OPEN ACCESS

Evaluation of Caesarean Section Rates at Sylhet MAG Osmani Medical College Hospital Using the Robson Ten Group Classification System

¹Dr. Mahbuba Khan, ²Dr. Rehana Pervin, ³Dr. S A M Husnayen, ⁴Dr. Rukhshana Jahan
1. Assistant professor, Department of Obstetrics and Gynaecology, Sheikh Hasina Medical College & Hospital, Tangail, Bangladesh
2. Assistant professor, Department of Obstetrics and Gynaecology, Sheikh Hasina Medical College & Hospital, Tangail, Bangladesh.
3. Associate Professor, Department of Cardiology, Khwaja Yunus Ali Medical college, Sirajgonj, Bangladesh.
4. Associate Professor, Department of Obstetrics and Gynaecology, Sylhet MAG Osmani Medical College (SOMCH), Sylhet, Bangladesh.

ARTICLE INFO	ABSTRACT	ORIGINAL RESEARCH ARTICLE

Background: The rising rates of Cesarean Section (CS) globally, and particularly in Bangladesh, have sparked concerns about the overuse of this surgical intervention, which may lead to adverse maternal and neonatal outcomes. The World Health Organization (WHO) recommends a population-based CS rate of 10-15%; however, the rates in many regions far exceed this threshold.

Objectives: The aim of the study was to evaluate the CS rates at Sylhet MAG Osmani Medical College Hospital (SOMCH) using the Robson Ten Group Classification System (TGCS), to identify the key factors contributing to the high prevalence of CS, and to provide evidence-based recommendations for reducing unnecessary procedures.

Methods: This cross-sectional observational study was conducted at SOMCH during July 2022 to June 2023. All pregnant women admitted for delivery at ≥28 weeks of gestation were included and categorized into ten groups according to the TGCS based on specific obstetric characteristics. Data were collected using a structured questionnaire and extracted from medical records. Descriptive statistics were used to analyze the distribution of women across the Robson groups, group-specific CS rates, and the contribution of each group to the overall CS rate. Statistical analyses of the results were be obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-24).

Results: The overall CS rates were reported at Sylhet MAG Osmani Medical College Hospital (SOMCH), 57.43% with 2849 CS cases among 4960 admitted women. The group size, CS rate, and absolute

group contribution to overall CS were 24.29%, 36.29%, and 8.81%, respectively in group 1. Another important group includes nulliparous women with single cephalic pregnancies at 37 weeks or more who had induced labor or a CS before labor, which accounted for 11.85% of deliveries with a high CS rate of 72.61% and contributed 8.60% to the overall CS rate. Similarly, multiparous women without a previous CS who received induction or a CS before to labor (Group 4) have a CS rate of 75.83%, accounting for 5.06%.

Conclusion: The study highlights the need for targeted interventions to reduce unnecessary CS procedures at SOMCH. Key recommendations include promoting Vaginal Birth After Cesarean (VBAC), optimizing labor induction practices, and standardizing clinical decision-making processes.

Continuous monitoring and evaluation using the TGCS will be essential to ensure that CS is used judiciously, ultimately improving maternal and neonatal health outcomes.

Corresponding author
Dr. M. Khan*

INTRODUCTION

The Caesarean section (CS) has become an increasingly common surgical intervention worldwide, intended primarily to safeguard the lives of mothers and their newborns in cases of complicated childbirth [1]. While CS can be life-saving, its rising prevalence has sparked global concern, particularly in light of the World Health Organization's (WHO) recommendation that the ideal population-based CS rate should be between 10% and 15%. Exceeding this threshold does not typically contribute to reductions in maternal and neonatal mortality, yet data indicate that the global average CS rate is significantly higher, hovering around 19% [2]. This rate reflects significant variations across regions, with some countries reporting CS rates as high as 40%, while others report rates as low as 7%. These discrepancies raise critical questions about the appropriateness of CS utilization, the factors driving its rise, and the broader implications for health systems and maternal health outcomes [3].

Several factors contribute to the high and rising CS rates in Bangladesh. In urban and private healthcare settings, financial incentives often drive the preference for CS over vaginal delivery. Private health facilities, which typically operate on a for-profit basis, may favor CS due to its higher profitability, as well as the logistical convenience of scheduling births rather than managing unpredictable vaginal deliveries. [4] Additionally, cultural factors, such as the desire for certain birth dates or the perception that CS is safer, also contribute to the preference for this surgical intervention.

