

# Robson Classification System: An Essential Tool for Evaluating Caesarean Section Indications and Implications at LUMHS

Najma Bano Shaikh<sup>1</sup>, Nabila Hassan<sup>2</sup>, Ambreen Mughal<sup>3</sup>, Samia Aijaz<sup>4</sup>, Shabnam Shaikh<sup>5</sup>, Sheena Memon<sup>6</sup>

- <sup>1</sup> Associate Professor, Department of Gynecology & Obs., Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro Pakistan  
Data collection, Manuscript writing
- <sup>2</sup> Associate Professor, Department of Gynecology & Obs., Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro Pakistan  
Data interpretation
- <sup>3</sup> Senior Registrar, Department of Gynecology & Obs., Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro Pakistan  
Data analysis
- <sup>4</sup> Senior Registrar, Department of Gynecology & Obs., Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro Pakistan  
Results & Tabulation
- <sup>5</sup> Consultant Gynecologist, Hospital Shah Faisal Colony Korangi, Karachi Pakistan  
Discussion writing
- <sup>6</sup> Consultant Gynecologist, Dr. Ruth K. M. Pfau, Civil Hospital, Karachi Pakistan  
References layout

## CORRESPONDING AUTHOR

Dr. Najma Bano Shaikh  
Associate Professor, Department of Gynecology & Obs., Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro Pakistan  
Email: najma.shaikh4@yahoo.com

Submitted for Publication: 07-03-2022  
Accepted for Publication 16-08-2023

**How to Cite:** Shaikh NB, Hassan N, Mughal A, Aijaz S, Shaikh S, Memon S. Robson Classification System: An Essential Tool for Evaluating Caesarean Section Indications and Implications at LUMHS. APMC 2023;17(4):508-512. DOI: 10.29054/APMC/2023.1239

## ABSTRACT

**Background:** The rise in the number of caesarean section (CS) deliveries worldwide has raised questions about its suitability and effects on the health outcomes of mothers and newborns. Consequently, healthcare professionals have been exploring standardized approaches for assessing the necessity of CS procedures to promote efficient use of this surgical intervention. The Robson Classification System has become a beneficial resource for classifying CS indications and supporting efforts to enhance the quality of obstetric care. **Objective:** To evaluate the utility of the Robson Classification System in assessing caesarean section indications and its implications at LUMHS. **Study Design:** Cross-sectional study. **Settings:** This study was done at Gynae and OBS department of Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro Pakistan. **Duration:** Three-month period from November 2020 to February 2021. **Methods:** Women who underwent CS deliveries with available data necessary for categorizing them into the ten groups of the Robson Classification System were included. After undergoing cesarean sections, patients were screened to classify them according to the Robson 10-group system. The information obtained was strictly used for the study's objectives and treated with confidentiality. Subsequently, the collected data were inputted into SPSS version 26 for analysis. **Results:** The overall rate of CS was 51.2%. Mean age of the patients was 36.73±2.43 years. The highest contributors to the CS rate were in women with preterm singleton cephalic term pregnancies (group 10) 31.7% and multiparous; single term pregnancy with one and more previous caesarean section around 5 a and b) 31.9%, followed by nulliparous, single, cephalic, ≥37 weeks, spontaneous labor (group 1) 11.2%, (group 2b) 8.1%, (group 3) 5.7% and (group 4) 4.0%. **Conclusion:** The CS rate was observed to be highly frequent, with Robson groups 5 and 10 being the primary drivers of this heightened rate. Initiatives aimed at decreasing the initial CS occurrence by enhancing the management of both spontaneous and induced labors, as well as strengthening clinical protocols to promote vaginal birth after CS, are anticipated to yield the most substantial impact on reducing the CS rate.

