

Patterns And Determinants Of Caesarean Section Rates According To Modified Robsons Criteria: A Descriptive Study From A Tertiary Care Hospital

Fozia Umer Qureshi¹, Shaherzad Sohail², Saima Jabeen³, Faiza Iqbal⁴

1. Professor, Shalamar Hospital, Lahore 2. Associate Professor, Shalamar Hospital, Lahore 3. Assistant Professor, Shalamar Hospital, Lahore 4. Senior Registrar, Shalamar Hospital, Lahore.

Corresponding author: Dr. Saima Jabeen, drsaima35@yahoo.com.

Abstract

Objective: The underlying purpose of this clinical audit is to categorize cesarean sections according to maternal characteristics as described in Modified Robson's Criteria, which facilitates the identification of the major contributing factors to the rapidly rising rate of cesarean sections (CS).

Materials and Methods: This retrospective study was conducted at Shalamar Hospital, Lahore, Pakistan. It is a descriptive analysis based on the delivery records of 3,925 women who delivered in the obstetric units of Shalamar Teaching Hospital from October 1st, 2022, to September 30th, 2023. Data collection was done using a research questionnaire which recorded data for relevant maternal characteristics. Then, the data was classified per Robson's criteria. The resultant involvement of each group was calculated to monitor each group's share in the consequent CS rate. Lastly, sorting data observations for noting the frequency of cesarean indications was included in the study to deliver eloquent discernments. Non-reassuring CTG and failed induction of labor were found to be the most prominent indications for cesarean deliveries.

Results: Out of the 3925 deliveries recorded, 2886 (73.5%) were cesarean sections. According to the criterion used, the major contributor to the overall Cesarean Section rate was Group 5, which includes previous cesarean delivery, single, cephalic, ≥ 37 weeks, accounting for almost 50% of the cesarean deliveries. The second largest group was Group 2 (22.1%), followed by Group 1 (9.3%), which heightens the overall CS rates. An enhanced level of medical intervention during pregnancy and low preferences of vaginal birth shift maternal as well as obstetric preferences towards cesarean sections which needs to be addressed.

Conclusion: Modified Robson's criteria is an effective tool for auditing cesarean sections to identify exact areas where efforts and strategies are required to reduce the overall CS rate. Women with previous 1 scar should be assessed and offered a trial of labor after cesarean section, where appropriate. Groups 1, 2 and 5 should be subjected to necessary intervention to curb the rising CS rates and support VBAC.

Keywords: Cesarean section, Modified Robson's Criteria, Maternal Characteristics, Vaginal Birth After Cesarean (VBAC)

Introduction

The increasing global rate of cesarean births is becoming one of the most significant public health concerns. Drastically soaring CS rates are most often associated with an escalating incidence of cesarean surgeries, especially in developed nations. The amplified relative preference for CS pertains to maternal mortality, which expresses itself through characteristics such as uterine scar rupture(s) and/or a higher extent of blood transfusion occurrences in women. Additionally, cases of placenta accrete, placenta previa, and hysterectomies lead to a high proportion of cesarean deliveries.^{1,2}

For a better understanding of the potential causes behind the escalating CS rates, a robust criterion for enabling substantive investigation is required. Such a system was introduced in 2001, known as 'Robson's Ten Group Classification', which has a proven record of effective investigation through the channel of clinical auditing and other monitoring procedures.³

Contributions:

F.U.Q, S.S - Conception of study
- Experimentation/Study Conduction
F.I - Analysis/Interpretation/Discussion
F.U.Q, S.J - Manuscript Writing
S.J - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

Conflicts of Interest: None

Financial Support: None to report

Potential Competing Interests: None to report

Institutional Review Board Approval

SMDC-IRB/AL/2023/27-1 0544

12-09-2023

Shalamar Hospital, Lahore

Review began 08/01/2025

Review ended 10/06/2025

Published 30/06/2025

© Copyright 2025

Qureshi et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY-SA 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



