

# Analysis of Caesarean Section Rates According to Robson's Ten Group Classification System (RTGCS) at Bolan Medical Complex Hospital, Quetta

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## Abstract

**Objectives:** To analyze the Cesarean Section (CS) rate at Unit II, Bolan Medical Complex Hospital, Quetta, using the Robson Ten Group Classification System.

**Methodology:** The present cross-sectional observational study was carried out within the Department of Obstetrics and Gynecology, specifically Unit II, at Bolan Medical Complex Hospital, located in Quetta, spanning from April 1, 2021, to March 31, 2022. All female individuals who underwent delivery procedures within this specified timeframe were enrolled as participants. Data pertaining to various variables were meticulously collected utilizing the Robson's App, with subsequent extraction from the Robson's classification report table for comprehensive analysis. The overall CS rates, relative size of each group, contribution of each group to the overall CS rate, and CS rates within each group were calculated.

**Results:** A total of 7,570 women presented for labor and delivery during the one-year study period. Five patients were unclassified, and 46 patients were excluded due to uterine rupture, leaving 7,519 deliveries for analysis. The CS rate was found to be 15.99%. The major contributors to the overall CS rate were Group 5 (54.66%), Groups 3 (9.65%) and 1 (9.57%) combined comprised around 74% of all cases of CS. Group 5 had an 80.7% CS rate, while 65.14% of the women in subgroup 5.1 (prior CS) had repeat CS. A total of 335 intrauterine deaths occurred during the study period, with 92% (308) being antepartum deaths and 8% (27) being intrapartum deaths.

**Conclusion:** The Robson's Ten Group Classification System serves as a standard method for analyzing obstetric practice and auditing CS rates. Encouragement of labor trials after one cesarean section is necessary, as the majority of women in Group 5.1 underwent repeat CS.

**Key words:** Cesarean section, Robson's Ten Group Classification System, Vaginal delivery.

Cite this article as: Bibi S, Khan R, Javed S, Gul S, Gul M, Mengal G, Bakhsh FM. Analysis of Caesarean Section Rates According to Robson's Ten Group Classification System (RTGCS) at Bolan Medical Complex Hospital, Quetta. J Soc Obstet Gynaecol Pak. 2023; 13(4):393-397.

## Introduction

Over the past few decades, there has been a gradual increase in the number of Cesarean Section (CS) deliveries in the majority of countries; however, the reasons behind this trend remain largely unclear.<sup>1</sup> This rise in CS rates presents a significant problem for public health. The World Health Organization (WHO) has recommended that a CS rate higher than 10–15% is not acceptable for any country, as such high rates are not associated with any additional reduction in maternal and neonatal mortality and morbidity.<sup>2</sup>

Traditionally, at facility level, CS rates are monitored by using the overall percentage of deliveries by CS.<sup>1</sup> The

CS rates vary greatly amongst different institutions. Many factors can account for differences in CS rates among institutions. These include differences in the characteristics of obstetric population served, type of institution e.g. primary versus tertiary level and available resources. Obstetric practice and clinical management protocols can also be a reason for this variation.<sup>3</sup> As a result, facilities shouldn't use population-based CS rates as recommended targets. Systems that track the rates of cesarean sections at facilities should, in fact, take these variations into account. The focus should now be on whether or not CS rates are appropriate rather than

Authorship Contribution: <sup>1,4,6</sup>Substantial contributions to the conception or design of the work or the acquisition, <sup>3,5</sup> Drafting the work or revising it critically for important intellectual content, <sup>2</sup>Final approval of the version to be published. Active participation in methodology

Funding Source: none

Conflict of Interest: none

Received: Feb 11, 2023

Accepted: Nov 18, 2023

whether they are too high or too low.<sup>4</sup> Therefore, a standardized and globally recognized classification system is required in order to compare and track CS rates in a way that is trustworthy, insightful, and focused on taking action.<sup>4</sup> In a systematic review carried out by the WHO in 2011, 27 systems for classifying CS were identified; Robson's Ten Group Classification System (RTGCS) was found to be the most effective option.<sup>5</sup>

