

# Reducing Cesarean Section Rate: Are Obstetric Audits Useful? Report from a Tertiary Referral Hospital of India

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## **ABSTRACT**

**Objective:** To create awareness by initiating discussion to ascertain the indications and to reduce the cesarean section rate by introduction of obstetric audit in North India's regional teaching hospital

**Setting:** Tertiary referral centre and regional teaching Hospital in North India

**Study design:** Cesarean section audit was introduced from August 2010 to July 2011 in the Department of Obstetrics and Gynecology of the Postgraduate Institute of Medical Education and Research, India. Cesarean sections were discussed with regard to indication, classification and audited for 'lack of necessity'. For comparing intervention rates with the period prior to audit, Chi-square test with Yates correction was used.

**Results:** Of 4464 deliveries during the audit period, 1241 were cesarean sections (26.72%) as compared to 4418 deliveries in the preceding year with 1278 were cesarean sections (28.93%). The reduction in cesarean section rate was significant. Assisted vaginal deliveries and induction of labor rates were comparable. Finding answers to the question 'could cesarean section have been prevented?' there was discussion in 17.08 % of cases. In 6.7% of cesarean sections, consensus about lack of necessity was achieved.

**Conclusion:** Introducing cesarean section audit especially in a teaching hospital is both feasible and practical. It creates awareness and encourages discussion among staff members concerning indications for cesarean sections and lack of necessity which results in significant decrease in cesarean section rate.

**Keywords:** Obstetrical audit; Cesarean section rate, medical audit

## **Introduction**

Cesarean section represents the most significant operative intervention in the modern era of obstetrics. Cesarean section (CS) rates vary from less than 5% of births in the developing world to up to 50% of births in some parts of the world.<sup>1</sup> In 1985 the World Health Organization (WHO) suggested optimum cesarean section (CS) rates to be around 10–15%.<sup>2</sup> The optimal rate of births by CS remains to be controversial in both developing and developed countries even after these recommendations. Kambo et al<sup>3</sup> in 2002 reported an increase in overall cesarean section rates from 21.8% in 1993-94 to 25.4% in 1998-99 by studying the rates in different institutes in India.

Medical audit cycle aims to initiate change and improve care. The labour ward audit cycle depends on auditing labour ward events and outcome, classifying them, assessing them and then subsequently modifying management.<sup>4,5</sup> The cesarean section rate is an important target of labor ward audit but it should never be considered in isolation. With continuous critical review and frequent comparison with other delivery units, the cesarean section rate in each individual unit can find its appropriate level. Whether that will mean a reduction in the cesarean section rate will depend on how high the rate was before the review.. van Dillen et al<sup>6</sup> reporting their experience of using obstetrics audit observed that there was a significant decrease in cesarean section rate during the audit period.

The CS birth rate at the Post-graduate Institute of Medical Education and Research, Chandigarh had increased from 25% in 1980 to 32% in 2008.( Annual labor room statistics unpublished data) By use of the principles of the medical audit cycle, cesarean section audit was introduced in the view to determine the cesarean section rates, to find out the appropriate standards for practice and outcomes, to compare it with standards, to modify any specific area of management, and finally to

assess the effect of modification of management. The purpose of this study was to find out whether introduction and completion of the medical audit cycle could influence the cesarean section rate.

### Methodology

This study was conducted in the Department of Obstetrics and Gynecology of Nehru hospital, attached to the Post-Graduate Institute of Medical Education and Research, Chandigarh, which is a tertiary care centre and is one of the major regional teaching and referral hospital in North India. The aim of this study was to introduce audit in view of cesarean section rates higher than the cut off suggested by WHO and to devise methods to cut down these rates without affecting the perinatal outcome.

As per duty protocol in the Department of Obstetrics and Gynecology, at a time one consultant, one senior resident and three junior residents belonging to the various semesters remain on duty in the labor ward. The decisions for cesarean section are taken by the senior resident under guidance of the consultant on duty for emergency cesarean sections. The decision for the cesarean section is endorsed by the senior resident with the help of junior residents. Consultants responsible for making the ultimate decision to perform cesarean section remained unchanged during the study period.

