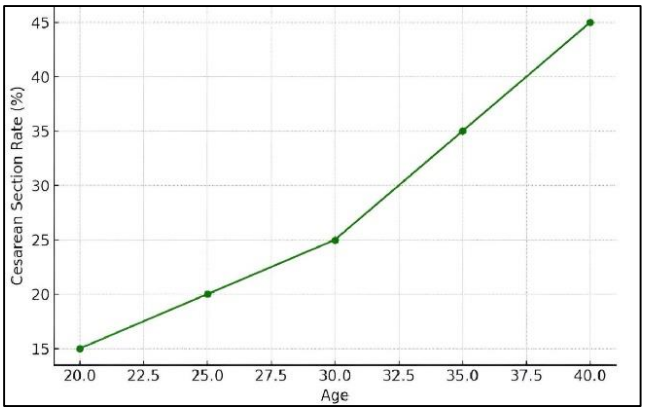

Figure 2: Incidence of caesarean section by age

Analysing demographic factors, revealed that the average age of women undergoing caesarean sections was 28

(**Figure 2**). A higher incidence of caesarean sections was noted among women over the age of 30.

Moreover, women residing in urban areas n=96(60%) showed a slightly higher rate of caesarean deliveries compared to those from rural settings.

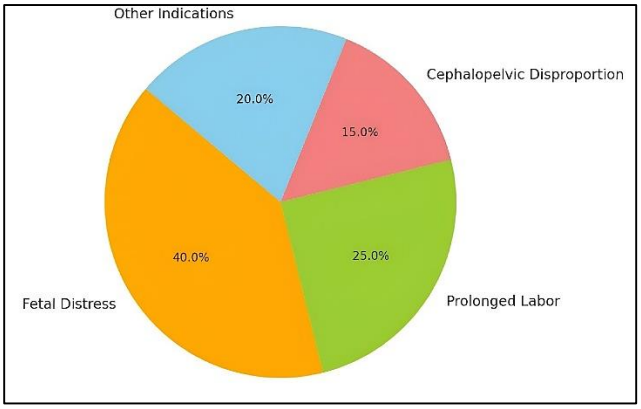

Figure 3: Indications for caesarean section

The most common indications for caesarean delivery were fetal distress n=64(40%) failed induction and prolonged labour n=40.

(25%) and cephalopelvic disproportion n= 24(15%). Other less frequent indications included pre-eclampsia, breech presentation, and multiple gestations, denoted in the below Pi diagram (**Figure 3**).

The other Indications for caesarean section, during 1st pregnancy from the obstetric point of view, where a normal delivery is not possible are twins with 1st twin in breech presentation, triplets, placenta previa/ accreta spectrum, abruptio Placenta with fetal distress.

In the above cases, trial of labor may not be possible as the amount of time needed for the natural process of cervical ripening and uterine contractions may not be available and imminent delivery is needed, and in cases of multiple pregnancy trial of labor when the 1st twin is not in cephalic position is difficult there by warranting Caesarean birth.

In cases of Placenta previa/ accreta spectrum due to the placenta covering on the internal os, there is no proper passage for the fetus and elective caesarean section is the best modality, as these cases usually are complicated by severe blood loss.

With advancements in medical knowledge, Caesarean section has improved drastically to reduce blood loss, and simplified surgical techniques, and enhanced recovery systems like (ERAS) have helped in a good prognosis for the mother and fetus.

In this study Fetal distress- is indicated by the presence of thick meconium-stained liquor with changes in the fetal heart rate like Bradycardia, tachycardia, sometimes there can be non-reassuring Cardiotocography (CTG) changes during the monitoring of labour due to a tight cord around the neck or any other factors that lead to hypoxemia in the fetus which can lead to distress seen as variable and late decelerations warranting urgent caesarean section.

In primiparous women, in most cases there is spontaneous onset of labour, at times due to various maternofetal indications induction of labor is needed to help in inducing uterine contractions and cervical changes, thereby a successful induction followed by augmentation leads to a vaginal birth. A lot of times due to inadequate contraction or no cervical changes, after maximum trial is given the mother may have to undergo caesarean section.

In cases of Cephalopelvic disproportion (CPD), wherein the passage for the fetus to come out is in sufficient as the pelvis of the mother is small or contracted while the baby is bigger there by chances of protracted labor and fetal distress increase. In primiparous women it is very important to assess the pelvis at term before trial or induction for vaginal delivery is done.

