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Original Research Article

A study of rate, indications and maternal morbidity associated with cesarean delivery in a tertiary care hospital

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ABSTRACT

Background: Cesarean section is one of the most commonly performed surgical procedures in obstetrics worldwide. Over the last three decades, a tremendous increase in cesarean section rates has been observed globally, which is a cause for concern as procedure is associated with higher morbidity and mortality compared to vaginal delivery. This study was done to analyze the rate and indications for cesarean section and associated maternal morbidity and mortality.
Methods: This retrospective study was conducted over a period of 6 months from 1st October 2017 to 31st March 2018 in the department of Obstetrics and Gynecology, Integral Institute of Medical Sciences and Research, Lucknow, India. Data of patients who were admitted for delivery in department of Obstetrics and Gynecology in OPD or emergency were recorded. Statistical analysis of various parameters namely, the cesarean section rates, its indications, the patient's morbidity and mortality was done.
Results: The total numbers of women delivered over the study period were 577, out of which 210 patients underwent cesarean sections. The overall cesarean section rate in our study was 36.39%. Previous cesarean section was the leading indication of cesarean section (31.9%) followed by arrest of labor (18.1%), CPD (14.2%), and fetal distress (12.9%). Breech presentation (5.2%), failed induction of labor (4.8%), pregnancy induced hypertension (PIH) (3.8%), oligohydramnios (3.3%), obstructed labor (2.4%), APH (1.4%), multiple pregnancy and BOH accounted for 0.95% of cesarean sections. 9% patients had few complications mainly minor wound infection (2.4%) and postpartum hemorrhage (2%). There was no mortality during this period.
Conclusions: Previous cesarean section has been found to be the main indication for cesarean section. So primary cesarean section should be reduced to decrease the overall cesarean rates. A comprehensive, evidence based approach needs to be introduced to monitor indication of all cesarean section.

Keywords: Cesarean delivery, Cesarean rates, Indications, Maternal morbidity, Previous cesarean primary cesarean section

INTRODUCTION

Cesarean section is the most common obstetric surgery that was introduced to save lives of women and their newborns from life-threatening pregnancy and childbirth related complications. When medically indicated, a cesarean section can effectively prevent maternal and perinatal mortality and morbidity. However, there is no evidence showing the benefits of cesarean section for women or infants who do not require the procedure.

Over the past three decades, cesarean section rates have risen substantially worldwide.[1] According to World Health Organization (WHO) the population based C-section rate should lie between 5 and 15 percent to have an optimal impact.[2]

Both developed and developing countries have shown an increase in the average rate of cesarean section (27%) during year 2013.[1]

There are various factors that are responsible for such dramatic increase in cesarean section. Among these, various medical and non medical reasons has been found in researches across the world.[3]

In the developed countries, increase in cesarean delivery has been found to be mainly due to fear of litigation, health insurance system, cesarean section by choice, increased use of electronic fetal cardiac monitoring and increased proportion of breech deliveries by cesarean section.

Several studies conducted across India have shown an alarming rise in the rate of cesarean section deliveries. With increase in institutional deliveries there has also been an increase in cesarean section birth in India. It has been observed that in India, cesarean section rate has increased to 18% in 2016 as compared to 3% in 1992.

In a study over a two year period in urban India, the cesarean section rates were reported as 20% and 38% in the public and private sectors respectively. A study by Sreevidhya and Sathiyasekeran showed cesarean section rate of 47% in the private sector. There is also a wide variation in the rates across the different states in the country.[4,5]

The reasons for the alarmingly increased cesarean rates are multifacated. Several studies conclude that many sociodemographic factors are influencing the decision making. Factors other than obstetric causes like, medical, social, ethical, economic and medico legal factors play a very important role in this rising trend of cesarean section. A number of cesarean sections were performed because of personal preferences apart from the clinical indications.[6]

Indications of cesarean section have changed a lot in recent years. It varies as there is no standard classification of indications and there can be multiple and related indications.[7] Most cesarean sections are currently performed to benefit the fetus and not the mother.

The most common indications of cesarean section include include previous cesarean section, CPD, fetal distress especially its detection by continuous electronic fetal monitoring, arrest of labor, breech presentation, abdominal delivery of growth retarded fetus, malpresentation, increasing body mass, multiple gestation, maternal request and fear of litigation are commonly cited causes.[8] This study was done to find the rate of cesarean section, indications and associated maternal morbidity and mortality.

