

# Classification of Cesarean Sections in Small Private Maternity Hospitals as assessed by the Modified Robson Criteria (Canada)

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## ABSTRACT

**Aims:** To assess 15 years' cesarean section data from small private maternity hospitals by the Modified Robson Criteria (Canada). To identify the groups that need to be focused to reduce the cesarean section rate.

**Materials and methods:** Classification of 7,342 cesarean section cases carried out over a period of 15 years from different small private maternity hospitals run by a single obstetrician was done using the Modified Robson Criteria (Canada). The contribution made by each group and subgroup was studied.

**Results:** About 50% of cesarean section cases occur in groups 1 and 2. The second largest group was group 5 (28.61%). A little over three-fourth of the contribution (78.12%) was made by nulliparous and previous cesarean section cases done at term with cephalic presentation. About one-tenth of the total cases belonged to the group of multiparous women.

**Conclusion:** The Modified Robson Criteria give us more clarity and allow perfect targeting. It is necessary to target group 1, 2B, and 5C to bring down the cesarean section rate in private maternity hospitals as the total of these subgroups makes it to little over 60%.

**Keywords:** Cesarean section, Classification, Private hospitals, The Modified Robson Criteria.

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## INTRODUCTION

Changing trends of cesarean section and efforts to reduce the incidence of cesarean section are the common topics of many academic activities and scientific journals all over the world. Despite the brainstorming exchange of views over last few decades, the situation has reached probably to an enigmatic level. Worries over such increases have led the World Health Organization to advise that cesarean section rates should not be more than 15%.<sup>1</sup>

The classification of cesarean sections forms the basis of efforts to reduce the incidence of cesarean sections. These efforts can go astray unless we classify the cesarean sections in a suitable way. The setup, whether public hospital or private maternity homes in which the cesarean sections are done, is one of the important factors affecting the incidence. The literature shows that the incidence of cesarean section is more in private institutions than in public institutions.

In an Indian study,<sup>2</sup> cesarean section in urban public hospitals averaged to 13.88% (1.37–28.50) and that in urban private hospitals was 25.97% (2.48–50.08). In Brazil, cesarean section rate in public institutes was low (18–19%) compared to that in private hospitals (84.4%).<sup>3</sup> In Iraq, the percentage of cesarean section in the public sector was 24.5% during 2009, increasing to 25.8% during 2010, whereas in the private sector, the percentage was much higher, reaching 75.8 and 75.9% during 2009 and 2010 respectively.<sup>4</sup> In private practice, changes in indications are mainly due to litigation fear and better neonatal facilities. The experience of one mishap changes the obstetrician's attitude, and for all say meconium stained liquor cases, he or she then readily resorts to cesarean section.<sup>5</sup> A cesarean delivery requires 2 hours of a physician's time and can be scheduled and planned. A vaginal delivery, on the contrary, is unpredictable and requires a physician's presence for far longer. In our hurried culture, patience is often limited on the part of patients and providers. Attention to staffing, systems approaches, and consideration of the human factor in the mode of delivery are important additional perspectives that should be considered in trying to solve this complex problem.<sup>6</sup>

In an attempt to find a solution to this complex problem, the first step would be to classify cesarean section cases, which will help us focus on a particular group, which in turn will guide us to take steps in

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decreasing the incidence. In 2001 Dr. Michael Robson of the National Maternity Hospital, Dublin, proposed the new Ten Group Classification System (TGCS). These 10 groups are mutually exclusive, simple to use and read, yet include the total sample. The Robson 10-group way of classification (Table 1) facilitates the comparative analysis of cesarean sections between hospitals/centers nationally, internationally, and globally.

To plan strategies to reduce cesarean section rates, the need of analyzing cesarean sections by Robson’s TGCS has been impressed in studies from India (Raipur)<sup>7</sup> and abroad (Muscat and Singapore).<sup>8,9</sup> A study from tertiary care hospital in Muscat, Oman,<sup>8</sup> concludes that efforts to reduce the overall cesarean section rate should focus on reducing the primary section rate even though the largest contribution in the study was of the previous cesarean section group.

