

## Analysis of Caesarean Delivery at Tertiary Care Hospital Using the Robson's Ten Group Classification System (RTGCS)

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### Abstract

**Introduction:** Increase in caesarean section rates up to 10-15% at the population level are associated with decreases in maternal, neonatal and infant mortality. Above this level, increasing the rate of caesarean section is no longer associated with reduced mortality. WHO proposes the Robson's classification system as a global standard for assessing, monitoring and comparing caesarean section rates within healthcare facilities. **Aims and Objectives:** Aim of the study was to know the caesarean section rate in our institution and to evaluate the distribution of caesarean deliveries according to Robson's Ten Group Classification System. **Material and Methods:** A prospective and observational study was conducted in the department of Obstetrics and Gynecology at GMC and Rajindra Hospital, Patiala. The study included all the women delivered by caesarean section from the period January 2016 to December 2016. The result obtained was analyzed to see and compare the caesarean section rate for the various contributing groups. **Results:** Caesarean delivery rate was found to be 40.49%. Maximum number of caesarean deliveries were contributed by Group 5 i.e. 26.51% followed by Group 10 (21.76%), Group 1 (19.87%) and Group 6 (6.78%). The main indication for caesarean delivery at our institution was repeat caesarean delivery (36.29%) followed by fetal distress (26.71%). **Conclusion:** Major contributing groups, Group 5, Group 10, Group 1 and Group 6 needs to be targeted to bring down the caesarean rate.

**Keywords:** Caesarean delivery, Robson classification, nulliparous, multiparous, singleton, cephalic.

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### INTRODUCTION

The caesarean delivery rate has been growing rapidly in many countries. The increase has been a global phenomenon and concern has been expressed at the growing rate of caesarean section in some countries and others referring it as an emerging "global epidemic" [1].

According to NFHS-4 2015-16, caesarean rate in India is reported to be 17.2% (28.3% in urban population and 12.9% in rural population) [2]. Based on the WHO systematic review, increase in caesarean section rates up to 10-15% at the population level is associated with decreases in maternal, neonatal and infant mortality. Above this level, increasing the rate of

caesarean section is no longer associated with reduced mortality [3].

Better understanding of caesarean section rates, their consequences and their benefits will improve care, and enable learning between delivery units nationally and internationally. Professionals need to monitor the quality of their practice continuously in a standardized way to ensure that women can make the right choice. Dr Michael Robson in 2001, proposed a 10-group classification system (also k.a. Robson classification), to classify caesarean deliveries. The system stratifies women according to their obstetric characteristics, thereby allowing a comparison of caesarean section rates with fewer confounding factors [4]. In 2011, WHO conducted a systematic review of systems used to classify caesarean section, and

concluded that the Robson classification is the most appropriate system to fulfill current international and local needs [5].

The system classifies all women into one of 10 categories that are mutually exclusive and, as a set, totally comprehensive. The categories are based on five basic obstetric characteristics that are routinely collected in all maternity units. [3]

- Parity
- Onset of Labour
- Gestational Age
- Foetal Presentation and *f*
- Number of Foetuses

The system classifies all women into one of 10 categories. [3, 6]

### ROBSON TEN GROUP CLASSIFICATION SYSTEM (RTGCS)

1. Nulliparous, singleton, cephalic,  $\geq 37$  weeks gestation, in spontaneous labour
2. Nulliparous, singleton, cephalic,  $\geq 37$  weeks gestation, induced labour or caesarean section before labour.
  - a. Nulliparous, singleton, cephalic,  $\geq 37$  weeks gestation, induced labour.
  - b. Nulliparous, singleton, cephalic,  $\geq 37$  weeks gestation, caesarean section before labour.
3. Multiparous (excluding previous caesarean section), singleton, cephalic,  $\geq 37$  weeks gestation, in spontaneous labour.
4. Multiparous without a previous uterine scar, with singleton, cephalic pregnancy,  $\geq 37$  weeks gestation, induced or caesarean section before labour.
  - a. Multiparous without a previous uterine scar, with singleton, cephalic pregnancy,  $\geq 37$  weeks gestation, induced labour.
  - b. Multiparous without a previous uterine scar, with singleton, cephalic pregnancy,  $\geq 37$  weeks gestation, caesarean section before labour.