METHODS

This retrospective study was conducted in all patients who underwent cesarean section during 6 months period from 1st October 2017 to 31st March 2018 in the department of obstetrics and gynecology, Integral Institute of Medical Sciences and Research Lucknow, Uttar Pradesh, India.

Inclusion criteria

- All pregnant women (booked or unbooked), who underwent cesarean section (elective or emergency) during study period was included in this study.

Exclusion criteria

- Patients who delivered at less than 28 weeks of gestation.

Data of 577 patients were collected in a retrospective manner who delivered in the Obsterics and Gynecology department during the study period. In patients who underwent cesarean sections, their sociodemographic characteristic likes age, parity, booking status, residence-urban/rural. Gestational age at the time of delivery, and whether it was an emergency or planned cesarean section were also recorded. The indications for cesarean section and factors contributing to repeat cesarean sections were recorded separately.

The indications of cesarean section included previous caesarean section, arrest of labor, cephalopelvic disproportion, fetal distress, multiple gestation, mal-presentation, and failed induction, fetal and obstetric indications. Foetal indications included oligohydramnios with or without IUGR, big baby >4kg leading to CPD. Obstetric indications are the conditions associated with present pregnancy like placenta previa, abruption, placenta accreta, pre-eclampsia/ eclampsia etc.

Indications for repeat cesarean section were recorded seperately. It included previous 2 more cesarean deliveries,scar tenderness, fetal distress, arrest of labor, refusal to VBAC, malposition, multiple pregnancy, oligohydramnios, APH, and bad obstetric history in association with previous cesarean section. Complications during surgery and post-operative period were also recorded. Data were entered into an excel spreadsheet and results were expressed as mean values and percentages.

Total, primary and repeat caesarean deliveries were calculated. The caesarean rate was calculated as the number of caesarean birth in a year divided by total number of deliveries in that year.

Statistical analysis

Statistical analysis was performed using SPSS 16.0 software. Unpaired t-test was used to analyze continuous data. Categorical data was compared using Chi-square test. P <0.05 was taken as statistically significant. Relative risk was calculated for abnormal UA PI, UA RI, UA S/D, MCA PI and cerebral-umbilical PI ratio. Multivariate regression was used to analyze effect of multiple variables.

RESULTS

Table 1: Demographic analysis of patients who underwent cesarean section.

Variables	Number of cesarean	Percentage (%)
Age group		
19 years and below (teens)	3	1.4
20-25 years	115	54.8
26-30 years	66	31.4
31-35 years	15	7.1
Above 35 years	11	5.2
Parity		
Nullipara	76	36.2
Primipara	81	38.6
Multipara (G2-G4)	53	25.3
Antenatal status		
Booked	56	26.7
Unbooked	154	73.3
Place of residence		
Rural	181	86.2
Urban	29	13.8
Religion		
Hindu	87	41.4
Muslim	123	58.6

The sociodemographic characteristics of the respondents are depicted in Table 1. The mean age of the respondents was 25.9±4.58 years. Maximum number of cesarean sections were in the age group of 20-25 years (54.8%) followed by 31.4% patients in the age group of 26-30 years. These two groups constituted 86.2% of total cesarean sections. Only 5.2% of the cases belonged to the elderly age group of above 35 years. Maximum no. of cesarean sections was primiparous females (38.6%). Out of 210 cesarean deliveries 86.2% were from rural area. Also, result showed that only 26.7% of women were booked for antenatal care. Most of the cases belong to Muslim community (Table 1).

Table 2 illustrates that the distribution of elective and emergency cesarean section of the study subjects. There were 210 cases of caesarean section, out of which 44 cases were elective (21.0%) and while 166 cases were emergency caesarean sections (79.0%). Table clearly defines the prepotency of emergency caesarean sections in the study subjects. Difference in the percentage is about 58% which shows higher prevalence of emergency caesarean sections (Table 2).

Table 2: Elective vs. emergency cesarean section.

Type of cesarean	Number of cesarean	Percentage (%)
Elective	44	21.0
Emergency	166	79.0
Total	**210**	**100.0**

Table 3: Percentage of cesarean section in relation to period of gestation.