How to cite this article: Qureshi FU, Sohail

S, Jabeen S, Iqbal F. Patterns And Determinants Of Caesarean Section Rates According To Modified Robsons Criteria: A Descriptive Study From A Tertiary Care Hospital. JRM. 2025 Jun. 30;29(2). <https://doi.org/10.37939/jrmc.v29i2.2800>

However, for a more versatile yet observational approach, another similar quality assessment tool termed 'Robson's Modified Criteria' is being widely used to conduct clinical trials and audits for associating reasoning with high CS rates. A thorough evaluation conducted by the World Health Organization in 2014 presented outcomes in favor of Robson's Criteria being an efficient tool for analyzing user experiences and consequences. It proposed Robson's Criteria as a definitive measure for drawing meaningful comparisons of varying CS rates in healthcare facilities worldwide.^{4,5} Therefore, both tools have established their worthiness for the investigation of CS rates.

The WHO has established a safe threshold value of 10-15% as the optimal CS rate. WHO's investigative study (2010-11), which includes a panel of 21 countries, has reported a CS rate of 31.2%, which is considerably higher than the previous rate of 26.4% as outlined in WHO's global survey (2004-08). The segregation of countries based on their HDI placement levels has eased justification for the consequent CS rates. For instance, countries which have high human development levels, such as Sri Lanka, Brazil and Mexico, had a CS rate of 33.5%, 47% and 47.5%, respectively. In contrast, China, being amongst the medium HDI countries, presented a rate of 47%, while Thailand was at 39.4% and India at 19.3%.⁶

A robust analysis using Robson's criteria for classification indicates the particular groups of women responsible for higher CS rates.⁷⁻⁹ Moreover, Holy Family Hospital in Karachi also reported a CS rate of 54.2%, out of which 48.8% were elective CS and 51.2% were emergency procedures.^{10,11,13} Similarly, an increase in the cesarean delivery rate in Ireland from 18.3% to 23.5% has been dominantly noted in nulliparous women, which induces a "domino effect", stimulating the probability of other patients undergoing cesarean surgeries as well.¹² An increased percentage of cesarean deliveries amongst groups 5 and 8 as per case studies of Tertiary Care Rural Hospitals in Manipur, Bihar, and Gujarat have proven Robson's Modified Criteria to be a standardized concept for guiding fair clinical audits retrospectively.¹⁴⁻¹⁶

Pakistan has also been an avid victim to globally high CS rates. According to a research study's highlight, Pakistan saw its CS rate undergo a stark leap over a few decades, with a rate of 40% reported during the term 2017-18.¹⁷ Such an elevated rate should be dealt with urgent scrutiny, especially as the country already possesses a greater susceptibility to higher maternal and neonatal mortality rates. In this regard, the current study intends to determine the various indications of lower segment cesarean section surgeries using Modified Robson's criteria in efforts to control and minimize the CS rate. The objective of this study is to categorize cesarean sections according to maternal characteristics as described in Robson's classification system so that the major leading factors towards the precipitously rising rate of CS can be determined and targeted to guide future quality improvement interventions.

Materials And Methods

This study was a retrospective analysis of caesarean section deliveries over one year, classified according to modified Robson's criteria based on the results obtained from the Obstetrics unit of Shalamar Hospital, Lahore. Shalamar Hospital is a tertiary health facility which provides care for all obstetric patients and is a referral hospital for many nearby clinics and medical centers. The population of interest were the women who gave birth at the obstetrics unit of Shalamar. The duration for data collection was one year, from 1st October 2022 up till 30th September 2023. Primary data collected for all women above 28 weeks who delivered during this period was included in the analysis. Data of patients undergoing termination of pregnancy and hysterectomies was excluded.

A research questionnaire was created to capture information regarding maternal traits, including age, parity, gestational age, number of fetuses, fetal presentation, previous CS, onset of labor and the clinical indications for CS. This questionnaire was the sole source of data collection, which provided significant insights for results. The electronic medical records of all the women included in the study were duly accessed for the extraction of relevant information for classification. The cesarean sections performed during the study period were classified using Robson's Modified Criteria.

