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An analytical study on increasing number of cesarean section in a tertiary care hospital

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ABSTRACT

Background: One of the most common surgeries performed worldwide is cesarean section (CS). The World Health Organization has identified an ideal CS rate for a nation of around 10–15%. In recent times, the proportion of delivery conducted by CS has increased. However, it can lead to significant increase in maternal and infant morbidity and mortality. **Aims and Objectives:** This study aims to analyze determine rate of CS and factors that lead to increased number of CS in a tertiary care hospital. **Materials and Methods:** This analytical prospective study has been carried out on pregnant women undergoing CS in Calcutta National Medical College and Hospital from March 2019 to February 2020. Total 1000 cases undergoing emergency CS during study period were included in the study. Template was generated and analysis was done on SPSS software. **Results:** In this study, lower segment CS (LSCS) rate is highest in age group of 20–25 years (47.2%), followed by <19 years age group (24%) and lowest LSCS rates seen in >35 years age group. Relationship between parity and LSCS rate is also considered in the present study. Primipara contributes around 76% LSCS rate, where multipara shows only 24% of total LSCS in this study. In respect to total number of LSCS in this study, Robson Group 2B is maximum contributor (37.4%), followed by 2A (14.4%), 4B (13.2%), and Group 6 (7.6%). **Conclusion:** The LSCS rate in the present study is far higher than standards which are statistically significant also. Hence, it is mandatory to assess risk and benefit ratio of mother and fetus before taking any measure to reduce LSCS rate.

Key words: Cesarean section; Emergency; Indications; Pregnancy

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INTRODUCTION

Increasing rates of cesarean section (CS) throughout past two decades have become an alarming condition and it needs for ongoing studies. CS is one of the most common major surgical procedures in health-care services. The average CS rate in India in 2019 was 20%. However, there's a large variation in rural and urban situation. In all urban situations, rate of CS is much more than World Health Organization (WHO) standard. The CS epidemic could be a reason for immediate concern and deserves serious international attention.[1] Since 1985, the international health-care community has considered the ideal rate for CSs to be between 10% and 15%. Since then, CSs rate is increasing day by day in both developed and developing countries. A meeting was organized by the WHO in 1985 in Fortaleza, Brazil with a panel of reproductive health experts. On the basis of this meeting, "There is no justification for any region to have a rate higher than 10–15%."[2] Contrary to this, CSs have become increasingly common in developed and developing countries both for a number of reasons.[3,4]

CS can be an essential, urgent, lifesaving procedure for both the mother, and the baby in certain medical conditions.[5]

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However, unnecessary CS can lead to increased health risks for both mother and baby. Hence, the equilibrium between risks and benefits to be weighted judiciously.[6] However, many questions the recommended optimum CS rate by suggesting that lowering the rate may be dangerous for baby as well as mother. Efforts to bring down the rate have failed and it is rising steadily.[1]

There are a variety of reasons for rising CS rates over the past 40 years which include relatively safer surgical procedure, medicolegal litigations, maternal preference, elderly mother giving birth, obesity, and lot of comorbid conditions making pregnancies a high-risk one.

CS may cause several complications for mother and baby immediately following delivery and in future also. During procedure injury of adjacent organs, severe hemorrhage may occur and later on sepsis, prolonged hospital stay may occur. Excessive and purposeless CS is also wastage of hospital manpower and money. Primary CS is also detrimental for subsequent pregnancies that may cause scar dehiscence or uterine rupture that increases further CS rate and maternal morbidity and mortality.

A recent systemic study has advocated that the Ten – Group Robson Classification of CS might allow to estimate CS rates in specific groups which aid to identify possible reasons of CS in different groups. These groups are formed in such a way that they are mutually exclusive and include all. It has been recommended for both the monitoring of rates for a time as well as between facilities by both WHO in 2014 and FIGO in 2016.[7,8]

The present study, thus, conducted to determine rate of CS and factors that lead to increased number of CS in Calcutta National Medical College and Hospital, Kolkata, West Bengal, India.