5. Previous caesarean section, singleton, cephalic,  $\geq 37$  weeks gestation.
6. All nulliparous with a single breech.
7. All multiparous with a single breech (including previous caesarean section).
8. All multiple pregnancies (including previous caesarean section).
9. All women with a single pregnancy in transverse or oblique lie (including those with previous caesarean section).
10. All singleton, cephalic,  $< 37$  weeks gestation pregnancies (including previous caesarean section)

### MATERIAL AND METHODS

A prospective and observational study was conducted in the department of Obstetrics and Gynecology at Government Medical College and Rajindra Hospital, Patiala from the period January 2016 to December 2016. All women undergoing caesarean section were included in the study and a predesigned proforma was filled based on relevant information. All caesarean section which were done at our institute during the period of study were included and all the vaginal deliveries and caesarean sections done outside and referred for any post operative complication were excluded. The distribution of cases was seen according to Robson's Ten Group Classification System as described. The result obtained were analyzed to see and compare the caesarean section rate for the various contributing groups and were applied for providing better quality care at our hospital

### RESULTS

There were total 3791 deliveries during the study period out of which 1535 were caesarean deliveries and 2256 delivered vaginally. Caesarean delivery rate was found to be 40.49 %. Majority (91.92%) of the caesarean deliveries were done as an emergency as our institute is a tertiary care institute and only 8.08% of caesarean deliveries were done as elective surgery (Fig-1).

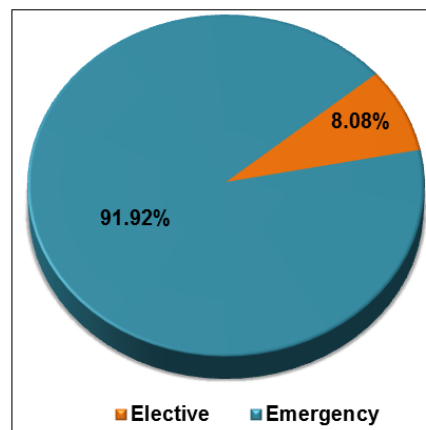


Fig-1: Distribution of subjects according to elective/emergency caesarean delivery

Mean age in the study was found to be 24.38±3.19 years. The number of booked cases in our study were only 12.83% and majority of cases were

unbooked (87.17%) and were referred from nearby and far off places to our tertiary care hospital (Fig-2).

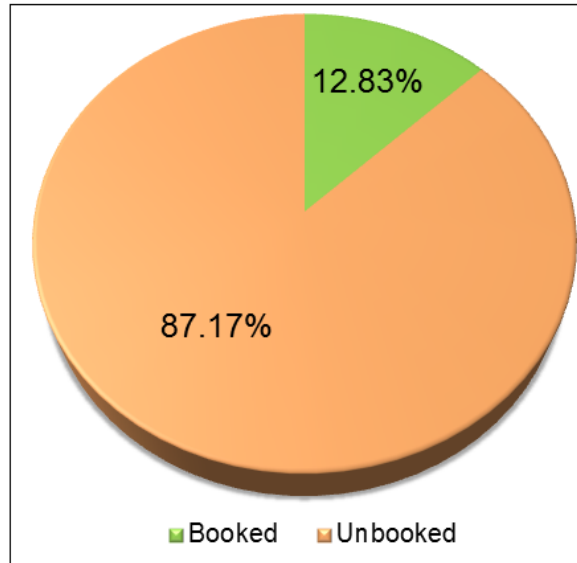


Fig-2: Distribution of subjects according to booked/unbooked status

Mean period of gestation came out to be is 37.44±2.81 weeks. 72.90% subjects underwent caesarean delivery at term i.e. ≥37 weeks and preterm (<37 weeks) caesarean deliveries were 27.10% and these were done in view of maternal or fetal indications (preeclampsia/ eclampsia, abruptio placentae, PROM with failed induction etc). 97.72% of subjects were having singleton pregnancy and 2.28% subjects were

having multifetal pregnancy. 87.49% fetuses presented as cephalic at the time of caesarean followed by breech presentation (10.23%), transverse lie (2.02%), and oblique lie (0.26%). 43.78% subjects were primigravidae and 56.22% subjects were multigravidae at the time of caesarean delivery in present study. The distribution of patients according to Robson's classification system is seen in Fig-3.

