

# Examining Stratified Cesarean Section Rates Using Robson Classification System at Tribhuvan University Teaching Hospital

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## ABSTRACT

**Background:** Caesarean section rates have been increasing worldwide over the past few decades, with most countries and regions exceeding the World Health Organization recommended rate of 15% of all deliveries.

**Methods:** This study was carried out with the objective of reviewing the rates of cesarean sections over five years (2005-2010) and to assess the stratified rates of cesarean sections for audit of intrapartum management in University Teaching Hospital, Institute of Medicine. Data was stratified into 10 mutually exclusive groups, by using the method presented by Michael Robson.

**Results:** A total of 5907 women had undergone caesarean section over a period of five years. The results showed a growing trend of cesarean section rate from 16.6% to 25.4%. The results of this analysis using the Robson classification has shown that group 1 (Nulliparous, single cephalic  $\geq 37$  weeks gestation in spontaneous labour) has the largest number of cesarean deliveries followed by group 3 (Multiparous, single cephalic  $\geq 37$  weeks gestation in spontaneous labor, no previous CS), although Robson classification showed that group 5 was the biggest contributor.

**Conclusions:** The growing and uniform distribution (throughout the year) of cesarean section has been observed for five years. This analysis provides evidence-based data so we can analyze where to aim our preventive measures and focus efforts in reducing the rate of CS. We would like to suggest that all hospitals and health authorities apply this standardized classification system as to monitor their CS rates and find ways to reduce it, and improve quality care.

**Keywords:** Cesarean Section; quality improvement; stratification.

## INTRODUCTION

To address the over the rising rates of CS and to develop a system for assessment and feedback, a 10-group classification system to examine CS within mutually exclusive groups of women with particular obstetric characteristics was proposed by Robson in 2001 where pregnant women according to their gravida status, parity, fetal presentation, obstetric history including previous CS, course of labour and delivery and gestational age, which provides relevant data for analysis and reporting the rates of CS.<sup>1,2</sup> The overall rate of CS is presented as a combined entity of individual rates from 10 groups, which helps us to study group specific rates to determine their aptness. By using the method presented by Michael

Robson, all deliveries are stratified prospectively into ten subgroups for comparison.<sup>3,4</sup> It will also help us to understand and reach our target goals i.e to be able to monitor CS finds interventions to reduce it.

## METHODS

A retrospective study conducted with the objective of reviewing the rates of CS over 5 years and to assess stratified rates of cesarean sections of intrapartum management at TUTH. The list of women who underwent cesarean section over the period of time was taken from the labour room register. The files were then taken from the medical record section and the details were

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extracted. Data was stratified into 10 mutually exclusive groups. By using the method presented by Michael Robson, all deliveries are stratified prospectively into ten subgroups for comparison as follows:

- Nulliparous, single cephalic  $\geq 37$  weeks gestation in spontaneous labor
- Nulliparous, single cephalic,  $\geq 37$  weeks gestation induced labor or CS before labor
- Multiparous, single cephalic  $\geq 37$  weeks gestation in spontaneous labor, no previous CS
- Multiparous, single cephalic,  $\geq 37$  weeks gestation induced labor or CS before labor, no previous CS
- Multiparous, single cephalic,  $\geq 37$  weeks gestation previous CS
- All nulliparous breeches
- All multiparous breeches (including previous CS)
- All multiple pregnancies (including previous CS)
- All abnormal lies (including previous CS)
- All single cephalic,  $< 37$  weeks gestation (including previous CS)

The tools were developed and data was collected from the registers of Labour room. The tool was pretested and modification in the column like 'date and time', 'place of delivered women' and 'CS before delivery' was made to finalize the tool. Data was entered into Epi Data and analyzed using Statistical Package for Social Sciences.

## RESULTS

Over a period of 5 years from 2005 to 2010, a total of 5907 women had undergone a cesarean section and a maximum was seen in the year 2010, which shows the growing trend of cesarean section rate from 16.6% to 25.4% (Table 1). There was a uniform distribution of CS performed throughout the year with a slight increase in the month of September. It was observed that the maximum (40.2%) of the women were in the age group of 25-29 years followed by 20 to 24 years (35.6%), however 0.6% were above the age of 40 years. More than half (51.9%) were primigravidas followed by second gravida (30.6%), however 1.6% were with more than five pregnancies (Table 2). A large number i.e. 81% of the cesarean sections were performed in term pregnancies, 15.3% for preterm pregnancies and 3.3% for post term pregnancies. According to the indications stated by Robson, 30.2% of the cesareans were done for primigravidas equal to or more than 37 weeks in labor which were in group 1. There were 11.5% of women undergoing a cesarean for primigravida as more than 37 weeks not in labor which were in group 2. In group 3 women had undergone cesareans for multiparous single pregnancies more than 37 weeks with no history of

previous cesareans which was 14.7%, however another 13.1% included multiparous, single pregnancies with a previous cesarean section and single with previous CS less than 37 weeks which was in group 10 (Table 3).

According to the indications stated in the labour room at TUTH the most common indication for CS was fetal distress which was 33.9%, followed by a history of having undergone previous CS at some point of time which was 14.7% (Table 4). On the whole 16.3% of women had undergone a CS in their previous pregnancies, amongst which 16.7% had undergone elective CS and 83.3% had emergency CS. More than 635 of the neonates weighed between 2501 and 3500 gm, 21.6% weighed between 2501 to 2500 gm. 1.8% weighed more than 4000 gm (Table 5).