The modification in the original classification suggested by M. Robson was approved by the Executive and Council of Society of Obstetricians and Gynecologists of Canada in 2012. The Modified Robson Criteria (Canada)<sup>10</sup> maintain

the same basic concept of classification of cesarean section as suggested in the original Robson criteria. The original TGCS divides the indications in 10 groups, and the modified criteria make it to in fact 24 groups when we consider all the subgroups. The modification is at the level of adding subgroups so as to provide more clarity (Table 1). It helps to focus on a particular group in an effort to reduce the cesarean section rate. There is hardly any study found in the literature that has analyzed cesarean section according to the Modified Robson Criteria (Canada).

While classifying cesarean sections, M. Robson suggests that four distinct clinical entities will emerge in the future.<sup>11</sup> The purpose of squeezing the 10 groups into only 4 groups is to further narrow the focus in an effort to reduce cesarean section rate. After identifying a group that needs to be focused to reduce the cesarean section rate, it is important to consider other parameters of perinatal care. This should include perinatal and maternal morbidity and mortality as well as the assessment of maternal satisfaction.<sup>12</sup>

**Table 1:** Description of original Robson Criteria and the Modified Robson Criteria

Groups	M. Robson Ten Group	The Modified Robson
1	Nulliparous women with single cephalic pregnancy, at ≥37 weeks’ gestation in spontaneous labor	1 Nullipara, singleton cephalic, ≥37 weeks, spontaneous labor
2	Nulliparous women with single cephalic pregnancy, ≥37 weeks’ gestation who either had labor induced or were delivered by cesarean section before labor	2 Nullipara, singleton cephalic, ≥37 weeks A: Induced B: Cesarean section before labor
3	Multiparous women, without a previous uterine scar with single cephalic pregnancy, ≥37 weeks’ gestation in spontaneous labor	3 Multipara, singleton cephalic, ≥37 weeks, spontaneous labor
4	Multiparous women, without a previous uterine scar with single cephalic pregnancy, ≥37 weeks’ gestation who either had labor induced or were delivered by cesarean section before labor	4 Multipara, singleton cephalic, ≥37 weeks A: Induced B: Cesarean section before labor
5	All multiparous women, with at least one previous uterine scar and a single cephalic pregnancy, ≥37 weeks’ gestation	5 Previous Cesarean section, singleton cephalic, ≥37 weeks A: Spontaneous labor B: Induced labor C: Cesarean section before labor
6	All nulliparous women with a single breech pregnancy	6 All nulliparous breeches A: Spontaneous labor B: Induced labor C: Cesarean section before labor
7	All multiparous women with a single breech pregnancy, including women with previous uterine scars	7 All multiparous breeches (including previous Cesarean section) A: Spontaneous labor B: Induced Labor C: Cesarean section before labor
8	All women with multiple pregnancies, including women with previous uterine scars	8 All multiple pregnancies (including previous cesarean section) A: Spontaneous labor B: Induced labor C: Cesarean section before labor
9	All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars	9 All abnormal lies (including previous cesarean section but excluding breech) A: Spontaneous labor B: Induced labor C: Cesarean section before labor
10	All women with single cephalic pregnancy at less than or equal to 36 weeks’ gestation, including women with previous scars	10 All singleton cephalic, ≤ 36 weeks (including previous Cesarean section) A: Spontaneous labor B: Induced labor C: Cesarean section before labor

Most of the articles in the literature review are from institutions (teaching) and from big corporate hospitals. The literature lacks a report of collected data from small private hospitals run by only one obstetrician (usually the owner). Cesarean sections from such hospitals form a major bulk in towns and small cities. The present study has this as a unique feature.

The present study has been carried out in a district located in the west zone of India. This place provides maternity services to the society through three public institutions and many small maternity hospitals in the private sector. The annual average of deliveries in public institutions and private hospitals in the last 4 years was similar, 11,799 (public institutions average for 4 years) and 11,785 (private hospitals average for 4 years) respectively. The incidence of cesarean sections in public institutes was 22.46% and that in the private sector was 36.47% (14% more in private sector).

The aim of the present study is to assess 15 years' cesarean sections data from small private maternity hospitals by the Modified Robson Criteria (Canada). This study also aims to identify the groups to be focused to reduce the cesarean section rate.