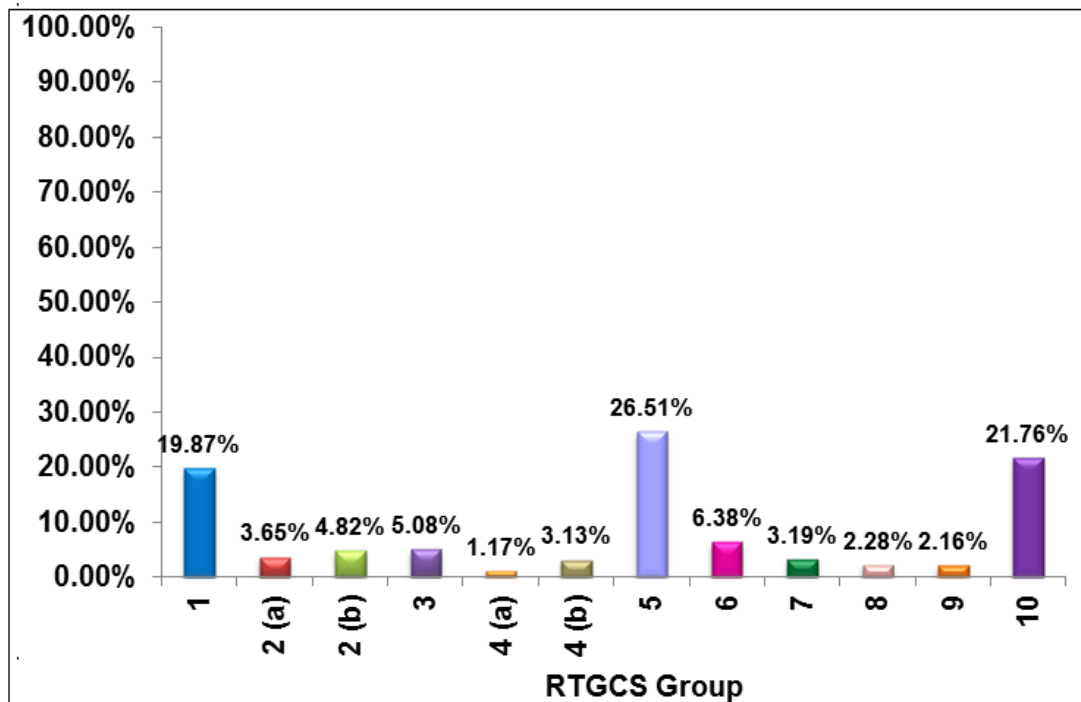


Fig-3: Showing distribution of subjects according to Robson's ten group classification system

Maximum number of caesarean deliveries was contributed by Group 5 i.e. 26.51% which consisted of term pregnancies with previous section and cephalic presentation. The indications seen were previous LSCS with short interpregnancy interval, scar tenderness, fetal distress, recurrent indications such as CPD, and previous two or three LSCS.

Next major contributor to the caesarean delivery rate was Group 10 (21.76%). Here the main reasons were severe preeclampsia/eclampsia with unfavorable Bishop Score or failed induction. Other indications included massive antepartum hemorrhage, FGR and severe oligohydramnios.

Group 1 also contributed substantially (19.87%), where the main indication became fetal distress with meconium stained liquor. Ours being a tertiary care institute, subjects were referred from periphery after mismanaged labour or failed induction.

The other contributing groups were Group 6 (6.38%) and 7 (3.19%), which consisted of breech presentation with or without prior caesarean delivery. In our institution these cases are mostly taken up for caesarean section.

Group 3 contributed with 5.08% and included multigravidae with term pregnancy and in spontaneous labour and the indication for caesarean delivery in most of these cases was fetal distress, CPD, NPOL etc.

Group 2 (b) contributed, 4.82% of the subjects. These are the one having associated antenatal complications such as placenta previa, or deranged color Doppler etc.

The contribution of Group 2 (a) was 3.65% and main indication for caesarean delivery was fetal distress, NPOL or failed induction.

Group 4 (b) contributed by 3.13% and the indications for section were associated antenatal complications such as placenta previa, severe FGR, deranged color Doppler etc.

Group 8, which represents the group having multifetal pregnancy, made a contribution of 2.28% to the total caesarean delivery rate. Usual indication for caesarean delivery in this group was first fetus having non cephalic presentation or twin pregnancy with previous caesarean delivery.

