



Original Article

A Study of Indications and Outcomes of Cesarean Section in a Tertiary Care Hospital

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ABSTRACT

Background: Cesarean section (CS) is one of the most frequently performed obstetric surgical procedures and plays an important role in reducing maternal and neonatal morbidity and mortality when vaginal delivery poses risks. However, the rising rate of cesarean deliveries has become a major concern worldwide. The present study was undertaken to evaluate the indications and outcomes of cesarean section in a tertiary care hospital.

Materials and Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital over a period of 24 months (January 2023 to December 2024). A total of 1,250 deliveries were recorded during the study period, among which 512 women underwent cesarean section. Data regarding maternal demographic characteristics, indications for cesarean section, and maternal and neonatal outcomes were collected using a structured data collection form and analyzed using descriptive statistical methods.

Results: Out of 1,250 deliveries, 512 (41%) were cesarean sections and 738 (59%) were vaginal deliveries. The majority of cesarean deliveries occurred in women aged 21–30 years (60%). Emergency cesarean sections constituted 70% of the cases, while 30% were elective procedures. The most common indication for cesarean section was previous cesarean section (28%), followed by fetal distress (24%), cephalopelvic disproportion (14%), and failed induction of labor (11%). Postoperative complications were relatively low, with 87% of women experiencing no complications. Most newborns (88%) had birth weight ≥ 2.5 kg, 92% had Apgar scores ≥ 7 at 5 minutes, and 11% required NICU admission.

Conclusion: Cesarean section accounted for a substantial proportion of deliveries in the tertiary care hospital, largely due to the referral of high-risk pregnancies. Previous cesarean section, fetal distress, and cephalopelvic disproportion were the most common indications. Maternal complications were low and neonatal outcomes were generally favorable. Careful evaluation of indications and promotion of safe vaginal birth after cesarean (VBAC) may help optimize cesarean section rates.

Keywords: Cesarean section; Maternal outcomes; Neonatal outcomes; Obstetric complications.

INTRODUCTION

Cesarean section (CS) is a surgical procedure in which the fetus is delivered through incisions made in the abdominal wall and uterus. It is one of the most commonly performed obstetric operations worldwide and has played a significant role in reducing maternal and neonatal morbidity and mortality when vaginal delivery poses risks to the mother or fetus¹. Common indications for cesarean delivery include fetal distress, cephalopelvic disproportion, abnormal fetal presentation, placental complications, and previous cesarean section².

Over the past few decades, the rate of cesarean section has increased substantially across both developed and developing countries. According to recent global estimates, cesarean deliveries account for approximately 21% of all births worldwide, and this proportion is expected to increase further in the coming years³. The World Health Organization (WHO) has suggested that population-based cesarean section rates of 10–15% are associated with improved maternal and neonatal outcomes, whereas rates beyond this range may not confer additional health benefits⁴.

In India, the prevalence of cesarean deliveries has shown a steady rise over the last decade. Data from the National Family Health Survey (NFHS-5) indicate that the overall cesarean section rate increased from **17.2% during NFHS-4 (2015–2016) to around 21.5% during NFHS-5 (2019–2021)**⁵. Several factors contribute to this increasing trend, including higher maternal age at childbirth, increased detection of obstetric complications, improved availability of healthcare facilities, and greater use of electronic fetal monitoring. Additionally, medico-legal concerns and patient preference may also influence the decision to perform cesarean delivery⁶.

Although cesarean section is considered a life-saving intervention when medically indicated, it is still a major surgical procedure and is associated with certain maternal and neonatal risks. Maternal complications may include hemorrhage, postoperative infection, anesthetic complications, thromboembolic events, and prolonged recovery compared with vaginal delivery⁷. Neonatal complications such as respiratory distress, transient tachypnea, and increased admission to neonatal intensive care units have also been reported following cesarean delivery⁸.