**Keywords:** Robson classification system, Caesarean section, Newborns.

## INTRODUCTION

Globally, there has been a concerning increase in the prevalence of cesarean sections (CS) over recent decades.<sup>1,2</sup> When natural childbirth isn't feasible or advised, opting out of CS could pose serious risks to both the mother and baby. Yet, it's worth acknowledging that CS procedures are sometimes performed without definite

reasons.<sup>2,3</sup> Although in few specific situations, a cesarean section (CS) might be necessary to protect the health of both the mother and the baby.<sup>4</sup> When compared to vaginal delivery, maternal mortality and morbidity rates are higher with cesarean delivery.<sup>5</sup> The overall maternal mortality rate ranges from 6 to 22 deaths per 100,000 live births, with approximately one-third to one-half of maternal deaths following cesarean delivery directly

linked to the surgical procedure itself and, in part, to the conditions necessitating the need for cesarean delivery.<sup>5</sup> However the increasing rate of multiple cesarean sections can be attributed to cultural and social pressures favoring larger families.<sup>6</sup> The global rise in cesarean sections can be attributed to better accessibility for women needing the procedure, but it's also linked to its overuse without medical necessity. Studies also indicate that cesarean section rates tend to be higher in private healthcare settings than in public ones. This variance is largely attributed to economic factors and maternal preferences.<sup>7,8</sup> Additionally, private health facilities are more than twice as likely to lack clear indications for CS compared to public health facilities.<sup>7,9</sup> The World Health Organization has recommended that a CS rate exceeding 10% at the population level does not offer any added benefits for either the mother or the baby.<sup>7</sup> Efforts to lower these rates now aim to incorporate women's obstetric preferences while addressing this issue.<sup>10,11</sup> Currently, the main challenge is to maintain a low cesarean section rate while ensuring the safety of both the mother and newborn. To achieve this, ongoing audits of CS procedures conducted in healthcare settings are important. The World Health Organization (WHO) has advised adopting a standardized and dependable classification system for all cesarean sections.<sup>12</sup> Among the various proposed systems, WHO and the International FIGO have recognized the Robson Ten Group Classification System (TGCS) as the most suitable for global use.<sup>9</sup> This system facilitates the monitoring, comparison, and comprehension of cesarean rates across various time periods and different healthcare institutions.<sup>12-14</sup> In this classification system, all women who have had a cesarean section are sorted into 10 groups according to various obstetric factors such as gestational age, parity, prior C-sections, fetal presentation, number of fetuses and mode of labor onset.<sup>15</sup> These groups are organized to ensure they are distinct from each other and collectively encompass all cases.<sup>15,16</sup> Limited data exists regarding the application of Robson's classification for cesarean sections (CS) in our healthcare setting, despite indications from numerous tertiary health facilities in the country that CS rates exceed WHO recommendations. Thus, the study seeks to assess the Robson Classification System in determining CS indications and their consequences.

## METHODS

This prospective study was conducted at the Gynecology and Obstetrics department of LUMHS, focusing on patients delivered over a three-month period from November 2020 to February 2021. The study included women who underwent cesarean section (CS) deliveries and had complete information on obstetric characteristics such as parity, previous CS history, onset of labor, fetal

presentation, number of fetuses, and gestational age. Additionally, women with available data necessary for categorizing them into the ten groups of the Robson Classification System were included in the study. Patients were excluded if their records lacked complete information regarding the indication for cesarean section (CS) and/or the timeframe, or if they did not consent to participate in the study. Written and verbal informed consent was obtained after explaining the study aims and objective. After undergoing cesarean sections, patients were screened to classify them according to the Robson 10-group system. This classification system categorizes patients based on various obstetric characteristics, aiming to provide valuable insights into the trends and patterns of cesarean deliveries. Data regarding gestational age, parity, onset of labor, history of prior C-sections, and the number and presentation of fetuses were recorded and categorized according to the Robson Ten Group Classification System (TGCS). The information obtained was strictly used for the study's objectives and treated with confidentiality. Subsequently, the collected data were inputted into SPSS version 26 for analysis.

## RESULTS

During the study period, 1033 cases were reported, with 454 (43.90%) of them undergoing c-sections and categorized based on the Robson Ten Group Classification System. Overall mean age of the patients was 36.73±2.43 years, minimum 23 years and maximum 40 years. Among the patients, 69.4% were multiparous, while 30.6% were primiparous. The majority, 98.9%, had singleton pregnancies and in terms to the fetal presentation mostly were cephalic (94.7%), followed by breech (5.1%) and transverse (0.2%). In terms of previous C-sections, 47.8% had none, 26.4% had one, and 25.8% had two or more. Furthermore, onset of labor presented in table 1.