Group 9 which comprise all subjects having abnormal presentation (transverse or oblique lie), made a contribution of 2.16%.

Group 4 (a) includes multigravidae, at term who were having cephalic presentation and were induced for some reasons and developed fetal distress or had NPOL or failed induction and then taken up for caesarean section. In our study this group made a contribution of 1.17%. These usually were the cases of preeclampsia/eclampsia.

**Table-1: Contribution of Robsons Ten Group Classification System (RTGCS) to total number of Caesarean Delivery**

RTGCS Group	No. of Subjects (n=1535)	%age contribution of each RTGCS Group in caesarean deliveries	%age contribution of each RTGCS Group in total no of deliveries (n=3791)
1	305	19.87%	8.04%
2a	56	3.65%	1.48%
2b	74	4.82%	1.95%
3	78	5.08%	2.06%
4a	18	1.17%	0.47%
4b	48	3.13%	1.27%
5	407	26.51%	10.74%
6	98	6.38%	2.58%
7	49	3.91%	1.29%
8	35	2.28%	0.92%
9	33	2.16%	0.87%
10	334	21.76%	8.81%

As shown in Table-1, highest contribution to caesarean delivery rate was made by RTGCS Group 5 (10.74%) to total deliveries during the study period followed by Group 10 (8.81%), Group 1 (8.04%).

The indications for caesarean deliveries in our study are as shown in Fig-4. The main indication for caesarean delivery at our institution was repeat caesarean delivery (36.29%) followed by fetal distress (26.71%).

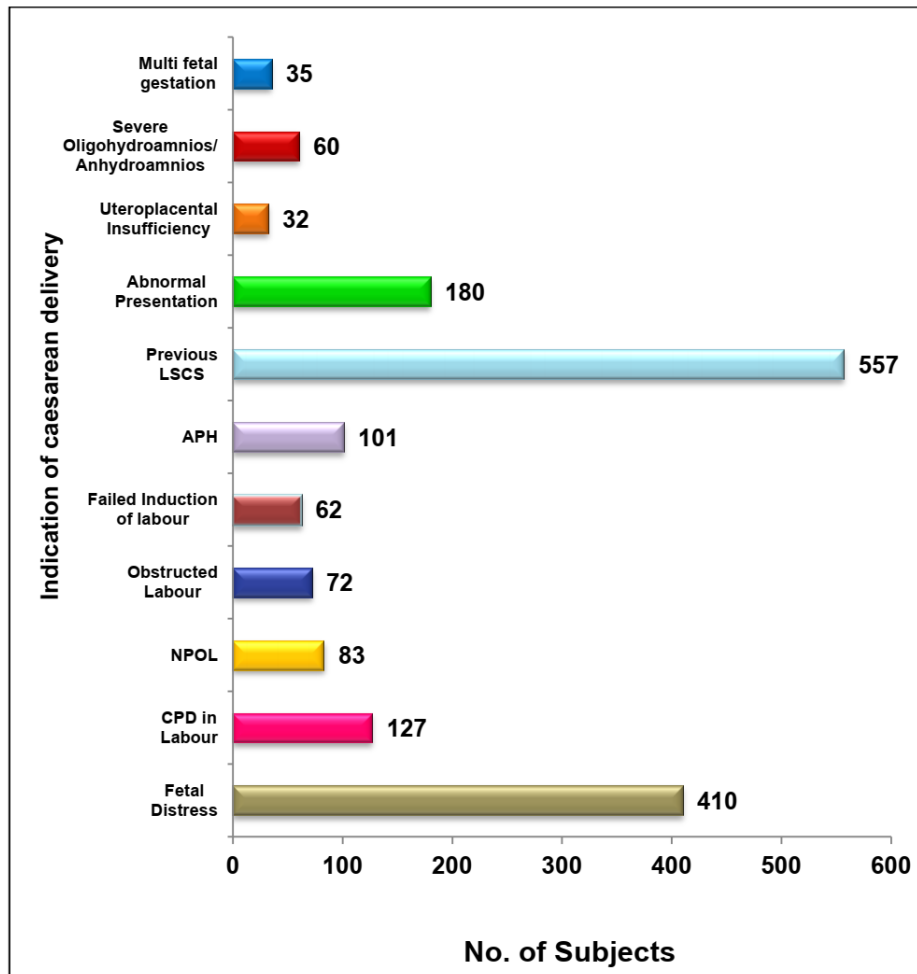


Fig-4: Showing indications for caesarean delivery (in many cases more than one indication of caesarean delivery was present.)