## MATERIALS AND METHODS

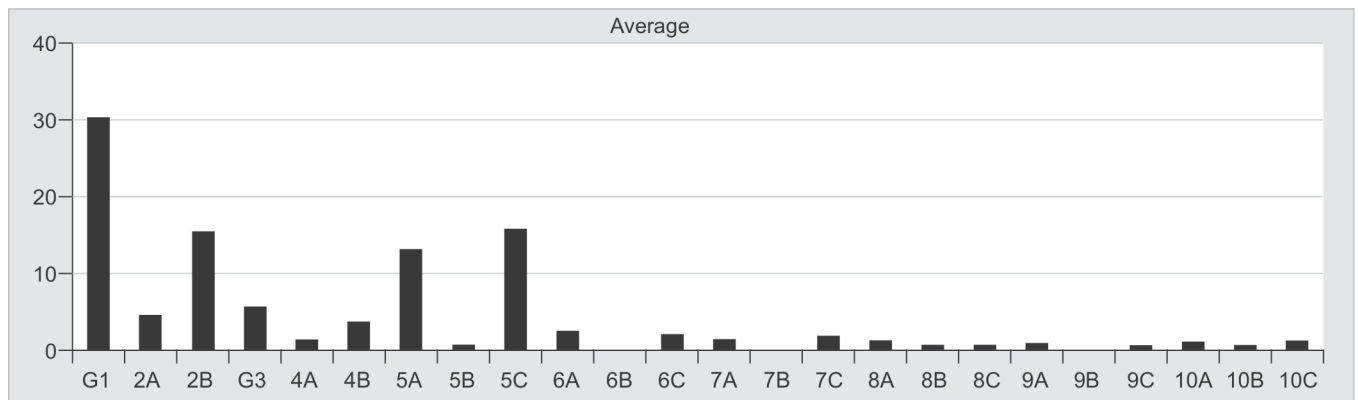
It is a retrospective observational study of 7,342 cesarean section cases carried out in different small private maternity hospitals over a period of 15 years, from July 24, 1999, to July 23, 2014. The indication of each cesarean section was noted down immediately after the procedure by the author himself in a proforma in which many other clinical parameters were also included. The author is a visiting (on call) obstetrician. The majority of his participation in cesarean section cases was in 12 different small maternity hospitals. He participated in all the 7,342 cases included in the study. These cases were grouped according to the Modified Robson Criteria (Canada) and the data were analyzed. Table 1 describes both the Robson 10-group classification system and the Modified Robson Criteria.

## RESULTS

The 7,342 cesarean sections done over a period of 15 years were grouped as suggested by the Modified Robson Criteria (Canada) (Table 2, Graph 1).

**Table 2:** Contribution made by each group

Groups	The Modified Robson Criteria	No. of cases	%
1	Nullipara, singleton cephalic, $\geq 37$ weeks, spontaneous labor	2,198	29.93
2	Nullipara, singleton cephalic, $\geq 37$ weeks, 2A Induced	316	4.30
	2B Cesarean section before labor	1,122	15.28
3	Multipara, singleton cephalic, $\geq 37$ weeks, spontaneous labor	398	5.42
4	Multipara, singleton cephalic, $\geq 37$ weeks, 4A Induced	86	1.17
	4B Cesarean section before labor	260	3.54
5	Previous Cesarean section, singleton cephalic, $\geq 37$ weeks		
	5A Spontaneous labor	947	12.89
	5B Induced labor	11	0.14
	5C Cesarean section before labor	1,144	15.58
6	All nulliparous breeches		
	6A Spontaneous labor	170	2.31
	6B Induced labor	00	00
	6C Cesarean section before labor	136	0.85
7	All multiparous breeches (including previous cesarean section)		
	7A Spontaneous labor	108	1.14
	7B Induced labor	00	00
	7C Cesarean section before labor	123	1.72
8	All multiple pregnancies (including previous Cesarean section)		
	8A Spontaneous labor	76	1.03
	8B Induced labor	1	0.01
	8C Cesarean section before labor	34	0.46
9	All abnormal lies (including previous Cesarean section but excluding breech)		
	A Spontaneous labor	48	0.65
	B Induced labor	00	00
	C Cesarean section before labor	16	0.21
10	All singleton cephalic, $\leq 36$ weeks (including previous cesarean section)		
	A Spontaneous labor	66	0.89
	B Induced labor	9	0.12
	C Cesarean section before labor	73	0.99
	Total	7,342	