The Robson classification system categorizes all childbirths into ten distinct groups, each encompassing specific obstetric features. These criteria encompass various factors such as the commencement of labor, gestational age, parity, history of cesarean section (CS), fetal position, and the number of fetuses, as depicted in Table I.<sup>3</sup> (WHO. Robson Classification) Further analysis is performed on each of the three Robson groups in order to determine their relative sizes to the obstetric population, their contribution to the overall CS rate, and the CS rate within the group. The classification system is easy to use and makes it possible to audit and analyze CS rates because it is based on the individual woman's routinely documented obstetrics characteristics rather than depending on the CS indication. Applying the RTGCS effectively has a number of benefits. It makes it possible to determine which Robson groups contribute significantly to the total CS rate. This is an important step in the audit process because interventions that alter the CS rate in these target groups, even slightly, have the potential to alter the CS rate as a whole.<sup>6,7</sup> The system provides a standardized comparison method between institutions at a national, regional, or global level over time, and it is easily replicable within a given institution. 8. The Robson classification system is recommended by the World Health Organization (WHO) and the

International Federation of Gynaecology and Obstetrics (FIGO) as a global standard for evaluating, tracking, and comparing CS rates between institutions and across countries over time, irrespective of the complexity of the institutions. This is due to its benefits and ease of use.<sup>8,9</sup>

Worldwide, numerous obstetric units have successfully implemented the Robson Ten Group Classification System (RTGCS). While the use of this system for analyzing Cesarean section (CS) rates has been undertaken in various regions, no such study has been conducted in Baluchistan. Consequently, the precise contribution of different TGCS groups to the overall CS rate remains unknown. Thus, the objective of this study was to evaluate the CS rate at our institution and perform an analysis using the Robson Ten Group Classification System. This analysis aims to improve clinical procedures and enhance the quality of care provided in our medical facilities.

## Methodology

This cross-sectional study was carried out at gynaecology unit 2, Bolan Medical Complex Hospital Quetta. All women who gave birth between April 2021, to March 2022 were included in the study population. Laparotomies performed for uterine rupture and deliveries before viability were excluded. The fetus is considered viable after gestational age of 22 weeks and if gestational age is unknown then birth weight 500 g or more is taken as viability. The determination of gestational age relied on either the menstrual date or prenatal ultrasound conducted before the 22nd week of pregnancy. Data variables were collected using the Robeson's App, developed by the Government of Pakistan specifically for gathering data from government

**Table I: Robson's 10 group classification.**

Group No.	Group Description
1	Nulliparous, singleton, cephalic, $\geq 37$ weeks' gestation, in spontaneous labour
2	Nulliparous, singleton, cephalic, $\geq 37$ weeks' gestation, induced labour or CS before labour
2a	Labour induced
2b	Pre-labour CS
3	Multiparous (excluding previous CS), singleton, cephalic, $\geq 37$ weeks' gestation, in spontaneous labour
4	Multiparous without a previous CS, with singleton, cephalic pregnancy, $\geq 37$ weeks' gestation, induced or CS before labour
4a	Labour induced
4b	Pre-labour CS
5	Previous CS, singleton, cephalic, $\geq 37$ weeks' gestation
5.1	With one previous CS
5.2	With two or more previous CSs
6	All nulliparous with a single breech
7	All multiparous with a single breech (including previous CS)
8	All multiple pregnancies (including previous CS)
9	All women with a single pregnancy in a transverse or oblique lie (including those with previous CS)
10	All singleton, cephalic, $< 37$ weeks gestation pregnancies (including CS)

hospitals in the country. A range of pertinent obstetric details were inputted into the Robson App, which automatically categorized them into their respective groups. This information included previous obstetric history (parity and prior cesarean section), fetal presentation or lie (cephalic, breech, transverse, or oblique), number of fetuses (single or multiple), mode of delivery (vaginal or cesarean section), gestational age (term or preterm), and labor onset (spontaneous, induced, or cesarean section prior to labor). Subsequently, we extracted the Robson's classification report table from our one-year dataset via the Robson's App. Microsoft Excel 2013 was utilized for data analysis.