A thorough descriptive analysis based on relevant literature, as well as a robust analysis involving classification through Robson's Modified Criteria, was done to assess the rising CS rate. The overall contributions of each Robson Group to the total delivery count and strength of cesarean sections was also calculated, which provided a fundamental basis in determining which Group had leading involvements in accounting for a CS rate of 73.5% in this study. Examination of the total cesarean deliveries under each Robson group was conducted to determine the contribution of each group to the overall CS rate. Additionally, major indications of cesarean deliveries were listed, and several cases for each indication were tabulated to assess which indication resulted in maximum cesarean deliveries.

Results

The total number of births which occurred during the study period was 3,925. 1,039 were normal deliveries, and 2,886 were cesarean sections, accounting for a CS rate of 73.5 percent. Table 1 depicts the number of cesarean sections which occurred in each group which makes up the Group CS rate. The involvement of each group in the overall CS rate is represented by relative

contributions per group, which have been calculated and displayed in the table. Figure 2 also illustrates the absolute contribution of Robson's 10 groups to the total deliveries that occurred in the study term.

The systematic classification done following the criterion discussed above dawned that the major contributor to the overall cesarean section rate was Group 5, accounting for almost 50% of the share in the overall CS rate significantly including the maternal characteristic of previous cesarean history. The second largest group was Group 2, with 22.1% cesarean deliveries, followed by Group 1 with a 9.3% contribution to the total CS rate. Table 1 shows the trends followed by each of the groups during the study term.

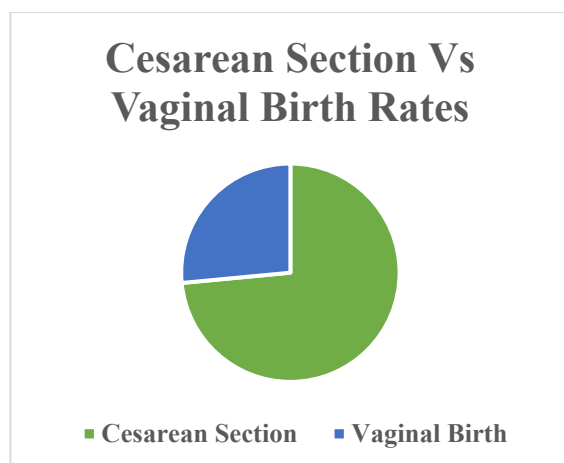


Figure 1: Cesarean Section Vs Vaginal Birth Rates



Figure 2: Modified Robson's criteria

Table 1: The Modified Robson's Classification Groups and Report Statistics

Modified Robson's Classification	No. of women in this group (a)	Relative size of Robson's Groups (%) (b)	No. of CS in each group (c)	Group CS rate (%) (d)	Relative contribution of groups to overall CS rate (%) (e)	Absolute contribution of group to overall CS rate (%) (f)
Group 1 Nulliparous single cephalic ≥ 37 weeks	440	11.2%	267	60.7%	9.3%	6.8%
Group 2 Nulliparous single cephalic more than 37 weeks' induction or caesarean section before labor	850	21.6%	636	74.8%	22.1%	16.2%
Group 3 Multiparous except previous caesarean section single, cephalic ≥ 37 weeks spontaneous labor	360	9.2%	91	25.3%	3.2%	2.3%
Group 4 Multiparous except previous caesarean section single, cephalic ≥ 37 weeks induction or caesarean before labor	290	7.4%	85	29.3%	3%	2.2%
Group 5 Previous caesarean section single, cephalic ≥ 37 weeks	1516	38.6%	1436	94.7%	49.8%	36.6%
Group 6 All nulliparous breech	149	3.8%	149	100%	5.2%	3.8%
Group 7 All multiparous breech including previous caesarean section	37	0.9%	37	100%	1.3%	0.9%
Group 8 All multiple pregnancies, including previous caesarean section	55	1.4%	50	90.9%	1.8%	1.3%
Group 9 All abnormal lies, including previous caesarean section	49	1.25%	49	100%	1.7%	1.24%
Group 10 All single cephalic more than 36 weeks including previous caesarean section	179	4.6%	86	48.1%	3%	2.2%
Total	$\Sigma X=3925$	100	$\Sigma Y=2886$	100	100	$\Sigma Y/\Sigma X=73.5\%$