The indications of cesarean sections were initially reviewed by the investigators of the study and on first Friday of each month all cesarean sections done in the preceding month, which needed discussion or clarifications, were discussed among all staff (faculty, senior resident and the postgraduate trainees). This was audited using a standard case record form, filed by the team taking decision and performing the case. Cesarean sections with acceptable indications (such as placenta previa, contracted pelvis etc) were excluded after the initial scrutiny. After discussion, the following questions were answered and the consensus was recorded:

- What was the indication for the cesarean section?
- Whether the cesarean section was preventable and if yes, how?

Concerning classification of cesarean sections, traditionally in our hospital, we follow two categories: Elective (done before the onset of labor), or Emergency (after the onset of labor; spontaneous or induced with any fetal or maternal complications necessitating urgent delivery such as antepartum hemorrhage, fetal distress etc). From

the previous year's annual labor statistical records, we identified two possibly avoidable indications for cesarean sections; non progress of labor and meconium stained liquor. We defined the set standards for these two indications to avoid unnecessary cesarean sections; **Dystocia** could be diagnosed when there is poor progress of labor in the presence of ruptured membranes, especially for primigravida augmentation with oxytocin. Most probable reason for the poor progress of labor had to be identified and mentioned in the indications such as failed labor induction, arrest of dilatation or descent, deep transverse arrest, cephalo-pelvic disproportion<sup>7</sup>. In patients with **meconium stained liquor**, the consensus was to perform cesarean section in the presence of other risk factors such as intrauterine growth restriction, pathological cadiotocographic findings or when they presented in very early labor with thick meconium. In the absence of these, patients were allowed to progress with cadiotocographic monitoring. Since ancillary testing is not available, pathological cadiotocographic finding is accepted as an indication for cesarean section in our hospital.

Using the audit form, the following characteristics of each delivery (from August 2010 to July 2011) were made available: maternal age and parity, previous cesarean section, gestational age, presentation of the fetus, onset of labor, indication for cesarean section, neonatal outcome, neonatal sex and weight. For comparison of cesarean section rates, delivery data from our hospital in the preceding year (August 2009 to July 2010) was used.

Confidentiality of the patients involved in the study was maintained. Clearance from the institute's ethical committee was obtained for this study. Statistical analysis was done using SPSS software after entering the parameters in the computer. Chi-square test and Students t test were used when appropriate to find out the statistical significance. Statistical significance was assumed if  $p < 0.05$ .

### Results:

During the audit period from August 2010 to July 2011, there were 4464 deliveries in comparison to 4418 deliveries in the preceding year (August 2009 to July 2010). There were 295 (6.6%) instrumental vaginal deliveries of which 254 were forceps deliveries and 41 were ventouse extractions and there were 306 (6.9%) instrumental vaginal deliveries (246 forceps and 60 ventouse extractions) in the preceding year. Induction of labor was done in 1310 women (28.20%) in the audit period and 1027 women (23.2%) in the pre-audit year. Total number of deliveries and the

incidence of instrumental deliveries were comparable between the two periods. Maternal demographic characteristics of women who underwent cesarean section in pre-audit and audit period were comparable (Table I).

The cesarean section rate in the pre audit period was 28.93% (1278 out of 4418 deliveries) and in the audit period it was 26.72% (1241 out of 4464 deliveries). This decrease in the cesarean rate was statistically significant ( $p < 0.05$ ). There was a significant difference in the indications of cesarean sections done in both the periods.

All cesarean sections were scrutinized by the investigators and 41 % (733/1241) were not discussed in the monthly meetings, as they were found to be done as per acceptable protocol followed by the institute. Most cesarean sections, which were not discussed, were primary cesarean sections. The main indications for these cesarean sections were ante-partum hemorrhage, fetal distress, malpresentations and abnormal lie. In our hospital the diagnosis of fetal distress ( $n=296$ ) due to fetal bradycardia is based on cardiotocographic finding alone, which were reviewed by the senior consultant of the concerned unit and if found adherent to the protocols were not discussed in the audit meetings. Cesareans sections due to dystocia or non progress of labor and meconium stained liquor were discussed in the monthly meetings.

