

Comparison of Rate and Indications of Emergency and Elective Caesarean Section: A Retrospective Study

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Background: Cesarean section remains most commonly performed obstetric surgery and is either an emergency or elective procedure. Knowing that always emergency procedure is one that carries a greater risk of complication than an elective procedure, there is a need to compare rate and indications of emergency and elective caesarean section. **Methods:** This retrospective study was conducted at Apollo Institute of Medical Sciences And Research, Chittoor, Andhra Pradesh, India, between Jan 1 2020 – Dec 31 2020. All women who underwent emergency and elective caesarean delivery in OBG department were taken in study. **Results:** Total no of caesarean deliveries was 1432. Among them, 804 (56.15%) patients had Emergency CS, and 628 (43.85%) had Elective CS. Majority of women were 20 to 30 years old, studied up to metric, residing in a rural area, belonged to middle socioeconomic status and were booked in both Emergency CS and Elective CS groups. Primigravida was more in Emergency CS group, and multigravida were more in Elective CS group. There were statistically significant differences in Age, Education, Residence, Socioeconomic status, Gravida and Booking status between Emergency CS group and Elective CS group ($p < 0.05$). Fetal distress was commonest indication for Emergency CS, were as Previous CS was most common indication for elective CS. **Conclusions:** Emergency CS rate is higher when compared to elective CS. Fetal distress is major indication contributing to Emergency CS, and previous CS is major indication contributing to Elective CS rate.

Keywords: Emergency CS, Elective CS, Fetal distress, Previous CS

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Introduction

Caesarean delivery is one of the most commonly performed operations. It is defined as the birth of a live or dead fetus through incisions in the abdominal wall (laparotomy) and the uterine wall (hysterotomy)[1].

Elective caesarean is a term used when the procedure is done prearranged during pregnancy to ensure the best quality of obstetrics, anesthesia, neonatal resuscitation and nursing services. The procedure is termed an emergency caesarean section when it is performed due to unforeseen or acute obstetric emergencies [2].

Even though emergency caesarean section depicts the tendency to give opportunity for vaginal delivery as long as feasible and to resort to a caesarean section only when the compromise to fetal or maternal health is anticipated, It is seen that morbidity and mortality are associated more with emergency procedures than with elective procedures[3,4].

As complications arising from elective caesarean sections are much less as compared to emergency caesarean sections, hence despite taking all the measures to electively deliver the pregnancy by caesarean section, many times emergency caesarean section may have to be resorted to for foetal or maternal salvage, though there are many problems associated with it. Also, the nature of the caesarean section performed as elective or emergency is predicted depending on the indication of the caesarean section [5,6].

The present study was therefore undertaken to compare the rate and indications of Emergency caesarean and Elective caesarean sections.

Material and Methods

Duration and type of study: Present study is a retrospective study for one year from Jan 1 2020, to Dec 31 2020.

Setting: hospital setting in the Department of Obstetrics and Gynecology, The Apollo Institute of Medical Sciences and Research and Govt District Hospital, Chittoor, a large tertiary care hospital in southern Andhra Pradesh of India.

Sampling methods: women who had undergone

Elective and Emergency caesarean section and their details documented in the caesarean section register kept in the operation theatre. Caesarean section delivery was classified as elective when the decision to operate was made before the onset of labour and after preoperative preparation at a prearranged time during office hours to ensure the best quality of obstetrics, anaesthetic, neonatal, and nursing services. Emergency caesareans were defined as those in whom the decision for CS was made as per RCOG guidelines [7]. as follows

Category I (immediately life-threatening to mother or fetus),

Category II (no immediate threat to mother or fetus) or

Category III (requiring early delivery).

Inclusion criteria: All the patients delivered by Elective and Emergency CS during the study period were included.

Exclusion criteria: women who underwent normal delivery or instrumental vaginal deliveries.

Data collection procedure: Data of elective and emergency caesarean section as documented in the caesarean section register were collected retrospectively. Data were collected on a predesigned proforma, which included sociodemographic characters & indications for elective and emergency caesarean section

Ethical consideration & permission: Not required as it is a retrospective study.

Statistical Analysis: Elective caesarean section rate is calculated and is defined as the percentage of births achieved by elective caesarean section among total caesarean deliveries in the study period. Emergency caesarean section rate is calculated and is defined as the percentage of births achieved by Emergency caesarean section among total caesarean births in the study period. Data of Age, Education, Residence, Socioeconomic status, Gravida, Booked or unbooked, and Indications of emergency and elective CS was collected from the caesarean section register in the operation theatre. Data analysis was done with the help of SPSS software version 23. Data were analysed with the help of a frequency and percentage table. Association among study groups was assessed using the Chi-square test, and a P value less than 0.05 was taken as statistically significant.