Table 2: Indications of Cesarean Section

Total Count of Cesarean Sections (N=2886)		
Indications	No. of women	Percentage of women
Reduced fetal movements	55	5.4%
Non-reassuring CTG	117	11.5%
Meconium	81	8 %
Oligohydramnios	81	8 %
Failed induction of labor	119	11.7%
Failure to progress	106	10.4%
Malpresentation	41	4.1 %
Relative CPD	102	10%
Precious pregnancy	40	4%
Poor bishop score	30	3%
Good size baby	16	1.6%
Cholestasis of pregnancy	42	4.1 %
IUGR	56	5.5%
PLH	29	2.8%
Gestational diabetes	12	1.2%
Maternal wish	38	3.8 %
Polyhydramnios	11	1.1%
Imminent eclampsia	11	1.1%
Twins	10	1%
ITP	10	1%
Placenta Previa	20	2%

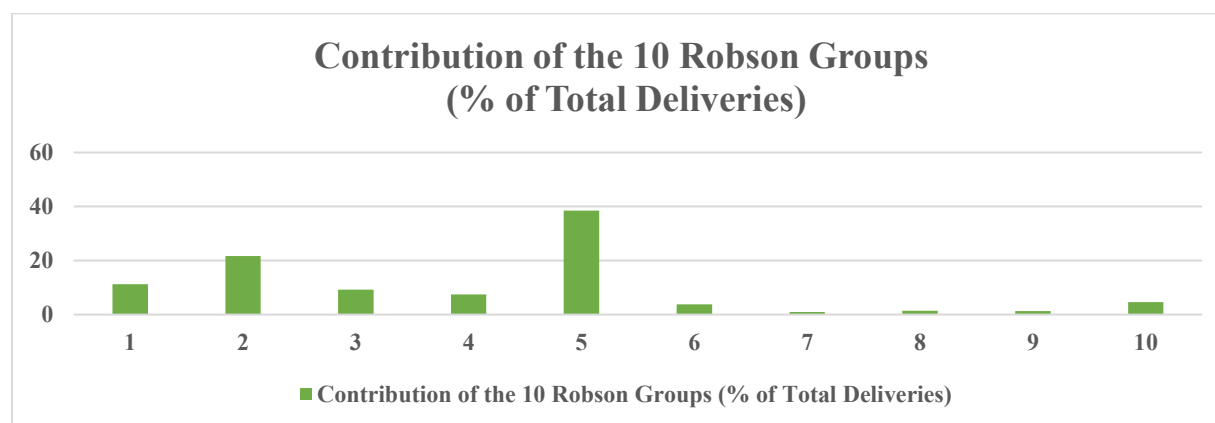


Figure 3: Contribution of the 10 Robson Groups (% of Total Deliveries)

