

# Evaluation of Cesarean Deliveries by using Using Ten Group Classification System in a Tertiary Care Centre: A Cross-Sectional Study

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## ABSTRACT

**Introduction:** Cesarean section has three times increased risk of maternal and fetal morbidities compared to vaginal delivery. The rising trend of cesarean deliveries across the globe led the WHO to recommend the use of the Ten Group classification system to monitor cesarean rates over time as well as between facilities. The cesarean section rate is increasing in our centre, so the study was conducted to evaluate the cesarean deliveries and identify the group with a major contribution to the cesarean rate so that policies could be formulated to decrease it in our centre.

**Method:** It was a cross-sectional descriptive study conducted in the Department of Obstetrics and Gynecology, Manipal Teaching Hospital, Nepal for six months after ethical approval. All women who delivered at or beyond 28 weeks were included in the study after their consent and were classified according to Robson's classification based on their obstetric parameters. The total cesarean section rate, the size of each group, the cesarean rate in each group and the absolute contribution of each group to the overall cesarean rate were calculated and analyzed.

**Results:** Out of 711 deliveries during the study period, the cesarean rate was 51% (n=362). Group 1(26%) was the major obstetric population followed by Group 3(20%) and Group 2(16%). Group 5(10.97%) had a major contribution to the overall cesarean rate followed by Group 1(10.68%) and Group 2 (9.7%).

**Conclusion:** The cesarean rate in our study was high and it could be decreased by encouraging the trial of labor after cesarean and revisiting the indication of induction and cesarean in Group 1 and Group 2.

**Keywords:** Cesarean Section; Cross-Sectional Studies; Trial of Labor

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## INTRODUCTION

Cesarean section (cs) is a lifesaving procedure performed in obstetrics[1] but there are three times increased maternal and fetal morbidities in comparison to vaginal delivery.[2,3] So, the World Health Organization (WHO) proposed that the cesarean section rate in any facility should be between 5-15% as the rate above it is not associated with improvement of maternal and fetal outcomes.[4]

But in the last decade, there has been an alarming rise in the cesarean section rate globally and has become a public health problem.[5] So there was a need for a standardized and internationally acceptable classification system for the cesarean section which was simple and consistent and could be used to analyze the outcome and results of the decision taken and compare between organizations.

In 2011, Torlani and colleagues did a systematic review of 27 classification systems of cesarean section and found that the Ten Group classification system proposed by Robson is the most appropriate for monitoring cesarean section rates. [6, 7]

So in 2014, the WHO recommended the Ten Group classification system also known as the Robson classification to monitor cesarean delivery rate over time as well as between facilities.[8] In the Robson classification system, women who give birth are categorized into 10 groups based on their basic obstetric characteristics like parity, previous mode of delivery, gestational age, mode of onset of labor (spontaneous/induced), fetal presentation (cephalic, breech, transverse, oblique) and several fetuses (singleton/multiple) as given in Table 1 below and hence analyzed.[7]

In a study done in our centre, the cesarean delivery rate is 36.76%[9] and is higher than that recommended by WHO. And till date, there has been no evaluation of cesarean deliveries using the Ten Group Robson classification

system. So, this study aims to evaluate the cesarean deliveries using this system so that we can find out the major group contributing to the cesarean section. This will help us to formulate policies aiming to reduce the cesarean deliveries in our centre.

## METHODS

This was a cross-sectional descriptive study that was conducted in the ward of the Department of Obstetrics and Gynecology, Manipal Teaching Hospital, which is a tertiary care hospital located in Fulbari 11, Pokhara, Nepal. This study was conducted from December 15, 2021, to June 15, 2022, after approval from Institutional Review Committee.

All the women who have undergone delivery at or after 28 weeks were considered the study population after giving consent. The sampling technique was a nonprobability sampling technique called purposive sampling technique. However, women who had a termination of pregnancy before 28 weeks, or women who had laparotomy for a ruptured uterus were excluded from the study.

Women admitted to the ward who fulfilled the inclusion criteria were enrolled in the study after taking consent. The demographic profile of the women was noted. Current obstetric parameters required for the Ten Group Robson Classification system (Table 1) were taken like parity, previous mode of delivery (cesarean or vaginal), gestational age (<37 weeks/≥37 weeks), fetal number (single/multiple), fetal presentation (cephalic/breech/transverse/oblique) and the onset of labor (spontaneous/induced/not in labor). The neonatal outcome was also recorded.

For the calculation of sample size, the prevalence of cesarean deliveries was taken from a study done in the hospital itself where the rate of cesarean deliveries was 36.76%.[9]

Considering a confidence interval of 95%, a level of precision (e) 5%, the sample size was calculated by using the following formula;

$$n = Z^2 pq / e^2$$

where n = sample size

Z= value for 95% confidence limit (1.96)

p= estimated proportion (0.3676)

q=1-p=0.6324

e= level of precision=0.05

The total sample size of the study was calcu-

lated to be 352.