**Table 1. Year of CS performed (n=5907).**

Year	Frequency(Percent)
2005	981(16.6)
2006	1136(19.2)
2007	1116(18.9)
2008	1174(19.9)
2009	1500(25.4)
Total	5907(100.0)

**Table 2. Gravida of the women (n=5907).**

Gravida category	Frequency (Percent)
Primi	3067(51.9)
G2	1810(30.6)
G3	690(11.7)
G4	245(4.1)
G5 and above	95(1.6)
Total	5907(100.0)

**Table 3. Ten stratified groups according to Robson classification (n=5907).**

Indication	Frequency (Percent)
1.Nulliparous, single cephalic $\geq 37$ gestation in spontaneous labour	1784 (30.2)
2.Nulliparous, single cephalic $\geq 37$ gestation induced labour or CS before labour	677(11.5)
3.multiparous, single, cephalic $\geq 37$ weeks gestation in spontaneous labour, no previous CS	867(14.7)
4.multiparous, single cephalic $\geq 37$ weeks gestation induced labour or CS before labour, no previous CS	540(9.1)
5.multiparous single cephalic $\geq 37$ weeks gestation previous CS	770(13.0)

6.all nulliparous breech	236(4.0)
7.all multiparous breech including prev cs	92(1.6)
8.all multiple preg including prev cs	109(1.8)
9.all abnormal lie including prev cs	61(1.0)
10.all single cephalic < 37 wks including prev cs	771(13.1)
Total	5907(100.0)

**Table 4. Indications for CS according to labor room register (n=5907).**

Indication	Frequency (Percent)
Foetal distress	2003(33.9)
PROM	108(1.8)
CPD	205(3.5)
Previous CS	870(14.7)
Impending Eclampsia	125(2.1)
IUGR	125(2.1)
non progress	397(6.7)
failed induction	249(4.2)
Infertility	108(1.8)
Primi breech	302(5.1)
Oligoamnious	442(7.5)
PIH	117(2.0)
DTA	56(0.9)
Others	800(13.5)
Total	5907(100.0)

**Table 5. Birth weight (n=5907).**

Birth weight category	Frequency (Percent)
up to 1500	99(1.7)
1501-2500 gm	1275(21.6)
2501-3500 gm	3773(63.9)
3501-4000 gm	652(11.0)
more than 4000	108(1.8)
Total	5907(100.0)

## DISCUSSION

The results of this study was based on 5907 women who delivered at TUTH over a period of 5 years, which were categorized into Robson classification groups which contributed to the overall CS rates in the hospital. Stratification is necessary in order to have evidence based data for evaluation of the labour room audit and for further comparison between the same unit as well as different hospitals in the country at a particular period of time.<sup>2,3,4</sup> The results of this analysis using the Robson classification has shown that group 1 has the largest number of cesarean deliveries followed by group 3 and group 5.

Going back to the history of CS worldwide it was observed that in the first half of the twentieth century, women who had undergone CS in the previous pregnancy was likely to deliver by a CS in the next pregnancy as well, So it is important to reduce it in the first instance itself.<sup>2,3,4</sup> In the current study 13% of the women had undergone a CS because of a previous CS. In a study conducted by Sherrie Kelly et al in Canada using Robson classification they found to have a maximum number in group 5, women with at least one previous CS and a term, singleton, cephalic presenting pregnancy. Group 2 contributed to the second largest cause of CS,i.e nulliparous women with a term, singleton, cephalic presenting pregnancy who had either induced labor or no labour.<sup>4</sup>

In our study Robson's group 1 contributed to the maximum of CS that took place at Tribhuvan University Teaching hospital. Fifty one percent were primi gravid and 30 percent were second gravid. Group 3 was the second largest contributing group which was 14.7% followed by group 5 which was 13%. Our finding was different from Robson and colleagues and others as well.<sup>5, 6, 7</sup> Although Robson classification showed that group 5 was the biggest contributor, ours was different because of the fact that TUTH is the largest tertiary hospital in the country where a majority of cases are referred from outside and that it deals with more complicated cases and high risk women. It was seen by the findings of the study that the birth weight was less than 2500 grams in 21.6% of women. The other causes for having surgery in the first pace were numerous medical causes, changes in the obstetrical practice like electronic fetal heart monitoring and early detection of fetal distress.

It is evident that a way to reduce CS is to either prevent it in the first place or promote VBAC. The rate of VBAC inclined in the 1980s and 1990s but things changed in 1996 when Nova Scotia study reported that maternal complications and morbidity to be more in women who had undergone a previous CS.<sup>5</sup> Following this VBAC fell drastically from 28.3% to less than 10% from 1996 to 2010.<sup>8</sup> The findings were controversial while weighing the risk and benefits of trial of labor following a caesarean section. However according to Grady D, VBAC has been recommended as the safety of VBAC compared to CS, and it has been stated that more than 60% of women can have a vaginal delivery after a previous lower segment CS however the indication for the surgery would definitely affect the outcome.<sup>9</sup> But because of the fact that health care providers are skeptical of the safety of VBAC over CS, the rate of elective CS declining is implausible which was similar in the current study as well. In the present study 16.7 percent had undergone an elective CS and the rest were emergency CS. After the main contributors

are identified strategies should be focused on preventive measure to decrease it where possible. The stratified data should be analyzed and evaluated periodically within the department and other hospitals as well, which help to change labour will room protocols based on evidence.

## CONCLUSIONS

The Robson 10-group Caesarean section classification system is a simple and standard tool that can be used to identify groups making the most significant contribution to the overall rate of CS. In our study group 1 had the highest contribution for CS rated followed by group 3. This classification will help us to agree on to which target groups to investigate and also help us learn more about the underlying reasons for the differences in CS rates over time and between units in different hospitals all over the country. We would like to suggest that all hospitals and health authorities apply this standardized classification system as to monitor their CS rates and find ways to reduce it, and improve quality care.

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