Discussion

The documented rates of Cesarean Sections (CS) in tertiary care facilities differ considerably. The recorded CS rate of Shalamar Hospital is 73.5%, which is higher than the CS rate of other tertiary care hospitals. For instance, the CS rate of the MCH center Punjab Institute of Medical Sciences, Islamabad, is 33.3%.³ In another study conducted in Pak Emirates Military Hospital (PEMH), Rawalpindi, the CS rate is 54%. The ¹⁸ CS rate in a tertiary care hospital in China is 56%.¹⁹ Meanwhile, the CS rate for a Hospital in Istanbul, Turkey, is 42.2%, and for India, it is 46.8%, which is also higher than the recommended rate of 15% by WHO.¹⁷ This situation of extremely high CS rates is frequently linked with private hospitals, causing a significant rise in the cesarean deliveries while using over medicalized measures, which include continuous fetal monitoring, oxytocin for augmentation, and early amniotomy.²⁰ These treatments are often misused, which accounts for high CS rates accompanied by aggravated fetal distress. The high CS rate at Shalamar Hospital is due to several reasons. Being the sole private tertiary care hospital in the area is one of the main causes. Shalamar Hospital has the privilege of being a tertiary health facility which provides care for patients of low, medium and high-risk pregnancies and is the primary referral hospital for many nearby clinics. Obstetric care is provided by senior and junior consultants, residents, nurses and midwives. The health facility has one of the three fully functional obstetrics theatre suites manned by consultant anesthetists, which makes it vulnerable to high-risk maternity cases. Moreover, the ease in availability of health cards rewarding free treatment facilities and private hospital atmosphere with exclusive care to people of all classes is also one of the contributing factors.

In the present study, analysis dawned that the largest contributor was Group 5, occupying 50% percent of total cesarean delivery cases. In a similar case, delivery data collected from nine institutions from different countries (European and Southeast Asian) reported Group 5 causing the overall CS rate to rise from 51% to 98.3%.²¹ The results of this study are comparable to the present study. For further clearance, Group 5 cases have been divided into females having previous 1 CS and those having previous 2 and above CS. In this group, 52% CS are due to previous 2 or more, which are recommended indications of CS. The group having previous 1 CS is 47.2%. This indicates a very low VBAC rate. One possibility is that women are not given enough support for the vaginal birth due to fear of uterine rupture. The other possibility is that females themselves do not want to bear a painful labor after previous experience of having a cesarean section even after the trial of labor. However, adequate counseling, support for VBAC and offering epidural during labor can increase the rate of VBAC.

Another case was Vienna, Austria, which claimed the maximum CS rate in group 5, followed by groups 2 and 1, which is exactly congruent to the results of the present study.²² Discussing along the same lines, a study of Europe and Indonesia has concluded the massive contribution of Group 5's resilience in the ever-increasing cesarean delivery rates.²³ Similarly, in another study of Turkey, women in the Group 5 cohort augmented 24.4% share to the CS rate along with Group 2 lodging the second highest place.²⁴ A study of Hawassa University Referral Hospital in south Ethiopia testified to a 22.9% segment of Group 2 and 5 lesions in keeping the CS rate around 32.8%.²⁵ All these CS rate statistics call for an inevitable reduction in cesarean surgeries buoyed with active intervention such as usage of partograms, improvements in technology to enable an enhanced monitoring system of fetal heartbeat and involvement of a companion along with better auditing systems to curate the relevance of potential CS indications.²⁵ Proper implementation of pertinent measures might induce a downward toll in CS rates.

Group 5 is the major contributing factor in studies conducted in other tertiary care hospitals.^{3,18} Group 2 is the second largest group as per the present study with 22.1% and Group 1 being the third largest group having a CS rate of 9.3%. High CS rates in this group have also been reported in other public sector hospitals in Pakistan and also in other countries.^{3,18} Failed induction of labor, fetal distress, and failure to progress are the major indications of CS in this group. Teaching sessions focused on correct interpretation of CTG, maintaining the program, and following strict protocols for induction of labor are proposed to reduce CS rate. The foremost priority, however, should be meaningful obstetric interventions towards guiding maternal preferences for modes of birth towards VBAC. Oxytocin augmentation and epidural anesthesia have proven significant towards lowering CS rates among Groups 2 and 5 with improved women's satisfaction of birthing experience.

The findings from the research studies feature focused treatments with evidence-based procedures to reduce unnecessary cesarean deliveries. Promotion of VBAC to achieve a safe vaginal delivery post a previous LSCS and preventing cesarean deliveries in nulliparous women with single cephalic full-term pregnancy (Groups 1 and 2) can aid in decreasing CS rate in the years to come. Additionally, psychosocial interventions such as one-to-one trained support during labor have been proven as an effective fix for reducing unwanted cesarean section births.