Period of gestation	Number of cesarean	Percentage (%)
Preterm (<37 weeks)	18	8.6
Term (≥37 to < 42 weeks)	192	91.4
Post term (≥42 weeks)	0	0.0
Total	**210**	**100**

Gestation period of maximum number of cesarean sections was in between greater than 37 weeks and less than 42 weeks (91.4%) followed by preterm. There were no cases belongs to post term of gestation period (Table 3).

Table 4: Indications of cesarean section.

Indication	Number of cesarean	Percentage (%)
Pre LSCS	67	31.9
Arrest of labor	38	18.1
CPD	30	14.2
Fetal distress	27	12.9
malpresentation	11	5.2
failed induction	10	4.8
PIH	8	3.8
Oligohydramnios	7	3.3
Obstructed labor	5	2.4
APH	3	1.4
Multiple pregnancy	2	0.95
BOH	2	0.95
Total	**210**	**100.0**

In this study, 210 cases that underwent cesarean section, the most common indication was previous cesarean section 67 (31.9%), followed by arrest of labor 38 (18.1%). Other common causes for cesarean section were CPD (14.2%), fetal distress (12.9%), Malpresentations (5.2%), and failed induction (4.8%) (Table 4).

Table 5 shows that among previous cesarean cases, 20 (29.8%) patients were having previous 2 cesarean sections, 8 (12%) patients were having previous cesarean section with scar tenderness, 7 (10.4%) patients were

having contracted pelvis along with previous cesarean section.

Table 5: Indications contributing to repeat cesarean section.

Indication	Number of cases	Percentage (%)
>Pre 2 LSCS	20	29.8
Pre 1 LSCS +Scar tenderness	8	12
Pre 1 LSCS +CPD	7	10.4
Pre 1 LSCS +Fetal distress	7	10.4
Pre 1 LSCS +Arrest of labor	6	9
Pre 1 LSCS +Refusal to VBAC	5	7.5
Pre 1 LSCS +PIH	3	4.5
Pre 1 LSCS +Breech	3	4.5
Pre 1 LSCS +Oligohydramnios	3	4.5
Pre 1 LSCS +BOH	2	3
Placenta previa	2	3
Multiple pregnancy	1	1.5
Total	**67**	**100.0**

Table 6: Maternal morbidity and mortality.

Complications	Number of cesarean	Percentage (%)
None	191	91
Wound infection-minor	5	2.4
PPH	4	2
Intraoperative haemorhage	3	1.4
Anaesthetic complication	3	1.4
Abdominal distension	2	0.95
Breathlessness	1	0.47
UTI	1	0.47
Total	**210**	**100.0**

In 7 (10.4%) cases, there was fetal distress during VBAC trial, 6 (9%) patients underwent cesarean because of arrest of labor. 5 (7.5%) patients refused for VBAC. PIH, oligohydramnios and breech were the indication in 4.5% of patients. Other less common indications were placenta previa, BOH and multiple pregnancies.

Table 6 shows the various complications suffered by the respondents during their post natal period. No postpartum morbidity was observed in 191 (91%) of the respondents, whereas 4 (2%) had PPH, 5 (2.4%) patients developed minor wound infection. Intraoperative haemorhage and anaesthetic complications were seen in 3 patients (1.4%). Two cases showed complication of abdomen distension. Breathlessness and UTI were seen in one patient that underwent cesarean section (Table 6).

DISCUSSION

Over the past three decades, the rate of cesarean delivery has increased dramatically. The rates of both primary and repeat cesarean section have been on the rise.[9]

Primary cesarean section usually determines the future obstetric course of any woman and therefore should only be done when it is genuinely indicated. The rate of cesarean section in our study was 36.39%. The high cesarean section rate in our study was observed as this study was conducted in a tertiary care centre. Because of the fact that majority of the pregnant women presented in the emergency were referred cases from PHC (Primary Health Centre), CHC (Community Health Centre), initial trial by dais, and private practitioners. Most of these patients are referred to this teaching hospital who have one or the other risk factors and who already had a trial of labor somewhere else. So the cesarean section rate was obviously high in these high-risk and unbooked cases.

High cesarean rate has also been reported by several studies conducted in India.