## Results

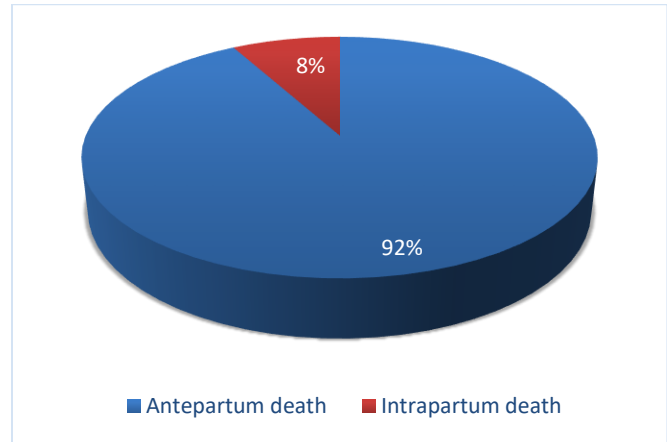
A total of 7570 women came in for labour and delivery during the course of a year. Five patients were unclassified and 46 patients were excluded due to uterine rupture. Thus, 7,519 deliveries in total were analyzed. The CS rate was 15.99%. (Table II)

Group 3 women accounted for 49.3% of all deliveries, making them the group with the largest contribution to the obstetric population. Group 1 and Group 5 were second and third major which accounted for 19.52% and 10.83% respectively. Group 4, which made up 6.12% of the obstetric population, was the fourth-largest group. (Table II)

Group 5 (54.66%), Group 3 (9.65%), and Group 1 (9.57%) were the main contributors to the total CS rate. Approximately 74% of all CS were contributed by these three groups. CS rate was 80.7% in group 5 on further

analyzing. In sub group 5.1 which is previous 1 CS), repeat CS done on 65.14% of women. Group 6 and group 7 together contributed 8.98% to overall CS while the CS rate within each group was 31.25% and 25.26% respectively. (Table II)

The total intrauterine deaths were 335 in the study period in which 308 (92%) were antepartum deaths and 27(8%) were intrapartum deaths. (Figure 1). Thus, the still birth rate was 44.5/1000 live births in which 3.7/1000 live births were intrapartum.



**Figure 1. Intrauterine deaths. (n=335)**

Total unclassified cases=5 (0.07%), Cases of Laparotomy=46 (0.61%)

Group size (%) = (number of women in the group / total number of women who gave birth in the hospital) × 100.

Group CS rate (%) = (number of CS in the group / total number of women in the group) × 100.

**Table II: Maternal Characteristics and Cesarean Section Rates.**

Classification group	Number of caesarean sections in group(A)	Total number of women in group (N)	Size of each group (%) N/total deliveries×100	Rate of caesarean section in each group	Absolute contribution to overall c/s rate	Relative contribution to overall c/s rate
1	115	1468	19.52	7.83	1.53	9.57
2	62	296	3.94	20.95	0.82	5.16
2a	13	246	3.27	5.28	0.17	1.08
2b	49	50	0.66	98	0.65	4.08
3	116	3707	49.3	3.13	1.54	9.65
4	49	460	6.12	10.65	0.65	4.08
4a	7	418	5.56	1.67	0.09	0.58
4b	42	42	0.56	100	0.56	3.49
5	657	814	10.83	80.71	8.74	54.66
5.1	284	436	5.8	65.14	3.78	23.63
5.2	373	378	5.03	98.68	4.96	31.03
6	35	112	1.49	31.25	0.47	2.91
7	73	289	3.84	25.26	0.97	6.07
8	29	176	2.34	16.48	0.39	2.41
9	49	52	0.69	94.23a	0.65	4.08
10	17	145	1.93	11.72	0.23	1.41

Absolute contribution (%) = (number of CS in the group / total number of women who gave birth in the hospital) × 100.

Relative contribution (%) = (number of CS in the group / total number of CS in the hospital) × 100.