**Graph 1:** The relative contribution of each group as assessed by the Modified Robson Criteria

**Table 3:** Analysis of all nulliparous cases (groups 1 and 2)

Sl. no.	Groups	Number of cases	%
1	Nullipara, singleton cephalic, > 37 weeks (spontaneous labor)	2,198	29.93
2A	Nullipara, singleton cephalic, > 37 weeks (induced labor)	316	4.3
2B	Nullipara, singleton cephalic, > 37 weeks (cesarean section before labor)	1,122	15.28
Total of all nulliparous		3,636	49.51

**Table 4:** Analysis of previous cesarean section cases (group 5)

Groups	Description	No. of cases	%
5A	Previous cesarean section, singleton cephalic, > 37 weeks (spontaneous labor)	947	12.89
5B	Previous cesarean section, singleton cephalic, > 37 weeks (induced labor)	11	0.14
5C	Previous cesarean section, singleton cephalic, > 37 weeks (cesarean section before labor)	1,144	15.58
Total		2,102	28.61

**Table 5:** Analysis of multiparous cases (no previous cesarean section)

Groups	Description	No. of cases	%
3	Multipara, singleton cephalic, > 37 weeks (spontaneous labor)	398	5.42
4A	Multipara, singleton cephalic, > 37 weeks (induced)	86	1.17
4B	Multipara, singleton cephalic, > 37 weeks (cesarean section before labor)	260	3.54
Total		744	10.13

It was found that the majority of the cases (29.93%) belonged to group 1 (Table 3). This group includes nulliparous women. Group 2 of this classification also includes nulliparous women, which contributed 19.58%. Among this, a major share was of group 2B (15.28%). All the nulliparous women put together amount to almost half the total number of cases studied (49.51%). Briefly put, 50% of cesarean sections occur in primigravidae with singleton vertex presentation pregnancy at term, and the remaining 50% cases are distributed in the other eight groups.

The second largest contribution (28.61%) was of group 5 (Table 4). This group includes all repeat cesarean section cases having singleton cephalic presentation at term. The percentage of cases in group 5A was 12.89% and that in 5C was 15.58%.

A little over three-fourth of the contribution (78.12%) was made by nulliparous and previous cesarean section cases done at term with cephalic presentation. In other words, groups 1, 2, and 5 made it to more than 75% cases.

Groups 3 and 4 give us an idea about the status of multiparous women. In our study it was found that 5.42% cases contributed to group 3 and 4.71% cases to group 4. About one-tenth of the total cases we studied belonged to the group of multiparous women (Table 5).

The contribution of breech presentation (groups 6 and 7) in our study was 7%. The total number of cases of multiple pregnancies (groups 8A, B, and C combined)

in this series was only 1.5%. The contribution of group 9 cases was less than 1%. All the cases of preterm labor having cephalic presentation put together in group 10 contributed only 2%.

## DISCUSSION

The 10-group classification as suggested by M. Robson is currently being used internationally, with a purpose that these different groups of women could be used to give an insight into the makeup of a cesarean section rate. The Modified Robson Criteria (Canada) includes the sub-classification of women having cesarean section after spontaneous onset of labor, after induction of labor, and before labor. It is important to remember that, although we are discussing an analysis of cesarean sections, we



should not interpret the comparisons in isolation from other parameters of perinatal care. This should include perinatal and maternal morbidity and mortality as well as assessment of maternal satisfaction.<sup>12</sup>

In the present study, the largest contribution (29.93%) is made by group 1 cases (nulliparous women in spontaneous labor at term with cephalic presentation). When we add groups 1 and 2 we reach almost a half-way mark (49.51%) of the total cases studied. The results of TGCS from a teaching institute at Raipur<sup>7</sup> show that the largest contribution was by group 1 cases, which are similar to our observations. In our study from small private maternity hospitals, the contribution of group 1 is 29.93% as against 38.22% from this teaching hospital. This means that nulliparas in spontaneous labor with cephalic presentation are readily taken for cesarean section at this teaching hospital when compared to small private hospitals. But the contribution of the same group from a study of a tertiary hospital in Muscat<sup>8</sup> is less by 10% (18.53 vs 29.93%) as compared to our study (Table 6). This may suggest that the labor management at this center is more effective in reducing cesarean section from group 1.