Concerning the audit question 'could cesarean section would have been prevented', there was discussion in 212 of the total 1241 (17.08%) cesarean sections. Of the cesareans sections which were discussed, consensus about lack of necessity was achieved in 14 of the 212 cesarean section (6.7 %). Discussion was aimed at finding the reason for dystocia and ways to prevent it in future cases. In women with indication of cesarean section documented as failed induction ( $n=6$ ), consensus was reached that it could have been averted if the induction of labor was delayed till the cervix was favorable. In women who underwent cesareans section for deep transverse arrest ( $n=3$ ), it was suggested that a trial of instrumental delivery would have prevented the cesarean section. In women who underwent cesarean due to cephalopelvic disproportion ( $n=4$ ) and non progress of labor otherwise not classified ( $n=1$ ), indication was found to be wrongly attributed and they should have been given adequate time to progress. For dystocia the following recommendations were formulated: improve usage of partogram and review of the pelvic findings by senior obstetrician on call to assess the possibility of instrumental delivery such as in deep transverse arrest. To reduce the cesarean section rate for failed induction

wherever possible, a policy to wait till favorable cervix if possible and avoiding un-indicated augmentation of labor was formulated. It was also decided to use prostaglandin especially intra cervical dinoprost gel more than twice (which was practiced in the pre-audit period), up to a maximum of 3 doses to decrease the incidence of cesarean section in the latent phase of labor.

In comparison with the pre-audit period, significant reduction was achieved in the group of women who underwent cesarean section for dystocia and meconium stained liquor during the audit period. A reduction of 42.2 % was achieved in cases with dystocia as the indication from 3.76 % (166/4418) in the pre-audit year to 2.06% (96/4644) in the audit period. A reduction from 2.85% (126/4418) in the pre-audit period to 1.38 % (64/4644) in the audit period, resulting in a reduction of 49.2%, was achieved for the meconium stained liquor as indication. An increase of 37% was noted in women with previous cesarean section from 4.12 % (182/4418) to 5.12% (254/4644). A marked increase of 57.4% in women who underwent cesarean section for fetal bradycardia was also noted during the audit period. (4.25% (188/4418) in the pre-audit year to 6.3% (296/4644) in the audit period).

### Discussion

By introducing cesarean audit, we could achieve a significant reduction in the cesarean section rates in our hospital. Comparison of cesarean sections between the pre-audit and the audit periods showed that a major reduction was achieved in the group of women who underwent cesarean section for dystocia (reduction by 42.1%) and meconium stained liquor (reduction by 49.2%) in the audit period. There was an increase (39 %) noted in women with previous cesarean and in the women who underwent cesarean section for fetal bradycardia (57.4%). In almost 7% of cases, there was consensus among staff members that cesarean might have been prevented.

WHO has set a cut off of 15 % for cesarean section rate.<sup>2</sup> Being a tertiary referral centre in the region, achieving this cut off is often regarded as unachievable, due to the diverse referral population that we receive from the community. Even then we could achieve a significant decrease in cesarean section rate during the audit period; the most likely explanation for the reduction may be behavioral change, as the total number of deliveries and instrumental delivery rate remained similar during the study period

Clinical audit is seen as an important aspect for improving the quality of care, but it is often found to be difficult to implement due to obstacles such as lack of time, resistance to change and lack of motivation.<sup>8</sup> In this study the initiation of a cesarean section audit was not difficult, but the continuation was not easy. Since it was a monthly meeting the number of cases which can be included for discussion were also limited. After discussing a primary cesarean section for breech presentation or fetal bradycardia for multiple times, most staff members felt there was no need to discuss them as they were done according to the protocol of our institute. Decreasing motivation due to poorly managed projects, non-maintenance of proper records and busy clinical services outweighing the audit priorities, being some of the reasons why an audit project may run into the ground.<sup>9</sup>

The reduction in cesarean rates after the introduction of audit and increasing awareness has been described in the literature.<sup>5, 10</sup> The Hawthorne effect<sup>10</sup> states that if an individual or group of individuals are knowingly observed their behavior is likely to change. Most of the people make an effort to oblige if they are made aware about the direction of change desired by their observers. Audit and detailed feedback has been reported in an evidence based review to be effective policy which can safely and successfully reduce the cesarean section rates.<sup>11</sup> Combining audit and the feedback with a comprehensive strategy including guideline education, identifying the obstacles of change, can further reduce the cesarean section rates. This might have a role in achieving reduction in cesarean section rates in our hospital as shown by the reduction of cesarean due to dystocia.