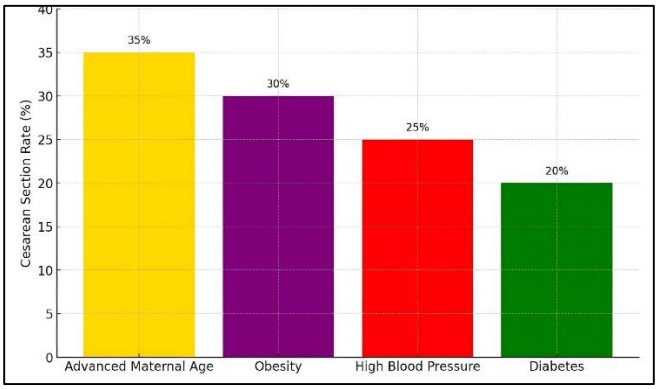

Figure 4: Risk factors for caesarean section in the study

Significant risk factors associated with caesarean delivery are denoted in the below **Figure 4**, included advanced maternal age 35% (n= 56), obesity, high blood pressure n= 40(25%), and diabetes n= 32(20%).

Women with a history of these conditions were more likely to undergo caesarean sections.

Approximately n=100 (20%) of the total 500 of the participants had one or more co-morbid conditions, with gestational diabetes being the most prevalent. Other conditions included hypertension and thyroid disorders, represented in **Figure 5**.

Both gestational hypertension and gestational diabetes, need very strict monitoring as the probability of these cases going for caesarean delivery is higher to safeguard both the mother and the fetus, due to complications like placental insufficiency and vasculopathy leading to intra uterine growth restriction (IUGR) is common.

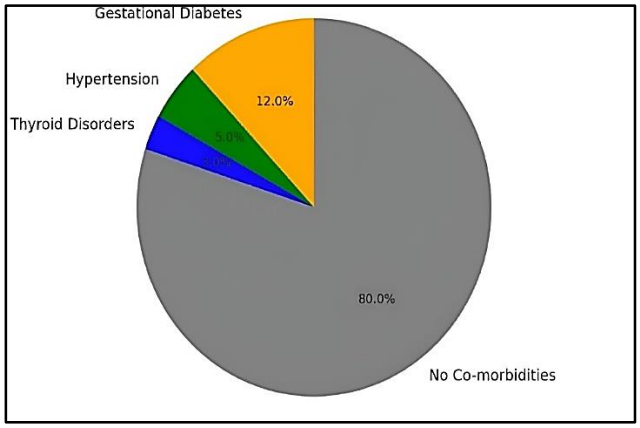

Figure 5: Associated co-morbidities in women undergoing caesarean section

The spectrum of hypertensive disorders have adverse outcomes on the mother and can lead to eclampsia, elevated blood pressure leading to seizures, blindness, renal failure and shock in severe cases, in all these cases imminent delivery is management of choice thereby caesarean sections are increased in severe pre eclampsia with end organ dysfunction and eclampsia.

In diabetic mothers due to the insulin resistance, during the antenatal period there is abnormally high flowof nutrients and thereby macrosomia (big baby) is common, which in turn, is an indirect reason for caesarean section.

With the advent of many diagnostic modalities, 2d echo has become mandatory in some parts of the country during antenatal period, though all cardiac conditions may not be symptomatic pregnancy induced changes and formation of new lesions is possible. Heart disease complicating pregnancy thereby needs precaution and more meticulous planning during delivery as, tolerating hemodynamic changes may be a challenge. In the present study there were women diagnosed with Rheumatic heart disease (RHD), Mitral valve prolapse (MVP) among a few.

Other major risk factor was Anemia diagnosed during different periods of gestation, needing proper prompt treatment to prevent fetal complications like intra uterine fetal growth restriction (IUGR), maternal complications like preeclampsia, post partum hemorrhage which are masked in cases of untreated anemia and have adverse outcomes at term.

Intraoperative complications were recorded in n= 8 (5%) of the caesarean deliveries. These complications primarily included excessive bleeding n= 4(3%), and bladder injuries n= 1(2%). The rate of complications was slightly higher in emergency caesarean n=12(7%) sections compared to elective ones n=4 (3%). denoted in the **Figure 6**.