Aims and objectives

This study aims to analyze determine rate of CS and factors that lead to increased number of CS in a tertiary care hospital.

MATERIALS AND METHODS

Study design

A hospital-based analytical prospective study was conducted in the Department of Gynecology and Obstetrics, Calcutta National Medical College and Hospital for 1 year (March 2019–February 2020).

Study population

Women will be delivered by emergency CS during study period. Sample size – 1000. The sample size is calculated using proper statistical formula n=4pq/12, P=prevalence of abnormal LFT in pregnancy 10% q=100-p. 1 (absolute precision)=5/0.

After putting all this value in the above formula, my sample size was 1000. After collecting data, it was analyses with suitable statistical techniques and presented using different graphs, charts, and statistical tests (if any).

Inclusion criteria

Women delivered by emergency CS (excluding cases delivered by obvious reason of CS).

Exclusion criteria

Women delivered by elective CS. Women delivered by emergency CS due to obvious indication, that is, central placenta previa, mass occupying lower birth canal, genital herpes, cephalopelvic disproportion, and previous CS with scar dehiscence or ruptured uterus and conditions where vaginal delivery is contraindicated.

Tools used for data collection

Predesigned study pro forma. Hospital record book (log book). BHT of patients and Discharge certificates.

Data collection and processing

Data pertaining to my study was collected from hospital record book (log book) recording all deliveries conducted in hospital. Other necessary information, that is, history, clinical condition, and indication of CS will be collected from BHT of the patients. Maternal age, economic status, parity, comorbidities, antenatal check-up status, and complications in previous pregnancies will be analyzed to search contributing factors, leading to increased number of CS. To determine CS rate, number of total delivery of the institution during study period is calculated and they are also classified in Robson classification to make assessment of the lower segment CS (LSCS) rate in different Robson Group and these rates are compared with expected rates of LSCS mentioned in Robson Guideline.

Statistical analysis

For statistical analysis, data were entered into a Microsoft Excel spreadsheet and, then, analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA). Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. $P \leq 0.05$ was considered for statistically significant.

Ethical clearance

The study was conducted only after obtaining written approval from the Institutional Ethics Committee

(CNMC/IEC/0265, Date: 28.01.2019). Written informed consent will be taken from every study patient or their logical representative.

RESULTS

This hospital-based analytical prospective study was conducted at the Department of Gynecology and Obstetrics, Calcutta National Medical College and Hospital, Kolkata, West Bengal, India from March 2019 to February 2020. During the period, 1000 women who will be delivered by emergency CS during study period fulfilling the inclusion criteria were included in the study. Template was generated in Microsoft Excel sheet and analysis was done on SPSS software.

In this study this study, LSCS rate is highest in age group of 20–25 years (47.2%) followed by <19 years age group (24%) and lowest LSCS rates seen in >35 years age group. Relationship between parity and LSCS rate is also considered in present study. Primipara contributes around 76% LSCS rate where multipara shows only 24% of total LSCS (Table 1).

Age-wise distribution in Robson Groups is also done in this study. In teenagers (<19 years), around 50% LSCS is in Group 2B and almost similar finding seen in 20–25 age group also. In others age groups, Group 4B is major contributor (Table 2).

Table 1: Distribution of cesarean sections in different age groups and parity

Age group in years	No of LSCS	Percentage
<19	240	24
20–25	472	47.2
26–30	206	20.6
31–35	66	6.6
>35	16	1.6
Parity		
Primipara	758	75.8
Multipara (G2–G4)	242	24.2

LSCS: Lower segment cesarean section

In the present study, in Group 1, CS rates under 10% are achievable, in Group 2, it is consistently around 20–35%, and in Group 9, it is 100% (Table 3).

In the present study, in indication of LSCS, fetal distress is 38.2%, preeclampsia/eclampsia is 17%, oligohydramnios is 13%, breech in labor is 10.6%, and failed induction is 9.4% (Table 4).