Results

Table 1 shows that there were a total of 1432 caesarean sections, and the caesarean section delivery rate was 56.14% for emergency caesarean sections and 43.85% for elective caesarean sections.

Table 1: Emergency and Elective CS rate.

| | Emergency CS | Elective CS | Total CS |
|------------|--------------|-------------|----------|
| Number | 804 | 628 | 1432 |
| Percentage | 56.15% | 43.85% | 100% |

Table 2: Emergency and Elective CS rate in India and other countries.

| S. no | Emergency CS rate | Elective CS rate | Period | Study | Country |
|-------|-------------------|------------------|-----------|---------------------------|---------|
| 1 | 75.85% | 24.15% | 2014 | Benzouina S et al [8] | MOROCCO |
| 2 | 74.40% | 25.60% | 2018 | Darnal N et al [9] | NEPAL |
| 3 | 61.12% | 38.88% | 2016-2017 | Jain SM et al [10] | INDIA |
| 4 | 59.68% | 40.32% | 2017-2018 | Reddy KM et al [11] | INDIA |
| 5 | 58.00% | 42.00% | 2000-2015 | Radha K et al [12] | INDIA |
| 6 | 58.00% | 42.00% | 2018 | Diema Konlan K et al [13] | GHANA |
| 7 | 56.15% | 43.85% | 2020 | Present study | INDIA |
| 8 | 44.19% | 55.81% | 2015-16 | Kathuria B et al. [14] | INDIA |

In Table 3, Emergency CS and Elective CS maternal age between 20 to 30 years was 82.58%, and 76.75% were as teenage pregnancy was 12.93% and 3.18%, respectively. Elderly (above 30yrs) was 4.47% and 20.06% in Emergency CS and Elective CS group respectively. The percentage of women studied up to metric was 63.43% and up to graduation was 35.32% in Emergency CS were as 76.43% had studied up to metric and 22.92% of women had studied to graduation in Elective CS. Only 1.12% and 0.63% did not have any formal education in Emergency CS and Elective CS group, respectively. In the Emergency CS group, 88.68 % were from a rural area, and 11.31% were from an urban area, whereas in the Elective CS group, it was 65.12% and 34.87% cases, respectively. Depending on the socio-economic class, 84.07% belonged to the middle class and 13.43% in the low class and 2.48 % in the higher socioeconomic class in the Emergency CS group. In the Elective CS group,

92.35% belonged to the middle socioeconomic class, 5.09% in the lower socioeconomic class 2.54% in the higher socioeconomic class. In the Emergency CS group, 59.70 % were primigravida, and 40.29 % were multigravidas, whereas, in the Elective CS group, it was 27.22% and 72.77% cases, respectively. Booked cases were 92.28 %, and 97.45% were unbooked cases, 7.71 % and 2.54% in Emergency CS and Elective CS, respectively.

Table 3: Sociodemographic Factors

| S.no | Socio-Demographic character | | Emergency CS | | Elective CS | | P values |
|------|-----------------------------|----------------------|--------------|------------|-------------|------------|----------|
| | | | number | percentage | number | percentage | |
| 1 | Age | Tenage | 104 | 12.93 % | 20 | 3.18% | 0.00001 |
| | | 20 to 30 years | 664 | 82.58 % | 482 | 76.75% | |
| | | Elderly(above 30yrs) | 36 | 4.47 % | 126 | 20.06% | |
| 2 | Education | No literacy | 10 | 1.12 % | 4 | 0.63% | 0.00001 |
| | | Matric | 510 | 63.43 % | 480 | 76.43% | |
| | | Graduate | 284 | 35.32 % | 144 | 22.92% | |
| 3 | Residence | Rural | 713 | 88.68 % | 409 | 65.12% | 0.00001 |
| | | Urban | 91 | 11.31 % | 219 | 34.87% | |
| 4 | Socioeconomic status | Lower | 108 | 13.43 % | 32 | 5.09% | 0.00001 |
| | | Middle | 676 | 84.07 % | 580 | 92.35% | |
| | | Upper | 20 | 2.48 % | 16 | 2.54% | |
| 5 | Gravida | Primagravida | 480 | 59.70 % | 171 | 27.22% | 0.00001 |
| | | Multigravida | 324 | 40.29 % | 457 | 72.77% | |
| 6 | Booking status | Unbooked | 62 | 7.71 % | 16 | 2.54% | 0.00001 |
| | | Booked | 742 | 92.28 % | 612 | 97.45% | |