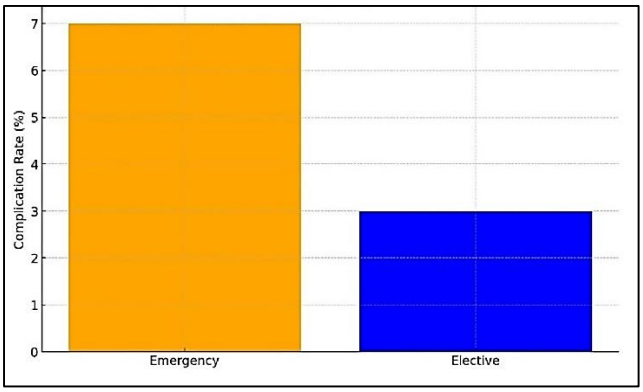

Figure 6: Complication rate in emergency vs elective caesarean section

Due to severe post partum hemorrhage, and other medical complications like pulmonary edema, prolonged blood pressure rise about n= 16(10%) of the women needed prolonged stay and ICU admissions- accounting to near miss morbidity.

Intraoperative complication like post-partum hemorrhage warrant a quick surgical skill and extreme precision and combined anesthetic and surgical team work to control it by both medical methods like uterotonics, blood products, and in extreme cases surgical techniques like arterial ligation and compression sutures may be needed. In the present study in about 1% of the cases it was needed of all the primiparous caesarean sections 2 cases had to undergo Caesarean hysterectomy due to uncontrolled bleeding.

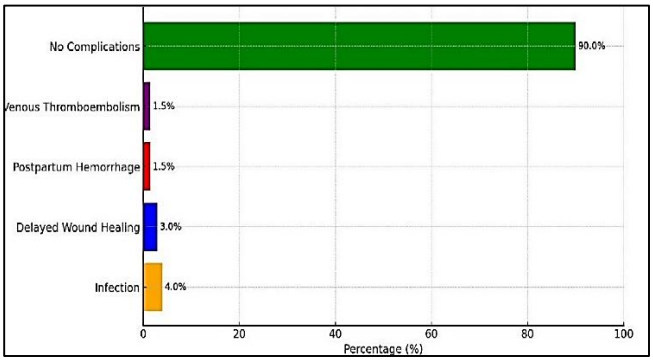

Figure 7: Postoperative complications

Postoperative complications were observed in n= 16(10%) of cases, with infection in n= 6 (4%) and delayed wound healing in n= 4 (3%) being the most common denoted in the below **Figure 7**.

Other complications included postpartum hemorrhage in some cases which can be a delayed cause and venous thromboembolism 1.5% each due to prolonged immobilization or other underlying risk factors like high body mass index (BMI). Patient satisfaction surveys indicated that n = 425 (85%) of the women were satisfied with their care denoted. However, recovery times varied, with n = 150 (30%) of the women reporting longer- than-expected recovery periods due to complications.

Figure 8: Robsons scoring system

Most of the Robson's score for caesarean section fell under Group-2B (induced), followed by Group 1 and Group 10 in cases of preterm and group 8 (multiple pregnancies)

This system was developed to check and tally the incidence of caesarean sections. It is universally followed to study and understand the causes of caesarean sections, thereby implementing steps to reduce the overall rate of caesarean sections.

In this system Group 5 is repeat caesarean sections, by reducing the rate of Group 1 and 2, we can reduce the overall caesarean sections as, Group 1 is caesarean in a primiparous with spontaneous labour and group2 isthe induced but failed group as depicted in **Figure 8**.[7]

4. Discussion

The findings of this study emphasise the intricate interaction of factors that influence the decision to conduct caesarean sections on first-time moms at a tertiary care hospital. Several major discoveries emerged, reflecting broader national patterns, unique institutional practices and patient characteristics.

The caesarean rate among first-time moms at this centre is consistent with a rising national trend, prompting critical questions about the criteria used to recommend caesarean deliveries. An analysis of the demographics revealed a significant association between higher rates of caesarean section, older maternal age and higher pre-pregnancy BMI. This association indicates that demographic characteristics, which may reflect underlying health conditions, play a crucial role in the decision-making process for caesarean procedures. Educational activities encouraging healthy lifestyle choices before and during pregnancy could help address these risk factors.

Foetal distress and prolonged labour were the most common reasons for recommending a caesarean section. This observation is consistent with existing literature, which frequently lists these factors as the major causes of surgical intervention. However, the subjective nature of evaluating foetal distress and making judgments during extended labour necessitates further investigation. The variation in practice among healthcare providers at the centre indicates a need to standardise assessment and intervention techniques to reduce unnecessary caesarean deliveries.