The highest contributors to the CS rate was in women with preterm singleton cephalic term pregnancies (group 10) 31.7% and multiparous; single term pregnancy with one and more previous caesarean section around group 5 a and b) 31.9%, followed by nulliparous, single, cephalic, ≥37 weeks, spontaneous labor (group 1) 11.2%, multiparous women without previous cesarean section with a single, cephalic presentation at full term who had induced labor or elective cesarean section (group 2b) 8.1%, multiparous women (excluding those with previous cesarean section) with a single, cephalic presentation at full term who experienced spontaneous labor (group 3) 5.7% and multiparous women with previous cesarean section who had induced labor or elective cesarean section (group 4) 4.0% as shown in table 2

**Table 1: Demographic characteristics of the patients n=454**

Variables	Frequency	%	
Parity	Multiparous	315	69.4%
	Nulliparous	139	30.6%
Gestational age	< 37	155	34.1%
	> 37	299	65.9%
Number of the fetuses	Multiple	05	1.1%
	Singleton	449	98.9%
Fetal presentation	Breech	23	5.1%
	Cephalic	430	94.7%
	Transverse	01	0.2%
Number of previous C-sections	None	217	47.8%
	One	120	26.4%
	Two or more	117	25.8%
Onset of labour	Induction	09	2.0%
	Pre labour CS	269	59.3%
	Spontaneous	176	38.8%

**Table 2: Cesarean section according to Robson's classification (n=454)**

Robson's classification	Frequency	Percent
Group 1	51	11.2%
Group 2a	07	1.5%
Group 2b	37	8.1%
Group 3	26	5.7%
Group 4	18	4.0%
Group 5	04	0.9%
Group 5a	80	17.6%
Group 5b	61	13.4%
Group 6	08	1.8%
Group 7	11	2.4%
Group 8	05	1.1%
Group 9	02	0.4%
Group 10	144	31.7%
Total	454	100.0%

## DISCUSSION

Cesarean section (CS) rates have been steadily rising worldwide, prompting the need for better classification systems to understand the underlying factors contributing to this trend. The Robson Classification System offers a valuable framework for categorizing and analyzing CS rates, providing insights into indications and implications for maternal and neonatal health. This study aimed to evaluate the prevalence of cesarean sections using the Robson Classification System. Over the study period, 1033 cases were analyzed, with 454

(43.90%) undergoing cesarean sections. The patients were categorized based on the Robson Ten Group Classification System, with an overall mean patient age of  $36.73 \pm 2.43$  years. These findings were consistent with those of Akadri AA *et al*,<sup>7</sup> who reported an overall cesarean section rate of 51.2% in their study. The most common indication for cesarean section in their research was a history of previous cesarean section, with 58.2% of women being over 30 years old. In contrast, Assefa EM *et al*,<sup>17</sup> found a lower overall cesarean section rate of 41%, with an overall mean patient age undergoing cesarean section of 28.37 years. Similarly, Waheed K *et al*,<sup>18</sup> reported an average patient age of  $26.70 \pm 3.73$  years in their study, with a lower cesarean section rate of 24.0%. These variations in cesarean section rates may be attributed to differences in patient demographics, healthcare practices, and the criteria used to determine the necessity for a cesarean section across different studies.

In this study 69.4% women were multiparous, while 30.6% were primiparous, the majority, 98.9%, had singleton pregnancies and in terms to the fetal presentation mostly were cephalic (94.7%), followed by breech (5.1%) and transverse (0.2%). In terms of previous C-sections, 47.8% had none, 26.4% had one, and 25.8% had two or more. In the line of this series Syed S *et al*<sup>19</sup> reported that the multiparous women were commonest, accounting for 57.45% and nulliparous were 32.4%, and majority of women had cephalic fetal presentation (95.57%), while breech and abnormal pre sensations constituted only 4.43%. Comparatively based on the demographic data, Waheed K *et al*,<sup>18</sup> reported that the mean BMI of the patients was  $28.59 \pm 5.53$  kg/m<sup>2</sup>, and the mean gestational age was  $39.99 \pm 1.20$  weeks. Most of the women were multiparous, cesarean section was conducted in 48 cases, which accounts for 24.00% of the total, while vaginal delivery was opted for in 152 cases, comprising 76.00% of the patients.