Table 4 shows a comparison of indications between Emergency CS and Elective CS. Fetal distress (31.96%) followed by Non-Progress of labour (23.88%), history of previous caesarean section (21.51%), Oligo-Hydramnious (8.33%), Malpresentation (6.07%) and chronic health conditions (4.97%) made the most significant contribution to the Emergency CS rate. Were as previous caesarean section (64.17%) followed by Cephalo-pelvic disproportion (14.16%), Oligo-Hydramnious (7.32%), Malpresentation (5.40%), Failed Induction (4.29%) and chronic health conditions (2.54%) made the greatest contribution to the Elective CS rate. Obstructed labour (1.11%), Multiple pregnancies (0.87%), Short stature in labour (0.87%) were the least common indication for Emergency CS and were not seen in Elective CS indications. Placental disorders were 0.24%, and 1.27% were as Precious pregnancy was 0.12% and

0.79% in Emergency CS and Elective CS group respectively.

Table 4: Indication for Elective CS

| S. no | INDICATIONS FOR CS | Emergency CS | | Elective CS | | P values |
|-------|------------------------------|--------------|---------|-------------|-------|----------|
| | | number | % | number | % | |
| 1 | Previous caesarean | 173 | 21.51 % | 403 | 64.17 | 0.00001 |
| 2 | Fetal distress | 257 | 31.96 % | 00 | 00% | 0.98 |
| 3 | Non-Progress of labour | 192 | 23.88 % | 00 | 00% | 1 |
| 4 | Cephalo-pelvic disproportion | 00 | 00% | 89 | 14.16 | 1 |
| 5 | Oligo-Hydramnios | 67 | 8.33 % | 46 | 7.32 | 0.48 |
| 6 | Malpresentation | 49 | 6.07 | 34 | 5.40 | 0.58 |
| 7 | Failed Induction | 00 | 00% | 27 | 4.29 | 1 |
| 8 | Chronic health conditions | 40 | 4.97 % | 16 | 2.54 | 0.01 |
| 9 | Obstructed labour | 9 | 1.11% | 00 | 00% | 0.98 |
| 10 | Multiple pregnancies | 7 | 0.87 % | 00 | 00% | 1 |
| 11 | Short stature in labour | 7 | 0.87 % | 00 | 00% | 1 |
| 12 | Placental disorders | 2 | 0.24 % | 8 | 1.27 | 0.02 |
| 13 | Precious pregnancy | 1 | 0.12 % | 5 | 0.79 | 0.05 |
| | TOTAL | 804 | 100% | 628 | 100% | |

Discussion

The Emergency CS rate is 12.3% which is higher when compared to the Elective CS rate in the present study. A similar finding was seen in other studies shown in table 2, except analysis by Katuria B et al. [14]. The Emergency CS rate was 11.62% less when compared to Elective CS. Except for Katuria B et al. [14], the present study shows that the Emergency rate is slightly lower. The Elective CS rate is somewhat higher when compared to Reddy KM et al. [11], Radha K et al. [12], and Diema Konlan K et al. [13], which were as the Emergency rate is considerably lower. The elective CS rate is significantly higher when compared to Benzouina S et al. [8] and Darnal N et al. [9].

Maternal age was comparable, with age ranging from 20-30 years being the most common in both groups. This is due to early marriage and childbearing in India, similar to the other developing countries. This finding was similar to the study of Shrestha A et al. [15]. Teenage pregnancies were least common in both groups but slightly higher in the Emergency CS group when compared to the Elective CS group. The majority of patients had education up to metric in both groups. The percentage of women with no formal education was less common and almost similar in both groups, but graduates were higher in Emergency CS compared to the Elective CS group. The majority of women

Belong to the rural area in both groups. Still, the percentage of women coming from the rural area was higher in the emergency CS group when compared to the Elective CS group. The rate of middle socioeconomic status women was higher in both emergency and elective CS groups. Higher socioeconomic status women were less common and almost similar in both groups. Still, lower socioeconomic status women were more elevated in the emergency CS group compared to the Elective CS group.