All the data were entered into an excel sheet and then imported to SPSS and results were calculated.

**Table 1: The Robson Classification**

Group	Obstetric population
1	Nulliparous women with a single cephalic pregnancy, $\geq 37$ weeks gestation in spontaneous labor
2	Nulliparous women with a single cephalic pregnancy, $\geq 37$ weeks gestation who had labor induced or were delivered by CS before labor
2a	Labor induced
2b	Pre-labor CS
3	Multiparous women without a previous CS, with a single cephalic pregnancy, $\geq 37$ weeks gestation in spontaneous labor
4	Multiparous women without a previous CS, with a single cephalic pregnancy, $\geq 37$ weeks gestation who had labor induced or were delivered by CS before labor
4a	Labor induced
4b	Pre-labor CS
5	All multiparous women with at least one previous CS, with a single cephalic pregnancy, $\geq 37$ weeks gestation
5.1	With one previous CS
5.2	With two or more previous CS(s)
6	All nulliparous women with a single breech pregnancy
7	All multiparous women with a single breech pregnancy including women with previous CS(s)
8	All women with multiple pregnancies including women with previous CS(s)
9	All women with a single pregnancy with a transverse or oblique lie, including women with previous CS(s)
10	All women with a single cephalic pregnancy $< 37$ weeks gestation, including women with previous CS(s)

CS: Cesarean Section; CS(s): Cesarean Sections

## RESULTS

During the study period, there were 711 deliveries that fulfilled the inclusion criteria and were included in the study and hence analyzed. The mean age of participants was  $27.53 \pm 4.87$  years with a range of 16-44 years.

The rate of cesarean section was 51% in our study.

On analyzing the group size of each Robson group, the results showed that the largest obstetric group contributing to deliveries was

term nullipara with single cephalic pregnancy (Group 1 and Group 2) which was 42% of total deliveries. The second large obstetric group was term multiparous women with single cephalic pregnancy (Group 2+ Group 3) which contributed to 31% of total deliveries. Group 7 (term multiparous with single, breech pregnancy including previous CS) and Group 8 (all multiple pregnancies including previous cesarean section) contributed the least to the total deliveries (1% each) which is given in the figure below.

Current Mode of Delivery

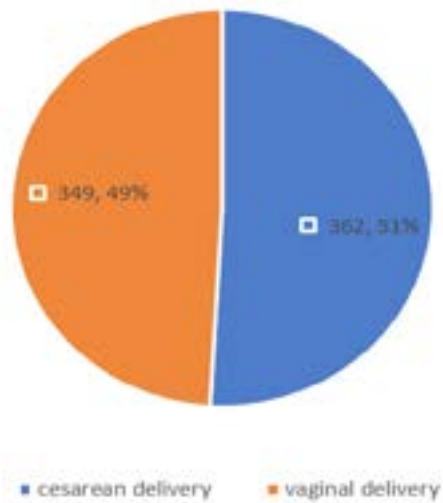


Figure 1: Current mode of delivery

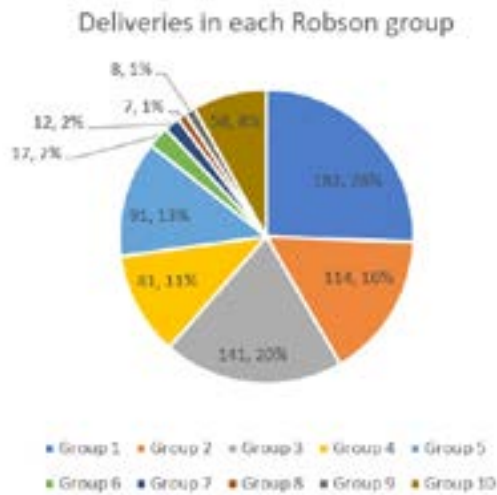


Figure 2: Deliveries in each Robson group

On analyzing the cesarean rate in each group, it was seen that the majority of women in Group 5(women with previous cesarean with term single cephalic pregnancy) and Group 8(all women with multiple pregnancies including previous cesarean) underwent cesarean delivery (85.71% each). It can also be seen that nulliparous women who were either induced or were not in labor (Group 2) underwent more cesarean deliveries (60.52%). The cesarean section rate in nullipara with singleton breech pregnancy (Group 6) was also high. The cesarean section rate in preterm singleton cephalic pregnancy (Group 10) was 46.55%.