In this study the highest contributors to the CS rate was in women with preterm singleton cephalic term pregnancies (group 10) 31.7% and multiparous; single term pregnancy with one and more previous caesarean section around group 5 a and b) 31.9%, followed by (group 1) 11.2%, (group 2b) 8.1%, (group 3) 5.7% and (group 4) 4.0%. Consistently Sharma A *et al*<sup>20</sup> also reported that the women categorized under Group 5 had the highest rate of cesarean deliveries, comprising 37% of the total. Following this, those classified under Group 2 accounted for 22.1%, while Group 1 had a cesarean rate of 9.5%. In the comparison of this study Parveen R *et al*<sup>1</sup> reported that the majority of patients, comprising 85 individuals (50.9%), were classified under Group-10. Following closely, Group-5 and Group-1 constituted the second and third most prevalent groups, representing 24

cases (14.4%) and 19 cases (11.4%), respectively. A comparable study conducted in Brazil yielded analogous results, indicating that Group 5 accounted for 31.3% of the overall cesarean section rate.<sup>21</sup> Costa Moresi EH *et al*<sup>22</sup> demonstrated that the main contributors to cesarean sections were Group-5 (39.3%), Group-2 (21.2%), and Group-1 (13.6%) according to the Robson classification. The identification of Group 5, which consists of multiparous women with a history of previous cesarean sections, as the most responsible group for the increase in cesarean sections according to the Robson classification, underscores the significance of this subgroup in influencing cesarean delivery rates. The high contribution of repeat cesarean sections (CS) to the overall CS rate underscores the need for a targeted approach to reduce primary CS rates. Repeat CS procedures often result from a cascade effect initiated by the initial cesarean delivery, leading to subsequent pregnancies being deemed high-risk and necessitating repeat surgeries. This cycle not only increases healthcare costs but also carries inherent risks associated with multiple surgeries, such as complications during surgery, prolonged recovery times, and potential adverse outcomes for both the mother and the baby. Reducing primary CS rates requires a multifaceted strategy that addresses various factors contributing to the rising rates of cesarean deliveries. This may involve implementing evidence-based practices to promote vaginal birth after cesarean (VBAC) for eligible candidates, providing comprehensive prenatal education and support to expectant mothers, and ensuring access to skilled obstetric care throughout pregnancy and childbirth. Additionally, efforts to minimize unnecessary interventions during labor and delivery, such as elective induction and non-medically indicated cesarean deliveries, are essential in reducing primary CS rates.

## CONCLUSION

The CS rate was observed to be highly frequent, with Robson groups 5 and 10 being the primary drivers of this heightened rate. The significant contribution of repeat cesarean sections (CS) to the overall CS rate, particularly from Group 5 according to the Robson classification system, underscores the critical importance of efforts aimed at reducing primary CS rates. Efforts focused on reducing the incidence of primary cesarean sections through improved management of both spontaneous and induced labors, along with the reinforcement of clinical protocols to encourage vaginal birth after cesarean, are crucial to have the most significant impact on lowering the cesarean section rate.

## LIMITATIONS

The study's limitations include a small sample size over a short three-month period, lack of investigation into perinatal and maternal outcomes, and being conducted at

a single center, potentially limiting the generalizability of the findings. Thus, while insightful, the results are not definitive or conclusive.

## SUGGESTIONS / RECOMMENDATIONS

Further larger-scale multicenter studies, particularly at the local level, are recommended for further investigation.

## CONFLICT OF INTEREST / DISCLOSURE

None.

## ACKNOWLEDGEMENTS

The author would like to express gratitude to their colleagues for their assistance in completing the research work, as well as to the patients who contributed to the study.