The percentage of primigravida was higher in the Emergency CS group were as the percentage of multigravida was higher in the Elective CS group. Similar results were seen in the study of Singh N et al. [16] and Daniel S et al. [17]. In the Elective CS group, the percentage of multigravida was high because 64.17% of Elective CS was done for previous caesarean section cases. Similar results were seen in the study of Govind L et al. [18]. Most of the women had regular antenatal checkups in both groups. But unbooked cases were slightly higher in the emergency CS group when compared to Elective CS and was similar to the study of Singh N et al. [16]. There were statistically significant differences in Age, Education, Residence, Socioeconomic status, Gravida and Booking status of the Emergency CS group and Elective CS group ($p < 0.05$).

Fetal distress was the most common indication in the Emergency CS group, and non-progress of labour was the second most common indication. Similar to the present study, Shrestha A et al. [15] reported that the most common indication of Emergency CS was fetal distress. Still, on the contrary second, the most common indication was a previous caesarean section. In Najam R et al. [19] study, repeat caesarean section as the commonest indication was contrary to the present study. Still, non-progress of labour was the second most common indication and was similar to the present study. Fetal distress, non-progress of labour, obstructed labour, multiple pregnancy and short stature in labour are emergency indications for caesarean section, hence not seen in the Elective CS group. Therefore p-value > 0.05 without statistical significance between Emergency CS and Elective CS group for these indications.

Oligo-hydramnios was slightly higher, and the fourth most common indication in emergency CS was the

Third most common indication in the elective CS group. The difference between the two groups was statistically not significant ($p=0.48$). Malpresentations were slightly higher and the fifth commonest indication in emergency CS compared to elective CS, in which it was the fourth commonest indication. But the difference is statistically not significant ($p=0.58$). In contrast to the present study, Daniel S et al. [17] reported that Malpresentation was common in elective CS than an Emergency CS. Chronic health conditions such as uncontrolled hypertension, pre-eclampsia, eclampsia and gestational diabetes mellitus were the fifth major contributor to Emergency CS and the sixth major indication for Elective CS. The association between chronic health conditions and type of CS was statistically significant with $p=0.01$.

Another least common indication for Emergency CS (but not present in Elective CS) was obstructed labour, multiple pregnancies and short stature in labour. In the study by Daniel CN et al. [20], obstructed labour (25.7%) was the most common indication for Emergency CS, and similar to the present research, Daniel S et al. [17] reported multiple pregnancies were seen only in the Emergency CS group. Placental disorders were the slightest common indication in both groups, but Elective CS was slightly higher than Emergency CS, and the difference was statistically significant with $p=0.02$. In contrast to the present study Soren R et al. [21]. in their study reported that Emergency CS was more than Elective CS for placental indication

While the study was conducted by Thakur V et al. [22] reported that the most common indication was previous CS in both the elective and emergency caesarean section group, the present study shows that the history of the last caesarean section was the most common indication in Elective CS group were as it was third most common in Emergency CS group. Similar to Singh N et al. [16], the present study also shows that women who presented with a previous history of caesarean had greater chances of elective caesarean section, and it was statistically significant ($P = 0.0001$).

All women diagnosed with cephalopelvic disproportion underwent caesarean section before the onset of labour suggests a more aggressive approach to decrease the Emergency CS rate. In the elective group, failed induction was the indication in 4.29% in the present

Study, whereas in Singh N et al. [16]. It was 7%. Cephalopelvic disproportion and failed induction are mainly elective indications for CS and are not seen in the Emergency CS group. Hence these indications with a p -value > 0.05 carry no statistical significance between Emergency CS and Elective CS groups. Precious pregnancy was the slightest common indication in both Emergency CS and Elective CS groups, and the difference in number was statistically not significant ($p=0.05$).

Conclusion

The Emergency CS rate is higher than the Elective CS rate. Despite knowing that Maternal morbidity is more in Emergency CS, still, it is unavoidable. But the rate of Emergency CS can be brought down by a proper selection of cases and management of labour.

What this study adds to existing knowledge:

Recent studies all over the world have shown repeat CS pregnancy as the main factor in the rise of CS, but the present study shows that repeat CS is the main indication in Elective CS and Fetal Distress is the main indication in Emergency CS

Abbreviations: CS: Caesarean sections. CPD: Cephalopelvic Disproportion

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Availability of data and materials: The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Authors' contributions: Harish KM and Shwetha N designed the study, analysing data and writing the manuscript. Pujith Kumar G, SaiChandhan T, Sreenivasa Reddy C and Satish Reddy GM contributed to data collection and revised the manuscript. All authors read and approved the final manuscript.

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