In present study, fetal distress was found maximum in Robson Group 3, Preeclampsia/Eclampsia was maximum in Robson Group 10, Oligohydramnios was maximum in Robson Group 4B (Table 5).

In our study, in the present study, induction in Group 2A was post-datism (54%), PROM (22%), preeclampsia/eclampsia (13%), and others were 11% (Figure 1).

In our study, in the present study, induction in Group 4A was post-datism (37%), PROM (6%), preeclampsia/eclampsia (25%), non-indicated induction (19%), and others were 13% (Figure 2).

In the present study, fetal distress was 38.2%, abnormal CTG was 27.2%, SNCU admission was 15.6%, SNCU admission due to abnormal CTG was 9.6%, and neonatal death was 2.4% (Table 6).

DISCUSSION

CS is one of the most common major surgical procedures in health-care services. LSCS is a life-saving surgical procedure when certain complications arise during pregnancy and labor. However, it is a major surgery and is associated with immediate maternal and perinatal risks and may have implications for future pregnancies as well as long-term effects.[9-12]

Table 2: Distribution of cesarean sections according to different age groups and Robson's criteria

	Age group in years					
Robson*s criteria	<19	20–25	26–30	31–35	>35	Grand total
1	20	30	8	0	0	58
2A	42	74	24	4	0	144
2B	114	192	54	8	6	374
3	0	4	6	6	0	16
4A	2	4	14	10	2	32
4B	2	56	48	20	6	132
6	26	42	6	2	0	76
7	0	8	14	8	0	30
8	4	16	8	2	0	30
9	2	2	0	4	0	8
10	28	44	24	2	2	100
Grand total	240	472	206	66	16	1000

*As per Robson criteria to assess caesarean section trends in 21 countries: A secondary analysisof two WHO multi-country surveys. Lancet Glob Health. 2015;3(5):e260-e270.3

Table 3: Comparison of CS rates in different groups with Robson guideline

Group	CS rate according to Robson guideline	MCS reference population*	CS rate in present study	Interpretation
1	CS rates under 10% is achievable	9.80%	8.49%	Fulfills Robson guideline
2	Consistently around 20–35%	39.90%	63.17%	Quite higher due to high CS rate in Group 2B
	Not higher than 3%	3%	1.86%	Fulfills Robson guideline
4	Rarely should be higher than 15%	23.70%	35.89%	higher due to high CS rate in 4B
5	50–60%		NA	NA
8	Around 60%	57.70%	52.63%	Fulfills Robson guideline
9	100%	100%	100%	Fulfills Robson guideline
10	Around 30%	25.10%	30.86%	Almost fulfills Robson guideline

CS: Cesarean section. *MCS reference population is with relatively low CS rate and at the same time with good outcome of labour and childbirth

Table 4: Distribution of LSCS according to indications

Indication of LSCS	No of LSCS	Percentage
Fetal distress	382	38.2
Preeclampsia/eclampsia	170	17
Oligohydramnios	130	13
IUGR	34	3.4
Failed induction	94	9.4
cord prolapse	6	0.6
Non-progress of labor/obstructed labor/deep transverse arrest	58	5.8
Deflexed head	6	0.6
Big baby/short stature	20	2
Maternal disease	8	0.8
Bad obstetric history/infertility	18	1.8
Transverse/oblique lie	8	0.8
Breech in labor/term breech	106	10.6
Twin pregnancy with first twin breech	30	3
Post-term with unfavorable cervix	16	1.6

