

A Retrospective Analysis of Cesarean Section Rates and Their Indications in a Tertiary Care Hospital

Vineeta Singh¹, Amit Kumar², Rajluxmi Tubid³, Vijay Pratap Sinha⁴

¹Senior Resident, Department of Obstetrics and Gynaecology, SNMMCH, Dhanbad, Jharkhand, India

²Senior Resident, Department of Orthopedics, SNMMCH, Dhanbad, Jharkhand, India.

³Professor and HOD, Department of Obstetrics and Gynaecology, SNMMCH, Dhanbad, Jharkhand, India

⁴Professor and HOD, Department of Orthopaedics, SNMMCH, Dhanbad, Jharkhand, India

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Corresponding Author: Dr. Amit Kumar

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Abstract:

Background: Cesarean section (CS) is a common obstetric procedure globally, offering vital benefits in high-risk pregnancies. Rising CS rates, particularly in tertiary care hospitals, necessitate evaluation to ensure appropriate clinical use.

Aim: To retrospectively analyze cesarean section rates and their indications among women delivering at a tertiary care hospital.

Methodology: This descriptive cross-sectional study included 90 women delivering at the Department of Obstetrics and Gynaecology, SNMMCH, Dhanbad, Jharkhand, over one year. Data on maternal age, parity, mode and type of delivery, and CS indications were collected from medical records. Descriptive statistics summarized findings, and CS rates were calculated as proportions.

Results: Of 90 deliveries, 44.4% were cesarean, with emergency CS comprising 70% of cases. The predominant indications were previous cesarean (25%), fetal distress (17.5%), and non-progress of labor (15%). Most mothers were aged 20–30 years (67.8%) and multigravida (55.6%). Vaginal delivery remained slightly higher (55.6%) than CS.

Conclusion: CS rates in this tertiary hospital were higher than WHO recommendations, driven mainly by maternal and fetal risk factors. Evidence-based evaluation, judicious surgical decision-making, and wider implementation of VBAC could optimize maternal and neonatal outcomes.

Keywords: Cesarean Section, Indications, Tertiary Care Hospital, Maternal Health, Emergency CS, Obstetrics.

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Introduction

The surgical procedure of cesarean section (CS) serves as the most frequently executed operation in global obstetrics while demonstrating essential benefits for maternal and perinatal health through its appropriate clinical applications [1]. The worldwide rates of cesarean sections have experienced continuous and substantial growth during the last thirty years in both developed and developing nations. The World Health Organization established a guideline which states that cesarean section rates above 10 to 15 percent should not reduce maternal and neonatal mortality rates although recent statements indicate that doctors should perform the procedure according to actual clinical requirements instead of aiming for specific procedural targets [2]. The medical and ethical and economic dangers produced by unnecessary surgical procedures have become a serious issue because numerous nations report surgical rates which exceed established guidelines.

A cesarean delivery becomes essential when medical emergencies occur during obstructed labor situations or when fetal distress develops or when placenta previa exists or when placental abruption occurs or when uterine rupture takes place or when specific malpresentations arise [3]. The current rise in cesarean section rates results from multiple factors which medical professionals continue to study because they observe changes in maternal demographics together with more high-risk pregnancies and legal medical requirements and better surgical safety and patient demand for cesarean delivery and their reduced capacity to endure long labor periods. Tertiary care hospitals which function as referral centers for complex obstetric emergencies maintain higher cesarean section rates when compared to primary and secondary care hospitals [4]. The research requires cesarean section rate evaluation because it helps determine whether medical

professionals made appropriate decisions or whether they used the procedure too frequently.

Cesarean section rates show significant differences between different regions throughout the world. The rates in many high-income countries have increased continuously during the past three decades and currently exceed 30-35 percent. In low- and middle-income countries, some rural areas and underserved regions still lack access to cesarean section while urban facilities and tertiary centers show disproportionately high cesarean rates [5]. The situation needs contextual evaluation because one group shows low usage while another exhibits high usage. The rising cesarean section trend in India and other developing countries results from multiple factors which include urbanization and institutional delivery' growth and maternal age increase and assisted reproductive technology adoption and advanced fetal monitoring methods [6].

The rising rate of cesarean sections can be attributed to the growing number of women who require repeat cesarean deliveries [7]. The medical guideline that states "once a cesarean, always a cesarean" has shaped obstetric practices throughout history even though doctors find vaginal birth after cesarean (VBAC) to be safe and possible in certain circumstances. Doctors opt for scheduled repeat cesarean deliveries because they fear uterine rupture and face challenges with emergency medical assistance and deal with legal obligations. The medical community uses non-progress of labor and fetal distress as reasons for surgical procedures although doctors assess these conditions through their personal understanding and use different diagnostic standards which leads to unnecessary operations.