The implications of these rising CS rates are far-reaching, with significant consequences for maternal and neonatal health. While CS is a critical intervention in cases where vaginal delivery poses a risk, its overuse can lead to a range of complications, including infections, blood loss, and longer recovery times for mothers [5]. Newborns delivered by CS may also face increased risks of respiratory issues and other complications associated with bypassing the natural birthing process. Moreover, the economic burden associated with unnecessary CS procedures is considerable, impacting not only the healthcare system but also families and society at large [6]. The implementation of the TGCS at SOMCH is expected to provide critical

insights into the factors driving CS rates and to inform the development of targeted interventions aimed at reducing unnecessary CS procedures. By analyzing the distribution of CS across different Robson groups, the study will identify specific areas where CS rates are disproportionately high and explore the underlying reasons for these trends [7].

This study aims to evaluate the CS rates at SOMCH using the Robson TGCS, with the goal of identifying the key factors contributing to the high prevalence of CS and providing evidence-based recommendations for reducing unnecessary procedures. By applying the TGCS at SOMCH, the study will categorize all deliveries into the Ten Robson groups, allowing for a detailed analysis of CS rates within each group. This analysis will help to identify specific populations that may be at risk for undergoing unnecessary CS and will provide insights into the obstetric practices at SOMCH that contribute to the high CS rate.

METHODOLOGY

This study was designed as a cross-sectional observational analysis conducted over a four-month period following the acceptance of the study protocol. The primary aim was to evaluate the Caesarean section (CS) rates at Sylhet MAG Osmani Medical College Hospital (SOMCH) using the Robson Ten Group Classification System (TGCS). This classification system provides a standardized method for categorizing pregnant women into ten distinct groups based on specific obstetric characteristics. The study was conducted in the inpatient Department of Obstetrics and Gynaecology at Sylhet MAG Osmani Medical College Hospital, Sylhet, Bangladesh. The study population included all pregnant women admitted for delivery at SOMCH during the study period. The inclusion criteria were all pregnant women admitted for delivery at ≥28 weeks of gestation. Women who were discharged undelivered or who refused to give consent were excluded from the study. The sample size for this study was calculated using the formula by Quirolf and Frucher's method, considering a 5% level of significance, a 5% margin of error, and a 33% prevalence of CS based on the BDHS 2017-2018 data.

A convenient sampling method was employed to select participants for the study. All eligible women admitted to the hospital during the study period and who met the inclusion criteria were enrolled in the study. The study focused on both obstetric and socio-demographic variables. Key variables included: Outcome Variable: Mode of delivery (Caesarean section or vaginal delivery) Robson Classification: Group 1-10 based on the TGCS. Obstetric Variables: Parity, previous Caesarean delivery, onset of labor, number of fetuses, gestational age, fetal lie and presentation. Socio-demographic Variables: Age, level of education, place of residence, socio-economic status, number of antenatal visits. Data were collected using a structured questionnaire specifically designed for this study. The questionnaire was developed by reviewing relevant literature and consulting with experts in the field. After obtaining informed written consent, participants were interviewed, and relevant clinical data were extracted from their medical records. The collected data included demographic information, obstetric history, details of the current pregnancy, and delivery outcomes. Following the ethical approval from the review committee of Sylhet MAG Osmani Medical College, the study was initiated. All procedures were conducted in accordance with the approved protocol. Upon admission, all pregnant women fulfilling the inclusion criteria were informed about the study and asked to provide written consent. For each participant, a detailed obstetric history was taken, followed by a thorough clinical examination, including an obstetric examination. A per vaginal examination was performed to assess the cervix using the

Bishop's score to determine its favorability for induction of labor.

Additionally, baseline investigations such as Complete Blood Count (CBC), blood grouping, Rh typing, screening for random blood sugar (RBS), Thyroid Stimulating Hormone (TSH), and a urine R/M/E were conducted. An ultrasonogram was performed (if not done previously) to confirm fetal lie and presentation, multiple pregnancies, and gestational age. Following the clinical assessment, participants were categorized into one of the Ten Robson groups. The study proceeded with observation until delivery, noting whether the delivery was via Caesarean section or vaginal delivery. Relevant data from the delivery were recorded post-partum. The study was conducted following the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the ethical review committee of Sylhet MAG Osmani Medical College. Informed consent was obtained from all participants before their inclusion in the study, ensuring confidentiality and the voluntary nature of participation.