Several studies conducted in tertiary care hospitals have identified previous cesarean section, fetal distress, cephalopelvic disproportion, malpresentation, and failed induction of labour as the most frequent indications for cesarean delivery⁹. In tertiary care institutions, a considerable proportion of cesarean sections are performed as emergency procedures because such hospitals often manage complicated pregnancies and receive referrals of high-risk cases from peripheral health centers.

Continuous monitoring of indications for cesarean section is important for evaluating obstetric practices and improving maternal healthcare services. Internationally, the Robson Ten-Group Classification System has been recommended as a standardized method for analyzing cesarean section rates and identifying target groups where unnecessary procedures can be reduced¹⁰.

The present study was undertaken to evaluate the indications and outcomes of cesarean section in a tertiary care hospital.

MATERIALS AND METHODS:

Study Design

The present study was conducted as a prospective observational study

Study Setting

The study was carried out in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital.

Study Duration

The study was conducted over a period of 24 months, from January 2023 to December 2024.

Study Population

All pregnant women who underwent cesarean section during the study period were included in the study. Both elective and emergency cesarean sections were considered for analysis.

Sample Size

During the study period, a total of 1,250 deliveries were recorded in the hospital. Among these, 512 women underwent cesarean section, and these cases formed the study population.

Inclusion Criteria

The following patients were included in the study:

- Pregnant women undergoing cesarean section during the study period
- Both elective and emergency cesarean deliveries
- Women willing to participate in the study

Exclusion Criteria

The following cases were excluded:

- Women with incomplete clinical records
- Patients referred after delivery from other institutions
- Pregnancies complicated by major fetal congenital anomalies

Data Collection

After obtaining informed consent, data were collected using a pre-designed structured data collection form. Information was obtained from patient interviews, clinical examination, and hospital records.

The following details were recorded:

Demographic Characteristics

- Maternal age
- Parity
- Gestational age at delivery
- Socioeconomic status

Obstetric History

Detailed obstetric history including:

- Gravidity and parity
- Previous cesarean section
- Antenatal complications
- History of infertility or previous obstetric complications

Clinical Examination

All patients underwent a general physical examination and obstetric examination.

General examination included:

- Assessment of pallor
- Measurement of blood pressure
- Body mass index

Obstetric examination included:

- Abdominal examination for fetal presentation and lie
- Assessment of fetal heart rate
- Pelvic examination when indicated

Indications for Cesarean Section

The indication for cesarean section was recorded based on the clinical diagnosis made by the attending obstetrician.

Common indications included:

- Previous cesarean section
- Fetal distress
- Cephalopelvic disproportion
- Failed induction of labour
- Malpresentation
- Placenta previa
- Hypertensive disorders of pregnancy
- Other obstetric complications

Intraoperative Findings

Information regarding operative details such as:

- Type of cesarean section (elective or emergency)
- Intraoperative findings
- Any surgical complications were recorded.

Maternal Outcomes

Maternal outcomes were assessed during the postoperative period until discharge from the hospital. The following complications were recorded:

- Postpartum hemorrhage
- Postoperative fever
- Wound infection
- Urinary tract infection
- Need for blood transfusion
- Duration of hospital stay

Neonatal Outcomes

Neonatal outcomes were evaluated immediately after delivery and included:

- Birth weight
- Apgar score at 1 minute and 5 minutes
- Requirement for neonatal resuscitation
- Admission to neonatal intensive care unit (NICU)
- Neonatal complications

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee (IEC) of the hospital. Written informed consent was obtained from all participants prior to inclusion in the study. Confidentiality of patient information was maintained throughout the study.