Conclusions

Modified Robson's criteria is an effective tool for auditing cesarean sections in identifying particular areas which require endorsement of strategies to diminish the overall CS rate. Women with previous 1 scar should be initially assessed and offered a trial of labor after cesarean section where appropriate, to promote VBAC. Additionally, it is also crucial to develop and implement further strategies which decrease the likelihood of CS in women of Group 5 while ensuring the provision of the best obstetric care. A more driven research should be carried out for further identification of the underlying factors leading to high CS rates.

References

1. Betrán AP, Vindevoghel N, Souza JP, Gülmezoglu 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 Jun 3;9(6). <https://doi.org/10.1371/journal.pone.0097769>
2. Giaksi P, Gourounti K, Vivilaki V, Zdanis P, Galanos A, Antsaklis A, et al. Implementation of the Robson classification in Greece: A retrospective cross-sectional study. *Healthcare*. 2023 Mar 21;11(6):908. <https://doi.org/10.3390/healthcare11060908>
3. Gilani S, Mazhar S, Zafar M, Mazhar T. The modified Robson criteria for caesarean section audit at MCH Center Pims Islamabad. *Journal of the Pakistan Medical Association*. 2019;(0):1. <https://doi.org/10.5455/jpma.293708>
4. Robson MS. Can we reduce the caesarean section rate? *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2001 Feb;15(1):179–94. <https://doi.org/10.1053/beog.2000.0156>
5. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, et al. Classifications for cesarean section: A systematic review. *PLoS ONE*. 2011 Jan 20;6(1). <https://doi.org/10.1371/journal.pone.0014566>
6. Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, et al. Use of the Robson Classification to assess caesarean section trends in 21 countries: A secondary analysis of two who multicountry surveys. *The Lancet Global Health*. 2015 May;3(5). [https://doi.org/10.1016/s2214-109x\(15\)70094-x](https://doi.org/10.1016/s2214-109x(15)70094-x)