The collected data were entered into a database and analyzed using statistical software. Descriptive statistics were used to summarize the characteristics of the study population, including the distribution of women across the Robson groups and the overall CS rate. The primary outcome measure was the rate of CS in each Robson group. Group-specific CS rates, as well as the absolute contribution of each group to the overall CS rate, were calculated. All data were anonymized to protect the privacy of the participants. After taking consent and matching eligibility criteria, data were collected from patients on variables of interest using the predesigned structured questionnaire by interview, observation. Statistical analyses of the results were be obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-24).

RESULTS

Figure I shows that the distribution of admitted patients according to The Robson Ten Group Classification System was analyzed. Group 5 had the highest proportion at 35.9%, followed by Group 1 (15.33%) and Group 2 (14.98%). Groups 3 and 4 comprised 9.65% and 8.81% respectively. Group 10 accounted for 7.58% of admissions. The remaining groups (6-9) collectively represented 7.69% of the total, with individual percentages ranging from 1.08% to 3.29%.
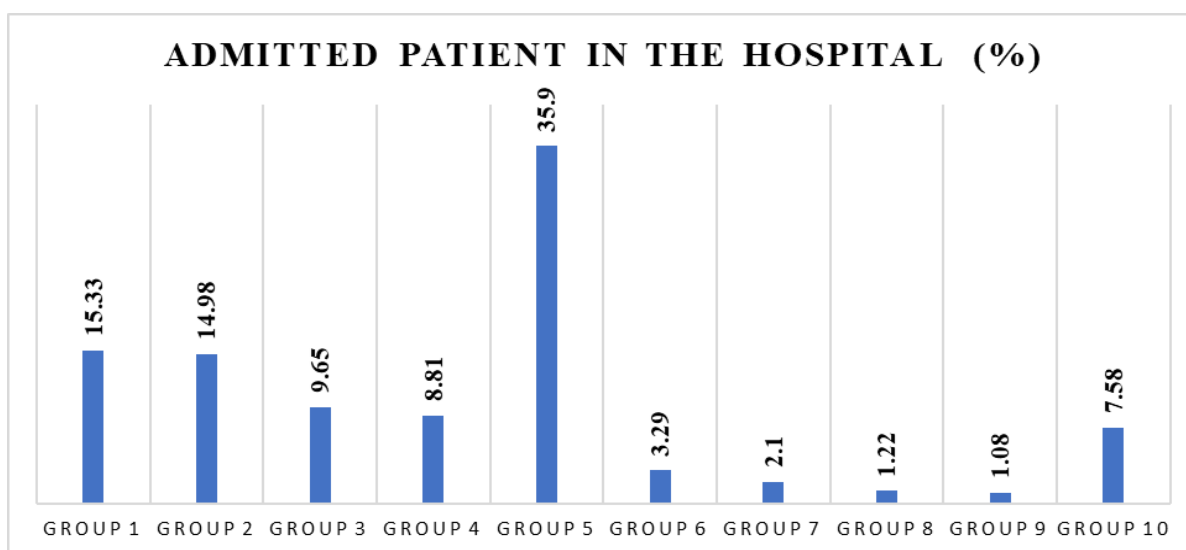

Figure I: Admitted patient in the hospital according to the Robson Ten Group Classification System

Table 1 illustrates that the Robson Classification Report provides a detailed analysis of Cesarean Section (CS) rates revealing key trends and their impact on the hospital's overall CS. According to the group of Nullipara single cephalic ≥ 37 weeks Spontaneous labour (Group 1), the number of CS group was 437 and number of women was 1205. And the group size, group CS rate and absolute group contribution to overall CS was 24.29%, 36.29% and 8.81% respectively. Another significant group is nulliparous women with single cephalic pregnancies at 37 weeks or more who had induced labor or a CS before labor (Group 2), representing 11.85% of the deliveries with a high CS rate of 72.61%, contributing 8.60% to the overall CS rate. Similarly, multiparous women without a previous CS who underwent induction or a CS before labor (Group 4) have a CS rate of 75.83%, contributing 5.06%. The group of women with a previous cesarean section (Group 5) is the most prominent, comprising 22.76% of the total deliveries and exhibiting an exceptionally high CS rate of 90.61%, making it the largest contributor to the overall CS rate at 20.62%.

Breech presentations, both in nulliparous and multiparous women (Groups 6 and 7), also show high CS rates of 77.04% and 69.76%, respectively, although their contributions to the overall CS rate are smaller, at 1.89% and 1.20%.

The data further reveals that women with multiple pregnancies (Group 8) and those with abnormal lies (Group 9) have smaller group sizes and contribute less to the overall CS rate, at 0.70% and 0.62% respectively. The elevated CS rates in Groups 2, 4, and 5, especially among women with previous cesarean sections, indicate that repeat CS and elective procedures significantly affect the hospital's overall CS rate.