## REFERENCES

1. Parveen R, Khakwani M, Naz A, Bhatti R. Analysis of cesarean sections using Robson's ten group classification system. *Pakistan journal of medical sciences*. 2021 Mar;37(2):567.
2. Betran AP, Ye J, Moller AB, Zhang J, Gulmezoglu AM, Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates:1990-2014. *PLoS One*. 2016; 11:e0148343
3. Mumtaz S, Bahk J, Khang YH. Rising trends and inequalities in cesarean section rates in Pakistan: Evidence from Pakistan Demographic and Health Surveys 1990-2013. *PLoS One*. 2017; 12(10):e0186563.
4. Betran AP, Ye J, Moller AB, Souza JP, Zhang J. Trends and projections of caesarean section rates: global and regional estimates. *BMJ global health*. 2021 Jun 1;6(6):e005671.
5. Raees M, Yasmeen S, Jabeen S, Utman N, Karim R. emergency versus elective caesarean section. *J Postgrad Med Inst* 2012; 27(1): 55-62
6. Abdelazim I, Alanwar A, Shikanova S, Kanshaiym S, Farghali M, Mohamed M, Zhurabekova G, Karimova B. Complications associated with higher order compared to lower order cesarean sections. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2020 Jul 17;33(14):2395-402.
7. Akadri AA, Imaralu JO, Salami OF, Nwankpa CC, Adepoju AA. Robson classification of caesarean births: implications for reducing caesarean section rate in a private tertiary hospital in Nigeria. *BMC Pregnancy and Childbirth*. 2023 Apr 12;23(1):243.
8. Strambi N, Sorbi F, Bartolini GM, Forconi C, Sisti G, Seravalli V, et al. Non-clinical variables influencing Cesarean Section Rate according to Robson classification. *Med (Kaunas)* 2020;56(4):180
9. Pourshiraz M, Heidarzadeh M, Taheri M, Esmaily H, Babaey F, Nasrin T, et al. Cesarean delivery in Iran: a population-based analysis using the Robson classification system. *BMC Pregnancy Childbirth*. 2022;22:185
10. Mascarello KC, Horta BL, Silveira MF. Maternal complications and cesarean section without indication: systematic review and meta-analysis. *Revista de saude publica*. 2017;17;51:105.
11. Althabe F, Belizan JM, Villar J, Alexander S, Bergel E, Ramos S, et al. Mandatory second opinion to reduce rates of unnecessary caesarean sections in Latin America: a cluster randomised controlled trial. *Lancet*. 2004;363(9425):1934.
12. Sharma A, Singh D, Verma S, Sharma S. Fetal. Classification of caesarean section based on Robson ten group classification system in our hospital. *Int J Reprod Contracept Obstet Gynecol* 2020;9:4232-5.
13. Best practice advice on the 10-Group Classification System for cesarean deliveries. FIGO Working Group on Challenges in Care

- of Mothers and Infants during Labour and Delivery. 2016;135:232-3
14. Betran AP, Vindevoghel N, Souza JP, Gulmezoglu AM, Torloni MR. A systematic review of the Robson Classification for caesarean section: what works, doesn't work and how to improve it. *PLoS One*. 2014;9:97769
  15. Bhangadia K, Shrivastav D. Analysis of Caesarean Section Rate in a Hospital of Central India: According to Robson's 10-Group Classification. *Indian Journal of Forensic Medicine & Toxicology*. 2020 Oct 1;14(4).
  16. Tanaka K, Mahomed K. The ten group Robson classification: a single center approach identifying strategies to optimize caesarean section rates. *Obstet Gynecol Int* 2017;2017:5648938
  17. Assefa EM, Janbo A, Ghiwot Y. Comparative analysis of cesarean section using the Robson's Ten-Group Classification System (RTCGS) in private and public hospitals, Addis Ababa, Ethiopia. *Clin J Obstet Gynecol*. 2021; 4: 081-091
  18. Waheed K, Ahsan A, Tahseen H, Khokhar S, Khurshid HN. Analysis of Caesarean Sections Using Robson 10 Group Classification System. *Journal of The Society of Obstetricians and Gynaecologists of Pakistan*. 2023 Sep 20;13(3):356-60.
  19. Syed S, Kalsoom T, Batool I, Naheed N, Malik U, Nawaz S. Use of Robson's Ten Group Classification System to Optimize Caesarean Section Rate; An Audit in a Tertiary Care Centre, Rawalpindi. *J Soc Obstet Gynaecol Pak*. 2023;13(3):241-246
  20. Sharma A, Singh D, Verma S, Sharma S. Fetal. Classification of caesarean section based on Robson ten group classification system in our hospital. *Int J Reprod Contracept Obstet Gynecol* 2020;9:4232-5
  21. Rudey EL, Leal MDC, Rego G. Cesarean section rates in Brazil: Trend analysis using the Robson classification system. *Medici*. 2020;99(17):19880
  22. Costa Moresi EH, Capovilla SaruboBaptistella MK, Piancastelli Moreira P, Vicari Bolognani C, Lemos Ferrer I. Robson Classification for cesarean section in a Public Hospital in Distrito Federal. *Brazilian Journal of Mother & Child Health (BJMCH)/Revista Brasileira de Saude Materno Infantil (RBSMI)*. 2022 Oct 1;22(4).