7. Robson M, Murphy M, Byrne F. Quality assurance: The 10-group classification system (Robson classification), induction of Labor, and Cesarean Delivery. *International Journal of Gynecology & Obstetrics*. 2015 Sept 30;131(S1). <https://doi.org/10.1016/j.ijgo.2015.04.026>
8. Saleh Gargari S, Essén B, Fallahian M, Mulic-Lutvica A, Mohammadi S. Auditing the appropriateness of cesarean delivery using the Robson classification among women experiencing a maternal near miss. *International Journal of Gynecology & Obstetrics*. 2018 Nov 2;144(1):49–55. <https://doi.org/10.1002/ijgo.12698>
9. Das V, Kumar N, Kumari V, Agarwal A, Pandey A, Agrawal S. Increasing rates of cesarean section, an upcoming public health problem: An audit of cesarean section in a tertiary care center of North India based on Robson Classification. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017 Oct 28;6(11):4998. <https://doi.org/10.18203/2320-1770.ijrcog20175015>
10. Abidi SM, Abbas S, Abidi ST, Hussain N, Hareesh S. Application of the Robson classification in assessing cesarean section rates: An audit of a tertiary care hospital's gynecology department in Karachi, Pakistan. 2023 May 1; <https://doi.org/10.1101/2023.04.30.23289336>
11. Ramos GG, Zlotnik E, Liao AW. Cesarean rates according to the Robson classification: Analysis in a municipal maternity in São Paulo. *einstein (São Paulo)*. 2022;20. https://doi.org/10.31744/einstein_journal/2022ao0075
12. Crosby DA, Murphy MM, Segurado R, Byrne F, Mahony R, Robson M, et al. Cesarean delivery rates using Robson Classification system in Ireland: What can we learn? *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2019 May;236:121–6. <https://doi.org/10.1016/j.ejogrb.2019.03.011>
13. Abdel-Aleem H, Shaaban OM, Hassanin AI, Ibraheem AA. Analysis of Cesarean Delivery at Assiut University Hospital using the Ten Group Classification System. *International Journal of Gynecology & Obstetrics*. 2013 Jul 31;123(2):119–23. <https://doi.org/10.1016/j.ijgo.2013.05.011>
14. Akoijam B, Janani L, Christina S, Nameirakpam D, Laiphrakpam R. Analysis of cesarean section rates and its indications using Robson's classification at a Tertiary Care Hospital, Manipur. *Indian Journal of Public Health*. 2022;66(4):434. https://doi.org/10.4103/ijph.ijph_1928_21
15. Moudi Z. Analysis of cesarean section rates based on Robson's classification and its outcomes at a governmental tertiary referral teaching hospital in the Sistan and Baluchestan Province, Iran. *Nursing and Midwifery Studies*. 2022;11(4):261. https://doi.org/10.4103/nms.nms_135_21
16. Jamshe S, Chien S-C, Tanweer A, Asdary R-N, Hardhantyo M, Greenfield D, et al. Correlation between previous caesarean section and adverse maternal outcomes accordingly with Robson classification: Systematic Review and meta-analysis. *Frontiers in Medicine*. 2022 Jan 10;8. <https://doi.org/10.3389/fmed.2021.740000>
17. Villar J, Carroli G, Zavaleta N, Donner A, Wojdyla D, Faundes A, et al. Maternal and neonatal individual risks and benefits associated with caesarean delivery: Multicentre prospective study. *BMJ*. 2007 Oct 30;335(7628):1025. <https://doi.org/10.1136/bmj.39363.706956.55>
18. Hou L, Li G, Zou L, Li C, Chen Y, Yuan Y, Wang X, Jia C, Zhang W. Cesarean delivery rate and indications in mainland China: a cross sectional study in 2011. *Zhonghua fu chan ke za zhi*. 2014 Oct 1;49(10):728–35.
19. Akhtar N, Hayat Z, Ashraf M. An Audit of Caesarean Section in Fauji Foundation Hospital Rawalpindi. *J Soc Obstet Gynaecol Pak*. 2016;6(4):183.
20. Vogel JP, Pingray V, Althabe F, Gibbons L, Berrueta M, Pujar Y, et al. Implementing the who labour care guide to reduce the use of caesarean section in four hospitals in India: Protocol and statistical analysis plan for a pragmatic, stepped-wedge, cluster-randomized pilot trial. *Reproductive Health*. 2023 Jan 20;20(1). <https://doi.org/10.1186/s12978-022-01525-4>
21. Brennan DJ, Robson MS, Murphy M, O'Herlihy C. Comparative analysis of international cesarean delivery rates using 10-group classification identifies significant variation in spontaneous Labor. *American Journal of Obstetrics and Gynecology*. 2009 Sept;201(3). <https://doi.org/10.1016/j.ajog.2009.06.021>
22. Eftekharian C, Husslein PW, Lehner R. Cesarean section rate and perinatal outcome analyses according to Robson's 10-group Classification System. *Maternal and Child Health Journal*. 2021 Jun 28;25(9):1474–81. <https://doi.org/10.1007/s10995-021-03183-7>
23. Mahale A. Using Robson's ten-group Classification system for comparing caesarean section rates in Europe: An analysis of routine data from the euro-PERISTAT study. 2024 Jan 31; <https://doi.org/10.22541/au.170667356.63023653/v1>
24. I. Eyi EG, Mollamahmutoglu L. An analysis of the high cesarean section rates in Turkey by Robson Classification. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2019 Oct 1;34(16):2682–92. <https://doi.org/10.1080/14767058.2019.1670806>
25. Abdo AA, Hinderaker SG, Tekle AG, Lindtjorn B. Cesarean section rates analysed using Robson's 10-Group Classification System: A cross-sectional study at a tertiary hospital in Ethiopia. *BMJ Open*. 2020 Oct;10(10). <https://doi.org/10.1136/bmjopen-2020-039098>