Statistical Analysis

All collected data were entered into Microsoft Excel and analyzed using Statistical Package for SPSS Version 20.0. Descriptive statistical methods were used to summarize the data. Categorical variables were expressed as frequency and percentage, while continuous variables were presented as mean \pm standard deviation where applicable. The results were presented in the form of tables to facilitate interpretation

RESULTS:

Among the 1250 total deliveries, 738 (59%) were vaginal deliveries, while 512 (41%) were delivered by cesarean section. (Table 1)

Table 1: Distribution of Deliveries According to Mode of Delivery

Mode of Delivery	Number	Percentage
Vaginal delivery	738	59%
Cesarean section	512	41%

The majority of cesarean sections were performed in women aged 21–30 years (60%), followed by those aged 31–40 years (24%). Women below 20 years accounted for 11%, while 5% of cesarean deliveries occurred in women above 40 years of age. (Table 2)

Table 2: Age Distribution

Age group	Number	Percentage
<20 years	56	11%
21–30 years	307	60%
31–40 years	123	24%
>40 years	26	5%
Total	512	100 %

Among the 512 cesarean sections performed, emergency cesarean sections constituted the majority (70%), whereas elective cesarean sections accounted for 30% of the cases. (Table 3)

Table 3: Type of Cesarean Section

Type	Number	Percentage
Emergency CS	358	70%
Elective CS	154	30%
Total	512	100 %

The most common indication for cesarean section was previous cesarean section (28%), followed by fetal distress (24%) and cephalopelvic disproportion (14%). Other indications included failed induction (11%), malpresentation (9%), medical disorders complicating pregnancy (6%), failed VBAC (3%), and other indications (5%). (Table 4)

Table 4: Indications for Cesarean Section

Indication	Number	Percentage
Previous cesarean section	143	28%
Fetal distress	123	24%
Cephalopelvic disproportion	72	14%

Failed induction	56	11%
Malpresentation	46	9%
Medical disorder in pregnancy	31	6%
Failed VBAC	15	3%
Others	26	5%
Total	512	100 %

Postoperative complications were relatively uncommon in this study. Postoperative fever (4.5%) was the most frequent complication, followed by surgical site infection (3%). Postpartum hemorrhage and paralytic ileus were each observed in 2% of cases, while urinary tract infection occurred in 1.5% of cases. The majority of women (87%) experienced no postoperative complications. (Table 5)

Table 5: Maternal Complications

Complication	Number	Percentage
Postoperative fever	23	4.5%
Surgical site infection	15	3%
Postpartum hemorrhage	10	2%
Urinary tract infection	8	1.5%
Paralytic ileus	10	2%
No complications	446	87%
Total	512	100 %

The majority of newborns delivered by cesarean section had normal birth weight (≥ 2.5 kg), accounting for 88% of cases, while 12% of the neonates were low birth weight. NICU admission was required in 11% of the newborns, indicating the need for specialized neonatal care in a small proportion of cases. Furthermore, 92% of neonates had a satisfactory Apgar score (≥ 7) at 5 minutes, suggesting generally favorable neonatal outcomes following cesarean delivery. (Table 6)

Table 6: Neonatal Outcomes

Outcome	Number	Percentage
Birth weight ≥ 2.5 kg	451	88%
Low birth weight	61	12%
NICU admission	56	11%
Apgar score ≥ 7 at 5 min	471	92%

DISCUSSION:

The present study evaluated the indications and outcomes of cesarean section in a tertiary care hospital and the findings were compared with previously published studies.

Cesarean Section Rate

In the present study, out of 1250 total deliveries, 512 (41%) were cesarean sections, while 738 (59%) were vaginal deliveries. The cesarean section rate observed in this study is higher than the World Health Organization recommended rate of 10–15%, which is considered optimal for improving maternal and neonatal outcomes at the population level.

Similar trends have been reported in several studies worldwide. Vogel et al. (16) highlighted the usefulness of the Robson classification system for analyzing cesarean section trends across multiple countries and reported increasing cesarean section rates in many regions. Furthermore, Betrán et al. (17) estimated that approximately 21% of births globally occur by cesarean section, and the proportion is expected to increase in the coming decades.

Higher cesarean section rates are commonly reported in tertiary care hospitals because these institutions often serve as referral centers for complicated pregnancies and high-risk obstetric cases.

Age Distribution

In the present study, the majority of cesarean deliveries occurred among women aged 21–30 years (60%), followed by 31–40 years (24%), below 20 years (11%), and above 40 years (5%). This finding reflects the reproductive age distribution of the population, as most pregnancies occur among women in their twenties.