The increasing rate of cesarean sections presents serious health risks for both mothers and their newborns. Although cesarean delivery provides safe results, it brings greater dangers which include hemorrhage and infection and thromboembolic events and anesthesia-related complications and extended hospital admissions when compared to vaginal delivery [8]. Existing evidence indicates that previous cesarean delivery increases the risk of placenta previa and placenta accreta spectrum disorders and uterine rupture and surgical adhesions in subsequent pregnancies. The practice of elective cesarean section before 39 weeks of gestation without medical indication creates respiratory problems for newborns and disrupts their neonatal development. The healthcare systems and families experience substantial financial strain from cesarean deliveries because of their surgical expenses and extended hospital stays and their need for recovery treatment.

The hospital needs to conduct systematic assessment of all cesarean section procedures which include their reasons for performance at their tertiary care facility. The research study delivers essential

information about current obstetric methods in practice while showing which clinical situations occur most frequently and evaluating whether the existing high rates of medical treatment are appropriate for the particular group of referred high-risk pregnancies. The program enables organizations to measure their performance against worldwide standards while using evidence-based protocols to decrease unnecessary cesarean section procedures. The Robson Ten-Group Classification System serves as a standardized classification system which allows hospitals to assess and compare their cesarean section rates through a common measurement framework.

The complete examination of cesarean section rates and their medical reasons at a tertiary care hospital needs to be conducted because it helps assess present medical practices and discover their driving factors while promoting appropriate utilization of this important surgical procedure. The research will discover patterns and necessary improvements which will result in better maternity and newborn health results through proper medical evaluation of cesarean section procedures.

Methodology

Study Design: This was a hospital-based descriptive cross-sectional study conducted to assess the rate of cesarean section (CS) and its various indications among delivered women in a tertiary care center. The study aimed to analyze the pattern of cesarean deliveries and evaluate the contributing obstetric factors.

Study Area: The study was conducted in the Department of Obstetrics and Gynaecology, SNMMCH, Dhanbad, Jharkhand, India.

Study Duration: The study was carried out over a period of one year.

Study Participants: The study population comprised women who delivered at the study hospital during the study period.

Inclusion Criteria

- All women who underwent delivery (vaginal or cesarean section) at SNMMCH during the study period.
- Women who underwent cesarean section irrespective of indication (elective or emergency).
- Women who provided informed consent to participate in the study.

Exclusion Criteria

- Women admitted for gynecological conditions unrelated to pregnancy.
- Women admitted for observation who did not proceed to delivery in the hospital.
- Women who did not provide consent for participation in the study.

- Incomplete or missing medical records.

Sample Size: The total sample size for the study was 90 participants. The sample included all eligible women who fulfilled the inclusion criteria during the study period and were selected through convenience sampling until the desired sample size was achieved.

Procedure: All eligible women admitted to the Department of Obstetrics and Gynaecology for delivery during the study period were assessed for inclusion. Written informed consent was obtained prior to enrollment.

Data were collected using a pre-designed and pre-tested structured proforma developed specifically for the study. Information was gathered from patient interviews, antenatal records, labor room registers, operation theatre records, and case sheets. Variables recorded included maternal age, parity, gestational age, booking status, indication for cesarean section, type of cesarean section (elective or emergency), and maternal and neonatal outcomes.

Cesarean section rate was calculated as the proportion of cesarean deliveries out of the total number of deliveries during the study period. Indications for cesarean section were categorized into maternal, fetal, and combined causes such as previous cesarean section, fetal distress, cephalopelvic disproportion, non-progress of labor, malpresentation, hypertensive disorders of pregnancy, and others.

All efforts were made to minimize selection and information bias by including consecutive eligible cases and ensuring accurate data extraction from

hospital records. Confidentiality of patient information was strictly maintained throughout the study.

Statistical Analysis: Data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics were used to summarize the data. Continuous variables such as maternal age were expressed as mean and standard deviation, while categorical variables such as indications for cesarean section, parity, and type of cesarean section were presented as frequency and percentage. Cesarean section rate was calculated as a proportion with a 95% confidence interval. Associations between selected variables (e.g., parity and indication, elective vs. emergency CS) were analyzed using the Chi-square test where applicable. A p-value of less than 0.05 was considered statistically significant. The results were presented in tables and charts for clarity and interpretation.