The contribution of group 2 cases in our study is almost double that of Raipur and Muscat studies. This suggests that in small private hospitals, cesarean section is more often resorted in nulliparas who are not in labor. However, the contribution to this group from our study and the Singapore study is almost the same.

As regards the largest group, the observations of our and Raipur study are similar (group 1 as the largest), but differ from that of Muscat and Singapore studies,<sup>9</sup> where group 5 is the largest. This conveys a message that in Singapore and Muscat institutes, women are given more opportunity to deliver vaginally, thus keeping groups 1 and 2 smaller than group 5. At the same time, group 5 being the largest in these two institutes, we can say that the uterus once scarred is given less opportunity to deliver vaginally (VBAC). The TGCS gives us an opportunity

for such comparisons, to find the reasons behind such wide variations and to address such differences, in turn to provide a solution to reduce the cesarean section rate.

However, an assessment by the Modified Robson Criteria (Canada) has more advantage as it provides distinct subgroups, making our approach more focused. For example, the percentage of cesarean section cases done before labor (group 2B) was 15.28% in our study. It was much more than cases of cesarean section in which labor was induced (group 2A), the contribution being only 4.30% (Table 3). The contribution of group 5C (previous section, before labor) was marginally more than that of group 5A (previous section, spontaneous labor) in our study. The percentage of 5B (previous section, induced labor) group was trivial (Table 4). It is not possible to know this type of distinction if we use TGCS. Therefore, it is suggested that all centers assess the data by using the Modified Robson Criteria (Canada).

Looking at the future, clinical entity 1 requires more attention (Table 7). It includes women having unscarred uterus (nulliparous). Therefore, it can be suggested that in some cases in which cesarean section is to be done for relative indication, the decision can be revised and alternative ways like induction of labor for group 2B and adequate trial of labor for group 2A cases can be considered. Along similar lines, VBAC policy can be adopted in some selected cases of clinical entity 3 (previous cesarean section cases). The group of multiparous women having unscarred uterus (clinical entity 2) makes its contribution a little over 10%. The possibility of cesarean section in this group is expected to be low. Therefore, this group also needs to be focused. The contribution of cesarean section cases done for obstetric abnormalities (clinical entity 4) in the present study is little over 10%. The possibility of undertaking cesarean section in such clinical situation is more. The efforts taken to reduce the cesarean section rate for this clinical entity in the future are less likely to be fruitful.

While classifying cesarean sections according to either the modified way or the original Robson criteria, the indication for cesarean section (maternal, fetal, or fetomaternal) has no place. In fact, it only denotes the status of a woman at the time of cesarean section and not the indication. It does not provide us any information regarding the exact reason for cesarean section. There

**Table 6:** Contribution of each group according to the original Robson Criteria<sup>a</sup>

Groups	Our study <sup>b</sup>	Raipur (India)	Muscat (Oman)
1	29.93	38.22	18.53
2	19.58	8.26	9.07
3	5.42	6.04	6.37
4	4.71	1.94	6.37
5	28.61	31.47	33.39
6	4.16	3.50	5.79
7	2.86	1.02	7.14
8	1.50	1.61	5.01
9	0.86	2.42	0.96
10	2.00	5.45	7.33

<sup>a</sup>Figures in percentage; <sup>b</sup>For comparison purpose, our data were converted into original Robson Criteria

**Table 7:** Four distinct clinical entities

Clinical entity	Groups	No. of cases	%
1	1,2	3,636	49.51
2	3,4	744	10.13
3	5	2,102	28.61
4	6,7,8,9,10	860	11.71
	Total	7,342	

cannot be any controversy for cesarean section done for absolute indications, but when it is done for relative indications (inclusive of nonobstetric indications), the decision needs to be revised. Unless we come to know exactly in which situation (considering clinical and nonclinical factors) a particular cesarean section was done, focusing only on the basis of Robson criteria will rather be an incomplete approach. We need to think about the “status” along with the obstetric and nonobstetric indications while undertaking the mission to reduce cesarean section rate. However, to know the “status” by either TGCS or the modified way is the fundamental step in the effort to reduce the cesarean section rate.