The study also found that the majority of women had longer-than-expected recovery times and encountered problems such as infections and delayed wound healing. These findings are significant because they impact patient satisfaction and total postoperative recovery. Implementing enhanced recovery after surgery methods specifically designed for caesarean deliveries may improve results.

Patient satisfaction levels were generally reflect underlying health conditions, play a crucial role in the decision-making process for caesarean procedures. Educational activities encouraging healthy lifestyle choices before and during pregnancy could help address these risk factors.

Recommendations for caesarean sections were most often due to foetal distress and prolonged labour. This finding is in agreement with existing scholarly work, which often cites these conditions as the principal drivers of a high surgical delivery rate, despite some dissatisfaction.[8] Some patients were dissatisfied due to postoperative issues and inadequate pain management and support. This feedback emphasises the importance of providing thorough postoperative care and educating patients to better prepare them for recovery and manage their expectations.

The impact of institutional rules and practitioner preferences, particularly in situations where caesarean sections may not be medically necessary, highlights the importance of continual training and discussion regarding the advantages and hazards of caesarean delivery. Regular evaluations of caesarean section cases could assist the centre in ensuring that best practices and evidence-based medicine are followed.

Research consistently indicates a global increase in caesarean section rates, often attributed to variables such as maternal request, perceived safety of caesarean birth and medicolegal concerns. According to WHO studies, non-

medical factors frequently impact decision-making more than clinical indications.[9] The findings of this study are consistent with global trends, particularly the rise in caesarean rates among older first-time mothers and those with higher BMI. This correlation suggests that demographic transitions such as delayed childbearing may contribute to the rising caesarean section rates, which is consistent with global demographic trends.

According to the literature, definitions of foetal distress and indications for extended labour vary greatly,[10] resulting in varying caesarean rates among different institutions and countries. Studies have recommended more specific criteria to standardise these indications.[11] The study discovered that, like previous research, subjective interpretation of foetal discomfort and decisions during extended labour is common. This reinforces the need for established clinical guidelines to prevent unnecessary caesarean deliveries, a common proposal in the literature.

Infections and delayed wound healing are well-documented consequences of caesarean delivery.[1] Research suggests these problems can significantly impact patient satisfaction and overall health.[13] The rate of postoperative problems in our study aligns with previous research, underlining the need for enhanced surgical and postoperative care protocols. Patient dissatisfaction reported in some cases due to the results of these problems is consistent with findings from other studies, emphasising the significance of improving recovery protocols and patient education.

The influence of institutional culture and practitioner preferences on caesarean delivery rates has been extensively investigated,[14] the findings imply that personal biases and the institutional context significantly affect delivery techniques, often irrespective of clinical need[15] our findings suggest similar influences, with variations in practice among healthcare practitioners at our centre influencing caesarean rates. This underscores the need for ongoing education and potentially system-wide improvements to ensure practice aligns with the best evidence-based guidelines.

5. Conclusions

The study focuses on the increasing caesarean sections among first-time mothers at a tertiary care centre, highlighting broader demographic, clinical and institutional aspects. The data indicates that older first-time mothers and those with a higher BMI are more likely to undergo caesarean sections, highlighting the importance of targeted health measures. The varying clinical reasons for caesarean sections, such as foetal distress and extended labour, highlight the significance of developing consistent treatment standards across healthcare providers. Furthermore, the study found a high incidence of postoperative complications, indicating the necessity for improved surgical techniques and postoperative care. Institutional culture and provider preferences substantially influence caesarean rates, highlighting the importance of continual education and policy reform to match evidence-based practices. Finally, the study adds to the continuing discussion about improving caesarean practices to improve maternal and neonatal outcomes, advocating for a balanced approach that considers both medical and non-medical factors in decision-making processes.

Further research is needed to examine long-term results and compare practices across different settings. This could help tailor interventions to meet the unique community requirements and reduce unnecessary caesarean deliveries.

6. Source of Funding

None.

7. Conflict of Interest

None.

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Cite this article: Ganti S, Srinivasan J, Amthul N, Rameshanand S. Patterns and factors influencing caesarean delivery in first-time mothers at a tertiary care hospital: A comprehensive study. *Indian J Obstet Gynecol Res*. 2025;12(2):171–177.