Performance of cesarean section in the latent phase of labor has been identified as an undesirable practice,<sup>12-14</sup> but this occurs very infrequently in spontaneous labor. There is considerable risk for dystocia and eventual cesarean section in women who undergo induction of labor with an unfavorable cervix as determined by a Bishop Score or who need cervical ripening at the time of induction especially in nulliparous women.<sup>14-18</sup> In induced labor, different criteria for management may apply, resulting in a higher section rate for dystocia. So induction should be considered only when the benefits of delivery outweigh the potential maternal and fetal risks of intervention.<sup>19</sup>

We found an increase in cesarean section rates for women with previous cesarean section in our series. Walker et al<sup>20</sup> in their review studying the effective strategies to address increasing cesarean section rates, identified increased prevalence of previous cesarean section (one of the two

indications; other being breech) leading to an increase in the cesarean rates. Both ECV and vaginal birth after cesarean (VBAC) have demonstrated Level 1 evidence for reducing cesarean section rates. In our hospital, the VBAC rate is nearly 50% [unpublished data], but it still remains an important issue. Concerning breech presentation, the cesarean section rate in our hospital for this indication has remained static at around 50%.

The introduction of obstetric audit in an existing structure like department report meetings is important and can be used for discussing different topics.<sup>6, 21</sup> This is especially true in teaching hospitals where audit can be used as an instrument to generate discussion between staff and the trainees. By rotating different audit topics and using the full audit cycle with potential recommendations of change, it will be possible to evaluate the long term effect of these audits. In a recently published study, where as an attempt to reduce cesarean delivery Audit was introduced and it proved effective in decreasing the cesarean section rate thereby showing its effectiveness<sup>22</sup>. Results like the one reported here might motivate others to initiate the process of self analysis and help to implement better clinical practices which may benefit healthcare seekers as well as the providers by giving them a chance to learn from their own actions.

In our study the cesarean section rate was reduced and the major part of this reduction appeared to be a result of specific changes in management decreasing the incidence of cesarean section for dystocia and meconium stained liquor. Dedicated attempts to increase the VBAC rate, use of external cephalic version in breech presentation and introduction of ancillary testing for fetal bradycardia may further reduce the cesarean section rates. Daily/ Weekly review meetings, better time management and inclusion of more cases for discussion to identify the areas which require more attention may be helpful to decrease the cesarean section rates.

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Parameter	Pre-audit Period	Audit Period	p value
Age( years, Mean±SD)	26.97 ± 4.29	27.27± 4.10	0.291(NS)
Parity			0.294(NS)
Nulliparous, (n{ %})	625(48.9%)	581(46.8%)	
Gestational Age, (weeks Mean±SD)	36.81 ± 2.73	and 36.69 ±2.85	0.116(NS)
Cesarean Sections, (n, { %})			
Total	1278(28.93)	1241(26.72)	0.019(S)
Primary	285 (22.3 %)	318 (25.6%)	0.510(NS)

Table 2: showing the indication of cesarean section in the pre and the post audit period compared with the ICMR and RCOG data

	Pre-audit (PGI) (n=1278)	Post Audit (PGI) (n=1241)	p value	RCOG (n>32,000)	ICMR 2002 (n=7017)
Dystocia	<b>13.0</b>	<b>7.7</b>	<b>&lt;0.001</b>	20.4	37.5
Fetal Distress	<b>22.5</b>	<b>32.2</b>	<b>&lt;0.001</b>	22.7	33.4
Meconium Stained Liquor	9.9	5.2	<0.001		
Cesarean History	14.2	20.5	<0.001	14.0	29.0
Antepartum hemorrhage	11.8	7.7	0.003	4.9	6.3
Malpresentations	16.8	17.2	0.8231	14.2	14.5
Others	7.6	5.8	0.4624	16.3	2.9
Multiple Pregnancy	4.2	4.2	>0.05	1.2	-