## CONCLUSION

The ten group classification system (TGCS) as suggested by Robson is a comprehensive, all-inclusive, and globally well accepted way of classifying the cesarean sections. The Modified Robson Criteria give us more clarity and probably allow perfect targeting. The three subgroups based on spontaneous labor, induced labor, and cesarean section before the onset of labor provide a better understanding of the whole situation. The incidence of cesarean section in nulliparous women is little over one and half times as compared to the previous section group. As primary cesarean section paves the way to repeat cesarean, we need to think and rethink before we carry out cesarean section in nulliparous women. There is enough room to state that the decision of cesarean section done before labor in multiparous women with unscarred uterus needs to be revised.

This study identifies groups 1, 2B, and 5C as the main contributors to the overall incidence of cesarean section as the total of these subgroups makes it to little over 60%. Therefore, it is necessary to take efforts to reduce both primary and repeat cesarean sections in small private maternity homes run by a single obstetrician.

## CLINICAL SIGNIFICANCE

The article identifies certain groups where strategies to reduce cesarean section rate in private sector can be targeted.

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## REFERENCES

1. World Health Organization. Cesarean sections as a proportion of all births. In: Monitoring emergency care: a hand book. Geneva, Switzerland; 2009. p. 25-30.
2. Roy Choudhary C. Cesarean births: Indian scenario. Paper presented at: Population Association of America 2008 Annual Meeting Program; 2008 Apr 17-19, Sheraton New Orleans.
3. Almeida SD, Bettiol H, Barbieri MA, Silva AA, Ribeiro VS. Significant differences in caesarean section rates between a private and a public hospital in Brazil. *Cad Saude Publica* 2008 Dec;24(12):2909-2918.
4. Al-Naimy MM, Yassin BAGh, AL-Kazzaz HHB. Comparison of rate of cesarean section between governmental and private hospitals in Baghdad city. *Iraqi Postgraduate Med J* 2013;12(2):288-295.
5. Doshi H, Tripathi J, Maheshwari S, Gupta A. Cesarean section-changing trends-a National survey. *J Obstet Gynecol India*. 2009 Mar/Apr;59(2):140-144.
6. Norton ME. Editorial comment. Safe prevention of the primary cesarean delivery. *Obstet Gynecol Survey* 2014 Jul;69(7):381-383.
7. Singh A, Channawar R. A recent way of evaluating cesarean birth. *J Obstet Gynecol India*. 2009 Nov/Dec;5(6):547-551.
8. Tahira K, Sarva SV, Sultana K. Analysis of cesarean section rate-according to Robson's 10 group classification. *Oman Med J* 2012 Sept;27(5):415-417.
9. Tan JK, Tan EL, Kanagalingan D, Tan LK. Rational dissection of a high institutional cesarean section rate: an analysis using the Robson Ten Group Classification System. *J Obstet Gynaecol Res* 2015 Apr;41(4):534-539.
10. Dan F, Debra S, Regina SK. Classification of cesarean sections in Canada: The Modified Robson Criteria. *J Obstet Gynaecol Can* 2012 Oct;34(10):976-979.
11. Robson M. Classification of caesarean section rates – Power-Point PPT Presentation. 2010 Oct 22: (73 screens). Available from: [http://www.Powershow/view4/50fc5b-ZjQ1Y/Classification\\_of\\_Caesarean\\_Section\\_Rates\\_powerpoint\\_ppt\\_presentation](http://www.Powershow/view4/50fc5b-ZjQ1Y/Classification_of_Caesarean_Section_Rates_powerpoint_ppt_presentation).
12. Robson M. Cesarean section: audit and analysis. In: Hillard T, editor. *The yearbook of obstetrics and gynaecology*, Vol. 12 (Part 2). London: RCOG Press; 2008. p. 238-249.