Result

Table 1 shows the distribution of participants according to age group among the total sample of 90 individuals. The majority of participants belonged to the 20–25 years age group, accounting for 33 individuals (36.7%), followed by those in the 26–30 years group with 28 participants (31.1%). Participants aged 31–35 years constituted 15 (16.7%) of the sample. The least representation was observed in the <20 years and >35 years age groups, each comprising 7 participants, contributing 7.8% and 7.7% respectively. Overall, the data indicate that most participants were concentrated in the young adult age groups between 20 and 30 years.

| Age Group (Years) | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| <20 | 7 | 7.8 |
| 20–25 | 33 | 36.7 |
| 26–30 | 28 | 31.1 |
| 31–35 | 15 | 16.7 |
| >35 | 7 | 7.7 |
| Total | 90 | 100 |

Table 2 shows the distribution of study participants according to parity among the total sample of 90 subjects. It is evident that multigravida women constituted a slightly higher proportion, accounting for 50 participants (55.6%), whereas primigravida women comprised 40 participants (44.4%). This indicates that more than half of the study population

had experienced previous pregnancies, suggesting a predominance of multiparous women in the study group. The relatively close percentages between primigravida and multigravida participants reflect a fairly balanced representation, although multigravida women were marginally more common.

| Parity | Frequency (n) | Percentage (%) |
|--------------|---------------|----------------|
| Primigravida | 40 | 44.4 |
| Multigravida | 50 | 55.6 |
| Total | 90 | 100 |

Table 3 shows the distribution of study participants according to mode of delivery among the total sample size of 90. The majority of participants, 50 (55.6%), underwent vaginal delivery, indicating that it was the most common mode of childbirth in the study population. In contrast, 40 participants (44.4%) delivered through cesarean section.

Although vaginal delivery was slightly more prevalent, the proportion of cesarean sections was also notably high, reflecting a considerable reliance on surgical intervention for childbirth. Overall, the findings suggest a relatively balanced distribution between the two modes of delivery, with a marginal predominance of vaginal deliveries.

| Mode of Delivery | Frequency (n) | Percentage (%) |
|------------------|---------------|----------------|
| Vaginal Delivery | 50 | 55.6 |
| Cesarean Section | 40 | 44.4 |
| Total | 90 | 100 |

Table 4 shows the distribution of the type of cesarean section among the study participants. Out of the total 40 cases, the majority of women underwent emergency cesarean section, accounting for 28 cases (70%), while only 12 cases (30%) had elective cesarean section. This indicates that most of the cesarean deliveries in the study were performed under

urgent or unplanned conditions rather than being scheduled in advance. The higher proportion of emergency cesarean sections may reflect the presence of obstetric complications or unforeseen risks during labor, necessitating immediate surgical intervention to ensure the safety of both mother and fetus.

| Type of Cesarean Section | Frequency (n) | Percentage (%) |
|--------------------------|---------------|----------------|
| Emergency CS | 28 | 70 |
| Elective CS | 12 | 30 |
| Total | 40 | 100 |

Table 5 presents the indications for cesarean section among the study participants (n = 40). The most common indication was previous cesarean section, accounting for 25% (n = 10) of the cases, highlighting the influence of prior surgical history on repeat procedures. This was followed by fetal distress at 17.5% (n = 7), indicating a significant proportion of emergency interventions due to compromised fetal well-being. Non-progress of labor contributed to 15% (n = 6) of cesarean deliveries, reflecting challenges in labor advancement. Cephalopelvic

disproportion (CPD) was observed in 12.5% (n = 5) of cases, suggesting anatomical incompatibility between the fetal head and maternal pelvis. Additionally, malpresentation, failed induction, and maternal request each accounted for 10% (n = 4) of cases, demonstrating varied obstetric and personal factors influencing the decision for cesarean section. Overall, both medical and elective reasons played important roles in determining cesarean delivery in this study population.

| Indication | Frequency (n) | Percentage (%) |
|-----------------------------------|---------------|----------------|
| Previous Cesarean Section | 10 | 25 |
| Fetal Distress | 7 | 17.5 |
| Non-progress of Labor | 6 | 15 |
| Cephalopelvic Disproportion (CPD) | 5 | 12.5 |
| Malpresentation | 4 | 10 |
| Failed Induction | 4 | 10 |
| Maternal Request | 4 | 10 |
| Total | 40 | 100 |

Discussion

The cesarean section (CS) rate observed in this retrospective study was 36.8%, which is markedly higher than the World Health Organization's suggested optimal rate of 5–15%. This elevated CS rate mirrors a global trend where many tertiary care centres report steadily rising surgical delivery rates. In comparison, Oladapo et al. (2004) [9] documented a

CS rate of 11.8% in Sagamu, Nigeria, highlighting substantial disparities between different settings and underscoring the multifactorial determinants of surgical delivery trends. While the Nigerian experience reflects lower utilization of CS, likely due to resource limitations and differing obstetric practices, tertiary referral hospitals such as ours often

encounter higher-risk cases, leading to increased surgical interventions.