## Discussion

One of the best measures of a facility's maternal health services quality is the number of cesarean sections performed there. We compared our result with Robson guidelines and as well as studies done in other facilities.

The cesarean section rate was 15.99% in our study, which is comparable to WHO recommendations and Robson guidelines. However, studies conducted in other tertiary hospitals of Pakistan showed much higher C-section rates of 54% in Rawalpindi<sup>11</sup>, 33% and 49% in Islamabad<sup>12</sup> and Karachi<sup>13</sup> respectively. Additionally, a study done in five hospitals across South Asia found a 36% overall C-section rate.<sup>14</sup>

By assessing the type of population, in our study, we found that Group 3 contributed the most to the obstetric population, accounting for 49.3% of all deliveries. Group 1 (19.52%) and Group 5 (10.83%) were the next largest contributors. According to Gilani et al<sup>12</sup>, groups-3(30.7%), group-5 (21.4%), and group-1(17.1%) were the most prevalent groups, in his study.

In contrast to our results, Khan MA et al<sup>15</sup> found that Groups 5 and 2 comprised the majority of obstetric patients. According to Dhodapkar SB et al<sup>16</sup> Groups 1, group 5 and group 2 were the most common, accounting for 33.3%, 19.7%, and 14.6% of cases, respectively. These studies all show the trends in the way that their respective institutions handle delivery cases.

According to Robson's guidelines, Groups 1, 3, and 5 contribute to two-thirds of all cesarean section (CS) rates and are the source of the biggest variation between units. In our study, these groups contributed approximately 74% of all CS cases, with Group 5 accounting for 54%. Khan MA et al.<sup>15</sup> noted that Group 5, Group 2, and Group 10 were the most significant contributors to overall CS rates.<sup>15</sup> In another study Group 10 (50.9%) was the most contributing group to overall CS followed by group 5 (14.4%) and group 1(11.4%).<sup>17</sup>

By comparing the CS rates in each group, we found that 80.71% of group 5 were CS. Further analyzing the group 5, about half of the CS were in sub group 5.2 (Pre-2 or more LSCS). According to Robson's guidelines if the

size of group 5 is larger, it means that there have been high CS rates in the past year in that hospital and mainly in group 1 and 2. But this is not the case in our study as the group 1 and 2 CS rates are according to Robson's guidelines, which has not been so high in past also. So, it is mainly due to the high cesarean sections in group 1 and 2 of other facilities, units and private sector which increased the CS rate of group 5. These findings may indicate that, as the largest tertiary care hospital in the area, most patients who have had two or more cesarean sections in the past may be referred to our hospital.

In our study 35% of women had vaginal birth after one CS, which is very low by comparing with the other studies, 47% and 66.7% VBAC in study of Afridi F et al<sup>18</sup> and Gilani et al.<sup>12</sup> Most of woman and practitioners have fear of vaginal delivery after one CS. Due to this fear, the section rate is very high in group 5.1. Although the success rate of TOLAC is 70 to 80% but mostly it is avoided and induction of labor is not given in cases of previous CS due to the risk of scar rupture. Additionally, induction in these patients requires close, one-on-one supervision, which is typically not feasible in a busy setting.

The still birth rate was 44.5/1000 live births in our study in which comparable with the stillbirth rate of Pakistan (43.1/1000 live births).<sup>19,20</sup> Although the cesarean section rate of the country is high but it did not decrease the still birth rates significantly.<sup>11,12,13</sup> Placental abruption, hypertensive diseases of pregnancy, infections, fetal anomalies and prematurity are the major causes of still births.<sup>21</sup> In this study 92% of still births were antepartum and only 8% were intrapartum. The high percentage of antepartum still birth shows the poor health system, inability to access to health facilities for good antenatal care, low status of woman and illiteracy and poverty in the province.

## Conclusion

All delivery units must adopt Robson's classification to prevent unnecessary cesarean sections. Every effort should be directed towards offering cesarean sections to women who require them, rather than striving for a specific rate. Encouraging labor trials after one cesarean section is crucial, as the majority of women in group 5.1 experienced repeat cesarean sections.

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