Gupta et al found C-Section rate of 31.46% in their study.[10]

Another study conducted in eastern India has also reported high cesarean section rate of 35.45%.[11]

Several studies conducted in India have shown wide variation in cesarean section rates at different places. Samdal LJ at al reported lowest cesarean section rates (9.5%) in Nepal.[12] and highest rate (51.1%) was reported by G Singh et al in their study conducted in Haryana.[13]

We observed that mean age of the respondents was 25.9±4.58 years in our study, with maximum number 115 (54.8%) patients between 20-25 years age group. Similar result was observed in other studies.[14,15]

In the present study, we observed that out of 210 cesarean deliveries 86.2% were from rural area. This shows that there is increased awareness among rural women and the improved transport facilities.

In our study 79% were emergency cesarean section and 21% were elective cesarean section. It could be because of the fact that our hospital is a tertiary centre located in rural area and majority (73.3%) patients were unbooked. Patil P et al in their study also reported 71.1% emergency cesarean section and 28.9% elective cesarean section.[16]

Gayathry D et al also reported emergency cesarean section rate of 62.5% which is higher than elective cesarean section in 37.5%.[17]

In our study we observed that, among cases that underwent cesarean section, 68.1% patients underwent primary cesarean section and 67 (31.9%) underwent repeat cesarean section.

The two most common indications of primary cesarean section were arrest of labor (18.1%) and CPD (14.2%). Other common causes were fetal distress (12.9%), malpresentation (5.2%), and failed induction (4.8%).

This is comparable to study by Bade P et al who reported arrest of labor (17.6%), CPD (11.7%), fetal distress (16.6%) as common indications of primary cesarean section.[18]

On analysis of indications of repeat cesarean section we found that 47 (22.4%) were previous one cesarean section and 20 (9.5%) were previous two cesarean section. Among various factors for cesarean section were scar tenderness (12%), contracted pelvis (10.4%), fetal distress (10.4%). (9%) patients underwent cesarean because of arrest of labor, (7.5%) patients refused for VBAC. PIH, oligohydramnios and breech were the indication in 4.5% of patients. Other less common indications were placenta previa, BOH and multiple pregnancies. Patients with previous two or more cesarean section were not given trial of labor.

Lakshmi et al has reported repeat cesarean (43%) followed by CPD (15%) as the common indications for cesarean section.[19]

Divyamol N et al in their study, also reported that the major indications were previous cesarean sections (40.44%), failure of labor to progress (22.47%) and fetal distress (14.6%).[20]

As we observed in our study and other several studies, that previous cesarean section is the most common indication for cesarean section. So there should be clear, compelling and well supported justification for every cesarean section. VBAC trials with proper selection criteria and proper monitoring can help in reducing the rate of cesarean section. There are evidences which prove VBAC to be safer for women having prior cesarean section as the risk of uterine rupture is low in lower segment cesarean section.[21]

Though cesarean section prevents maternal and neonatal deaths, severe morbidity rate was three times in planned cesarean section compared to planned vaginal delivery.[22] With the advancement in anaesthetic services, improved surgical techniques, and blood transfusion, the morbidity and mortality of this have come down considerably.

In the present study, no postpartum morbidity was observed in 91% of the repondents. Minor wound infection (2.4%) was the commonest complication followed by atonic PPH (2%). Among intra-operative complications, intra-operative haemorhage and anaesthetic complications were seen in 3 patients (1.4%).

In a study by Santhanalakshmi C et al, the commonest complication was wound infection (38%). The next common complications were UTI, post-op fever and spinal headache, 20%, 19%, and 14.4% respectively.[19]

Another study by Das RK et al, showed morbidity in 12.02%. Surgical site infection (4.35%) was the commonest complication followed by atonic PPH (2.43%).[11]

CONCLUSION

Cesarean delivery due to maternal and fetal indications cannot be deferred. Instead timely performed cesarean section reduces morbidity and mortality. The benefits of the indicated cesarean delivery cannot be denied, but unnecessary cesarean sections must be avoided. We can balance the rate of cesarean by implementing protocol, evidence based medicine, and by judicious use of proper indication for the case.

As repeat cesarean section is a most common cause, reduction of primary cesarean section should be given priority and should only be performed when it is clearly advantageous.

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