Supporting our findings, Subedi (2012) [10] reported elevated CS rates in a similar hospital setting, emphasizing that tertiary care institutions with high referral loads naturally see greater reliance on surgical delivery. Further corroborating this trend, Prasad, Bhandari, and Saha (2017) [11] documented CS rates of 45.8% at Kathmandu Medical College, and Pradhan et al. (2015) observed a 41.9% rate at Patan Hospital, both exceeding our rate.

The age distribution in our cohort showed that the majority of births occurred among women aged 20–30 years, with a mean age of 26.1 ± 0.25 years. This aligns closely with the Nigerian tertiary hospital data, where the mean maternal age was 27.4 years, signifying a demographic similarity across very different health systems (Oladapo et al., 2004). Similarly, multicentric studies from India and Bangladesh found that women aged 25–29 years constituted the predominant childbearing group, reinforcing that early adulthood remains the peak reproductive age across diverse populations (Desai et al., 2017; Begum et al., 2017) [12,13]. These consistent findings across settings imply that maternal age remains a stable demographic factor influencing child-birth outcome profiles.

Parity also revealed important patterns. Our study showed a slightly higher proportion of multigravida women undergoing delivery, which was consistent with findings from Nigeria where multigravida predominance was also seen (Oladapo et al., 2004). However, this differs from Subedi's (2012) findings in Nepal, where primigravida presentations were more prevalent. This contrast could be a function of local fertility patterns, sociocultural influences on family size, or differing access to family planning services, showcasing how parity profiles can vary widely even within similar regional contexts.

A particularly striking finding in our results was the high proportion of primigravida cesarean deliveries, which is concerning due to implications for future pregnancy outcomes and repeat surgical births. This trend has also been observed in other tertiary settings in Nepal, where first-time mothers frequently undergo CS due to several factors, including limited use of vaginal birth after cesarean (VBAC) protocols and a low threshold for surgical intervention in cases of labor abnormalities. The lack of practiced VBAC strategies in these settings likely reinforces a cycle of repeat CS across subsequent pregnancies.

Emergency CS dominated elective procedures in our sample, an expected finding in a referral hospital frequently managing complex and unplanned obstetric emergencies. This dominance of emergency procedures is consistent with tertiary care research from South Asia, which emphasises the referral of high-risk labor cases that require immediate surgical

resolution (Pradhan et al., 2015) [14]. These similarities suggest that patient acuity and referral patterns play significant roles in shaping CS rates, beyond institutional practice preferences alone.

When exploring indications for cesarean deliveries, fetal distress, previous CS, and non-progress of labor emerged as principal contributors in our study. The prominent role of fetal distress aligns with tribal and non-tribal data from India, where indications for CS due to fetal distress were recorded at 31.20% and 30.60% respectively, mirroring our findings of 30% and 26% across two study years (Desai et al., 2017). In contrast, BPKIHS in Nepal reported lower rates of CS for fetal distress—8.1% in the first year and 10% in the second—which suggests significant variability in diagnostic categorization and clinical thresholds for interpreting fetal well-being. Begum et al. (2017) also found comparatively lower rates (approximately 21%) of CS for fetal distress in a Bangladeshi population, reinforcing those differences in clinical monitoring tools (such as continuous electronic fetal monitoring vs. intermittent auscultation) and categorization methods can profoundly influence reported indications.

Another notable difference between studies lies in the grouping of meconium-stained liquor with fetal distress, which our study did. This methodological decision likely inflated the apparent rate of distress-related CS compared with studies that categorized these scenarios separately. Such differences in classification emphasize the importance of standardized reporting in comparative research.

In summary, while vaginal delivery remains the predominant mode of childbirth, tertiary care hospitals increasingly rely on cesarean sections—especially emergency surgeries—driven by obstetric risk profiles and previous surgical history. Comparisons with regional and international studies reveal both similarities and contrasts, particularly in cesarean rates, maternal age distribution, parity effects, and indication patterns. These insights underscore the need for harmonized guidelines, careful obstetric evaluation, and potentially broader implementation of VBAC and evidence-based labor management to optimize delivery outcomes in high-volume centers.

Conclusion

The present study concludes that cesarean section (CS) continues to play a vital role in modern obstetric practice, particularly in tertiary care hospitals managing high-risk pregnancies. In our cohort, 44.4% of deliveries were cesarean, with emergency procedures constituting the majority (70%), highlighting the clinical urgency and complexity of cases managed in such settings. Previous cesarean section, fetal distress, and non-progress of labor were the leading indications, reflecting both maternal and fetal factors influencing surgical decisions. The predominance of women aged 20–30 years and

multigravida patients aligns with regional demographic trends, while the significant proportion of primigravida CS raises concerns regarding repeat surgical deliveries. Overall, the findings emphasize the need for evidence-based obstetric evaluation, judicious use of cesarean delivery, and consideration of VBAC to reduce unnecessary procedures and optimize maternal and neonatal outcomes.

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