Table 2: Contribution of each group to Cesarean Section

Robson Group	CS % in each group	Contribution to CS (%) by each group
1	41.75%	10.68%
2	60.52%	9.7%
3	21.27%	4.21%
4	56.7%	6.46%
5	85.71%	10.97%
6	76.47%	1.82%
7	75%	1.26%
8	85.71%	0.84%
9	100%	1.12%
10	46.55%	3.79%

CS: Cesarean Section

Regarding absolute contribution to cesarean deliveries by each group, it was found that the group having a major contribution to cesarean deliveries was term multiparous women with singleton cephalic pregnancy with previous cs(Group 5 -10.97%) followed by term nulliparous women with singleton cephalic pregnancy (Group 1-10.68%, Group 2- 9.7%) and term multiparous women with a singleton pregnancy with no previous cs (Group 4 -6.46%). All women with multiple pregnancies and malpresentation including previous cs (Group 8 and Group 9 respectively) contributed the least to the cesarean deliveries as shown in Table 2.

DISCUSSION

As the cesarean section rate is increasing globally, the cesarean section rate has also increased in our centre in the last three years. It has increased from 36.5% to 51%. Going through the cesarean trend in Nepal, it has been seen that the institution-based cesarean section rates have gone up from 10.4% to 16.4% between the year 1996-2016.[10] In various studies done in different medical colleges in Nepal, the cesarean section rate ranges between 15% to 47%.[11] So as the cesarean section rate was increasing in our centre, Robson classification was used to evaluate the

cause of the increased cs rate and help formulate plans to bring down the rate.

Using the Robson Ten Group Classification implementation manual, the size of each Robson Group, the cesarean rate in each group and the absolute contribution to the cesarean rate by each group was calculated. In our study, the largest obstetric population was term nullipara with singleton pregnancy (Group 1 and 2) followed by term multiparous women with a singleton pregnancy with no previous cs (Group 3 and 4), which meets the standard provided by Robson guideline. A study done by Das A in a tertiary care centre in Dharan also showed that Groups 1 and 2 were the major obstetric population coming for delivery. [12] However, a study done in the Provincial hospital, Janakpur showed that the major obstetric population coming for delivery was Group 3 followed by Group 1 which was just opposite to our finding.[13] In studies done in other countries, the largest obstetric group coming for delivery was Group 3 followed by Group 1.[14,15]

Regarding the group having a major contribution to the overall cs rate in our study, it has been observed that women at term with one or more previous cesarean sections (Group 5) were the major contributor to the cesarean rate followed by primigravida at term who presented with spontaneous labor (Group 1). Similar findings were observed in studies done by Murari in Janakpur Amatya A in Maharajgunj Medical College in Kathmandu. [13,16] But in a study done by Poudel R, the major contributor to overall cs was Group 1 followed by Group 5 and Group 2.[17] In the study by Das A, the nullipara group (Groups 1 and 2) was the highest contributor to cs followed by women in Group 5.[12] In a study where a secondary analysis of two WHO multicountry surveys was done, it was seen that Groups 1 and 2 were the largest contributor to the overall cs rate, which was followed by Group 5.[18] In another study done in Ethio-

pia, Group 3 was the highest contributor followed by Group 5.[14] From all these studies done in Nepal and in other countries, we can see that Groups 1, 2 and 5 are among the major contributors to overall cs.

According to the Robson guideline, the cesarean rate in Group 1 should be under 10% and in Group 2 should be around 20%-35%. In Group 5, 50%-60% of the cesarean rate is acceptable. In our study, the cesarean rate in these groups is much higher (Table 2) than recommended by Robson.

So, from our study, we can infer that if we can reduce the cs rate in term nulliparous women with singleton, cephalic pregnancy (Group 1 and 2), then we can reduce the overall cs rate and we can also reduce the size of Group 5 in the coming years, which has been the major contributor to overall cs rate. For reducing the cs rate, we may conduct further studies to revise the indications of cs done in Group 1 and Group 2. We can also evaluate the indication for induction, gestational age at an induction in Group 2a so that vaginal delivery can be achieved in most women. And we may also need to screen the prelabours indication in Group 2b. For reducing the cs rate in Group 5, the trial of labor after cesarean section (TOLAC) can be offered to women with the provision of good maternal and fetal monitoring during labor. The role of the external cephalic version and stabilizing induction in term nullipara and multipara with singleton breech pregnancy can also be explored.

## CONCLUSION

The cesarean section rate was much higher in our centre than recommended by WHO and is on a rising trend. Groups contributing most to the overall cs rate were Group 5, Group 1 and Group 2. So, possible actions that can be proposed to decrease the cesarean rate in our centre could be encouraging TOLAC, critically appraising the indication of cesarean deliveries and induction in term nullipara with



singleton cephalic pregnancy to increase vaginal birth without compromising the maternal and fetal outcome.

## LIMITATION

The limitation of this study was it was done for a short duration in an institution, so it may not reflect the actual scenario of the community. However, this can provide a platform for comparison with other centres and at the national level and aid in formulating plans and policies for meeting up with the WHO guidelines for cesarean section.

## CONFLICT OF INTEREST

None

## SOURCES OF FUNDING

None

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