LSCS: Lower segment cesarean section, IUGR: Intrauterine growth restriction

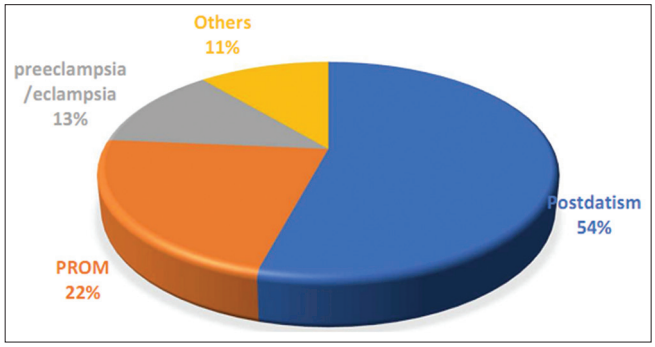

Figure 1: Different indication of induction in Group 2A

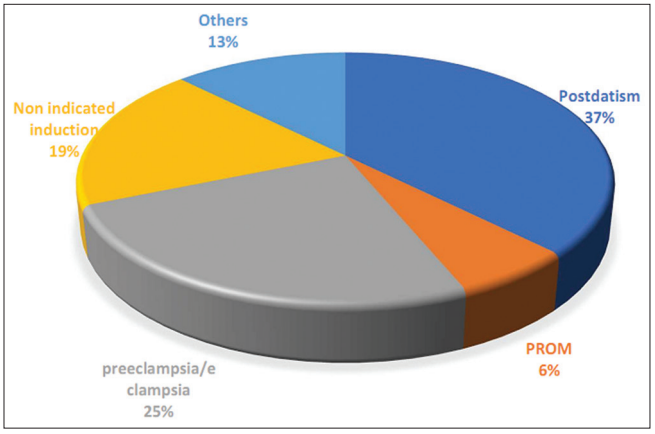

Figure 2: Different indication of induction in Group 4A

Over the past decades, the unprecedented and steady rise in the rates of LSCS have led to increased research, debate and concern among health-care professionals, governments, policy-makers, scientists, and clinicians.[3,7,13-15]

In this present study, LSCS rate is found 29.99% (95% CI, P<0.05), whereas LSCS rate in NFHS-4 is 17%. This difference in LSCS rate is statistically significant (95% CI, RD>2). Similar high LSCS rates of LSCS also found by Bhasin et al., (32.46%), Subhashini and Uma (25.66%), Yadav and Maitra (28.87%) though Santhanalakshmi et al., (12.5%), and Chavda et al., (19.90%) found low LSCS rate in their study.[16-20]

The Group 1 of Robson contributes 5.8% of total LSCS in present study. About 17.24% of LSCS in this group has been done due to fetal distress. A comparative analysis of international cesarean delivery rates in nine institutional cohorts of different countries by Brennan et al., showed that although overall LSCS rates correlated with LSCS rates in singleton cephalic nulliparas.[21]

Brennan et al., reported a study which examined contribution by singleton, cephalic, term nulliparous women (group one) over a period of 35 years.[22] They found a significant increase in LSCS in group one which rose from 2.3% to 7.2%. In the present study also, we find a fairly handsome contribution of group one (8.5%). It fulfills Robson guideline for this group.

Group 2B includes primipara who underwent LSCS before onset of labor and this group contributes 37.4% of overall LSCS rate in the present study. Jogia and Lodhiya found LSCS rate from Group 2B (2.46%).[23] Tanaka and Mahomed

Table 5: Percentage of indications in different Robson group

Indication	1	2A	2B	3	4A	4B	6	7	8	9	10
Fetal distress	17.24	29	50.3	62.5	43.7	36.36	10.5	2	0	0	56
Preeclampsia/eclampsia	3.4	12.5	19.3	25	25	13.6	10.5	20	6.6	0	32
Oligohydramnios	0	0	12.83	0	0	28.78	23.68	0	6.67	0	24
IUGR	0	0	4.27	0	0	7.58	2.6	6.67	0	0	4
Failed induction	0	23.6	0	0	68.7	0	0	0	0	0	4
Cord prolapse	0	0	0	0	0	3	0	0	0	0	2