**DISCUSSION**

WHO officially withdrew its statement regarding optimum rate of 15% in June 2010. Their official statement read, every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate. [3] Goals for achieving an optimal caesarean delivery rate should be based on maximizing the best possible maternal and neonatal outcomes taking into account available medical and health resources and maternal preferences. This opinion is based on the idea that if left unchallenged, optimal caesarean delivery rates will vary over time and across different populations according to

individual and societal circumstances. In present study the rate of caesarean delivery at our institute was found to be 40.49% which is quiet high. Our institute is a tertiary care referral center, draining a wide area and cases are being referred here as complicated high risk cases.

When we compared our study with that of other authors to see the contribution of various groups to overall deliveries using Robson ten group classification system at different institutions, we observed that in most of the studies Group 5 and 1 were major contributors (Table-2).

Table-2: RTGCS and its contribution to overall deliveries

Author and year of study	RTGCS Group									
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)	10 (%)
Singh and Channawar (2009) [7]	10	2.2	1.6	0.5	8.2	0.9	0.3	0.4	0.6	1.4
Costa et al., (2010) [8]	5.7	4.8	5.6	3.7	14.9	1.3	1.9	1.1	0.6	3.7
Kazmi et al., (2012) [9]	3.77	1.84	1.29	1.29	6.79	1.17	1.45	1.02	.19	1.49
Benipal et al., (2014) [10]	6.28	1.64	3.09	0.29	5.26	1.75	1.74	0.65	0.27	0.89
Prameela et al., (2015) [11]	5.05	4.47	3.2	2.27	8.48	1.05	0.59	0.12	0.22	0.33
Bama et al., (2016) [12]	12.7	15.4	0.2	9.1	12.2	1.2	0.1	0.2	0.3	3.2
Ray et al., (2017) [13]	1.52	4.93	0.73	1.34	8.29	2.43	1.21	3.78	1.21	3.41
Present Study (2017)	8.04	3.43	2.06	1.74	10.74	2.59	1.29	0.92	0.87	8.81

To bring down the rate the major contributing groups Group 5, Group 10, Group 1 and Group 6 needs to be targeted. Best way to reduce the overall CS rate is by preventing the primary caesarean section and select subjects very carefully for caesarean delivery. Traditionally Group 1 is a low risk group but caution should be made as increase in contribution by this group will lead to rise in contribution by Group 5 in future. Thus it is necessary to manage labour efficiently to reduce CS rate in this particular group. Establishing the labour appropriately by achieving good uterine contractions, proper usage of oxytocin, diagnosis & treatment of dystocia by proper use of partograph and strict fetal monitoring will help reduce rate in this group. In our center and most of other centers the means to detect fetal hypoxia are amniotic fluid aspect and fetal heart rate distress assessed clinically. This at times leads to over diagnosis of fetal hypoxia. To specifically target Group 5, we should practice and promote TOLAC in all carefully selected cases. Group 10 contributed substantially in present study and to decrease section in this group we need to look carefully at improving antenatal surveillance and counseling, early detection of high risk cases, better intra partum monitoring. Then though tertiary referral centers are expected to have elevated rate of preterm delivery as they are dealing with high risk pregnancies but a change can be brought about. For addressing Group 6, we can go for external cephalic version and assisted breech delivery in carefully selected cases.

## CONCLUSION

Robsons ten group classification system is easy to use. This classification system can provide critical assessment of care at delivery and can be used to change practice if used on a continuous basis. Each maternity unit can use this system to compare its rates with other maternity units at similar level as caesarean rates will definitely be more at a tertiary care center. We also observed some limitations of RTGCS during the course of study as:

- It does not tell us the specific indications e.g. placenta previa, fetal distress, CPD
- It gives no clue of associated medical disorders
- It does not tell about the indications for induction
- No assessment could be done regarding the degrees of prematurity
- In Group 5 which was the largest group in our study also, we can't differentiate whether elective repeat CS was done or TOLAC was tried and failed

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