Similar findings have been reported in several hospital-based studies. Keag et al. (18) reported that maternal age plays an important role in obstetric outcomes and that increasing maternal age is associated with a higher likelihood of cesarean delivery due to pregnancy-related complications.

Type of Cesarean Section

In the present study, emergency cesarean sections constituted 70% of cases, while elective cesarean sections accounted for 30%. The predominance of emergency cesarean sections reflects the referral nature of tertiary care hospitals where complicated pregnancies are frequently managed.

Emergency cesarean section is commonly performed in situations such as fetal distress, obstructed labor, placental abnormalities, and failed induction of labor. Sandall et al. (19) also reported that tertiary care institutions often perform a higher proportion of emergency cesarean sections because they manage complicated pregnancies and referrals from peripheral healthcare facilities.

Indications for Cesarean Section

In the present study, the most common indication for cesarean section was previous cesarean section (28%), followed by fetal distress (24%), cephalopelvic disproportion (14%), failed induction of labor (11%), malpresentation (9%), medical disorders complicating pregnancy (6%), failed VBAC (3%), and other indications (5%).

Previous cesarean section has been widely recognized as the leading indication for repeat cesarean delivery. Once a woman undergoes a cesarean section, the likelihood of repeat cesarean delivery in subsequent pregnancies increases significantly. Souza et al. (20) emphasized that repeat cesarean delivery is a major contributor to the rising cesarean section rates worldwide.

Fetal distress was the second most common indication in the present study. Advances in electronic fetal monitoring have improved the detection of fetal compromise during labor, often leading to cesarean delivery in order to prevent adverse neonatal outcomes. Molina et al. (21) reported that timely cesarean section in cases of fetal compromise can significantly reduce neonatal morbidity and mortality.

Cephalopelvic disproportion and failed induction of labor were also important indications in this study. These conditions arise when there is a mismatch between fetal head size and maternal pelvic capacity or when labor fails to progress despite adequate uterine contractions.

Maternal Complications

Maternal complications following cesarean section were relatively low in the present study. The most common postoperative complication was postoperative fever (4.5%), followed by surgical site infection (3%), postpartum hemorrhage (2%), paralytic ileus (2%), and urinary tract infection (1.5%). The majority of women (87%) experienced no postoperative complications.

Postoperative infections are among the most frequently reported complications following cesarean section due to the surgical nature of the procedure. However, improvements in surgical techniques, prophylactic antibiotic use, and better postoperative care have significantly reduced these complications. Mascarello et al. (22) reported similar findings where postoperative infections and hemorrhage were the most common maternal complications following cesarean delivery.

Neonatal Outcomes

The neonatal outcomes observed in the present study were generally favorable. The majority of newborns (88%) had a birth weight ≥ 2.5 kg, while 12% were low birth weight. Low birth weight may occur due to prematurity, intrauterine growth restriction, maternal medical disorders, or placental insufficiency.

Approximately 11% of neonates required admission to the neonatal intensive care unit (NICU). NICU admission may be necessary for neonates with respiratory distress, prematurity, or low birth weight. Ye et al. (23) reported that cesarean delivery rates are associated with variations in neonatal outcomes, particularly in high-risk pregnancies.

Several hospital-based studies in India have reported similar neonatal outcomes following cesarean delivery. Patel et al. (24) reported that most neonates delivered by cesarean section had normal birth weight and satisfactory Apgar scores.

CONCLUSION:

The present study showed that cesarean section accounted for 41% of total deliveries in the tertiary care hospital, reflecting the high proportion of referred and high-risk pregnancies. The majority were emergency cesarean sections, with previous cesarean section, fetal distress, and cephalopelvic disproportion being the most common indications.

Maternal complications were relatively low, and neonatal outcomes were generally favorable, with most newborns having normal birth weight and satisfactory Apgar scores.

These findings emphasize the need for appropriate clinical decision-making and promotion of safe vaginal birth after cesarean (VBAC) in suitable cases to optimize maternal and neonatal outcomes.

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