IUGR: Intrauterine growth restriction

Table 6: Comparison of fetal/neonatal condition in different groups

Group	Fetal distress	Abnormal CTG	SNCU admission	SNCU admission due to abnormal CTG	Neonatal death
1	10	ND	22	nil	0
2A	42	28	6	6	0
2B	188	132	36	36	0
3	10	ND	6	nil	0
4A	14	10	2	2	0
4B	48	62	18	18	2
6	8	ND	10	nil	4
7	6	ND	6	nil	2
8	0	NA	10	nil	8
9	0	0	0	0	0
10	56	40	40	34	8
Total	382	272	156	96	24
Percentage	38.2	27.2	15.6	9.6	2.4

from Australia found that this group contributed only 0.5% to their overall LSCS rate.[24] In this study, the rate of LSCS in this group is significantly high. Here, major indications of LSCS are fetal distress which contributes 50.3% of LSCS, followed by severe preeclampsia/eclampsia (19.3%), oligohydramnios (12.83%), and intrauterine growth restriction (IUGR) (4.27%).

In the present study, this group contributes to 1.6% of present overall LSCS rate and 1.86% of total deliveries in this group. This rate fulfills Robson guideline.

In the present study, this group constitutes Group 4 constituted 16.4% of present overall LSCS rate and 35.89% of this group size. Among them, Group 4A contributes 9.85% in respect to this group. Alike Group 2A, most common indication of induction is post-datism (37.5%), followed by preeclampsia/eclampsia (25%) and PROM (6%). Here, around 19% of induction done without any proper indication which is not desirable. Group 4B contributes 13.2% of total LSCS, where 36.36% of LSCS is due to fetal distress alone, 28.78% oligohydramnios, 13.6% severe preeclampsia/eclampsia, and 7.58% IUGR.

In women, where LSCS is done purely on maternal request, without a medical indication, LSCS cannot be considered as appropriate or justified. When LSCS is done for fetal distress, sometimes on delivery, the fetus is depressed and has to be admitted to NICU or SNCU for its survival, whereas, at other times, the fetus is born healthy and with good Apgar scores. In the present study, LSCS done with indication of fetal distress is around 38%, but SNCU admission rate is only 15.6%. Hence, LSCS for this category of women is always a dilemma for the obstetrician. In the present study, maximum LSCS for fetal distress seen in Robson group 2B followed by Group10 and Group 4B.

In the present study, Groups 2B and 4B are major contributor of LSCS rates. Where major indication of LSCS is fetal distress which is mainly determined by Cardiotocography. Hence, facility for review of CTG result is needed as it carries a high false-positive rate. Fetal scalp blood sampling, ST segment analysis of fetal ECG may correct CTG misinterpretation as fetal distress.

Post-cesarean group is a big contributor of increased LSCS rate also but it is not part of present study. Risk versus benefit ratio is quite questionable in these cases. VBAC is an option to reduce LSCS rate in this group but safety profile for both mother and baby is doubtful.

Limitations of the study

This study is only done in the primary cesarean deliveries as there is scope of reduction of LSCS rate and VBAC is very rarely done in this institution. There is lacking of standard induction protocol. In many cases induced, cases are prepared for LSCS without providing adequate time to progress into active phase of labor. This study is done for a period of 1 year. In this duration, changing trend of CS

cannot be determined. Further, analysis of data for few years is needed.

CONCLUSION

Increasing number of CS is a matter of concern in day–to-day practice. Reduction of rate of the primary CS safely will require multiple approaches for each indication. Analysis of each and every indication and careful evaluation with help of standardized guidelines, use of evidenced-based obstetrics, and audits in the institution, can help us limit LSCS rate. Here, we have the CS rate for a tertiary care hospital receiving high number of referral cases from all over the state as well as neighbor states. Hence, the LSCS rate is far higher than standards which are statistically significant also. Although post-cesarean LSCS is not a part of this study, VBAC can be practiced with strict monitoring of maternal and fetal wellbeing to reduce LSCS rates in this group. How to cut down, LSCS rate is main focus of this study, but it should be remembered that safety of mother and baby is most important at any cost. Hence, it is mandatory to assess risk and benefit ratio of mother and fetus before taking any measure to reduce LSCS rate.

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ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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