Table 1. Robson Classification Report for the four months

Group	Number of CS Group	Number of women in Group	Group Size [1] (%)	Group CS rate [2] (%)	Absolute Group contribution to overall CS [3] (%)
1. Nullipara single cephalic ≥ 37 weeks Spontaneous labour	437	1205	24.29	36.26	8.81
2. Nullipara single cephalic ≥ 37 weeks induced or CS before labour	427	588	11.85	72.61	8.60
3. Multipara (exclude previous CS) single cephalic ≥ 37 weeks Spontaneous labour	275	1008	20.32	27.28	5.54
4. Multipara (exclude previous CS) single cephalic ≥ 37 weeks induced or CS before labour	251	331	6.67	75.83	5.06

5. Previous Caesarean section single cephalic ≥ 37 weeks	1023	1129	22.76	90.61	20.62
6. All nulliparous breeches	94	122	2.45	77.04	1.89
7. All Multiparous breeches (including previous caesarean section)	60	86	1.73	69.76	1.20
8. All multiple pregnancies (including previous caesarean sections)	35	76	1.53	46.05	0.70
9. All abnormal lies (including previous caesarean sections)	31	33	0.66	93.93	0.62
10. All Single cephalic < 37 weeks (including previous caesarean sections)	216	382	7.70	56.54	4.35
Total	2849	4960	99.97		57.43

[1] Group Size (%) = n of women in the group/total N women delivered in the hospital X 100

[2] Group CS rate (%) = n of CS in the group/total N of in the group X 100

[3] Absolute contribution (%) = no of CS in the group / Total N of women delivered in the hospital X 100
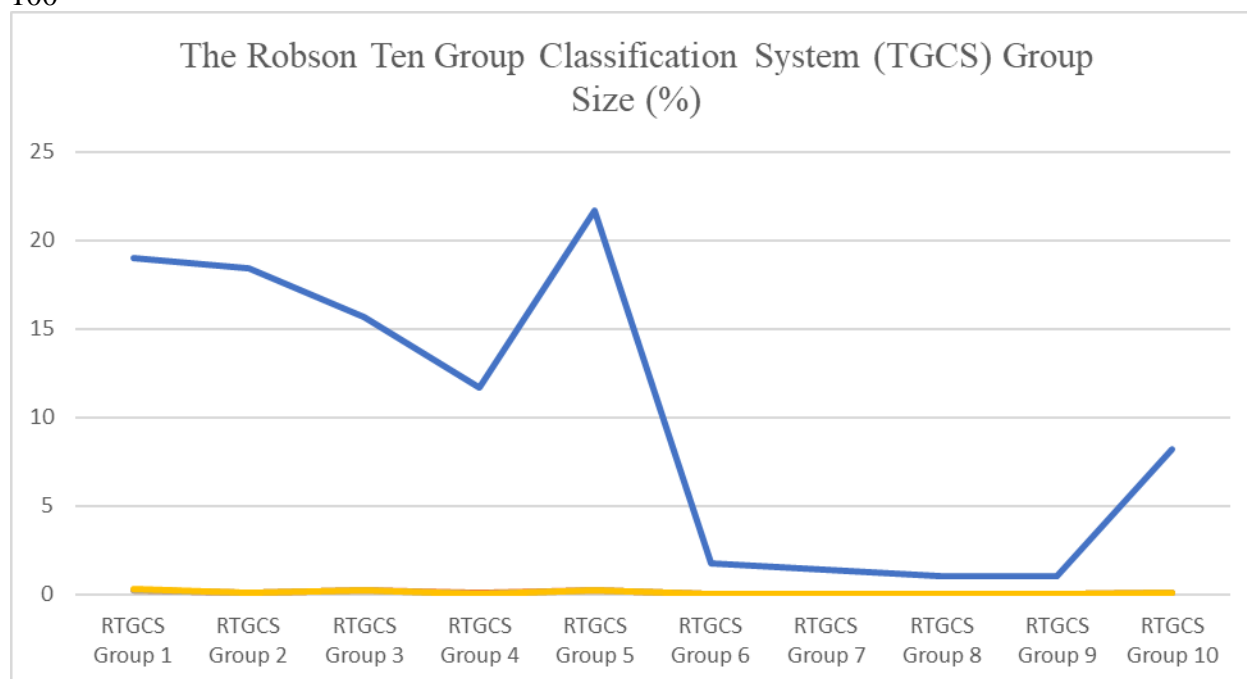

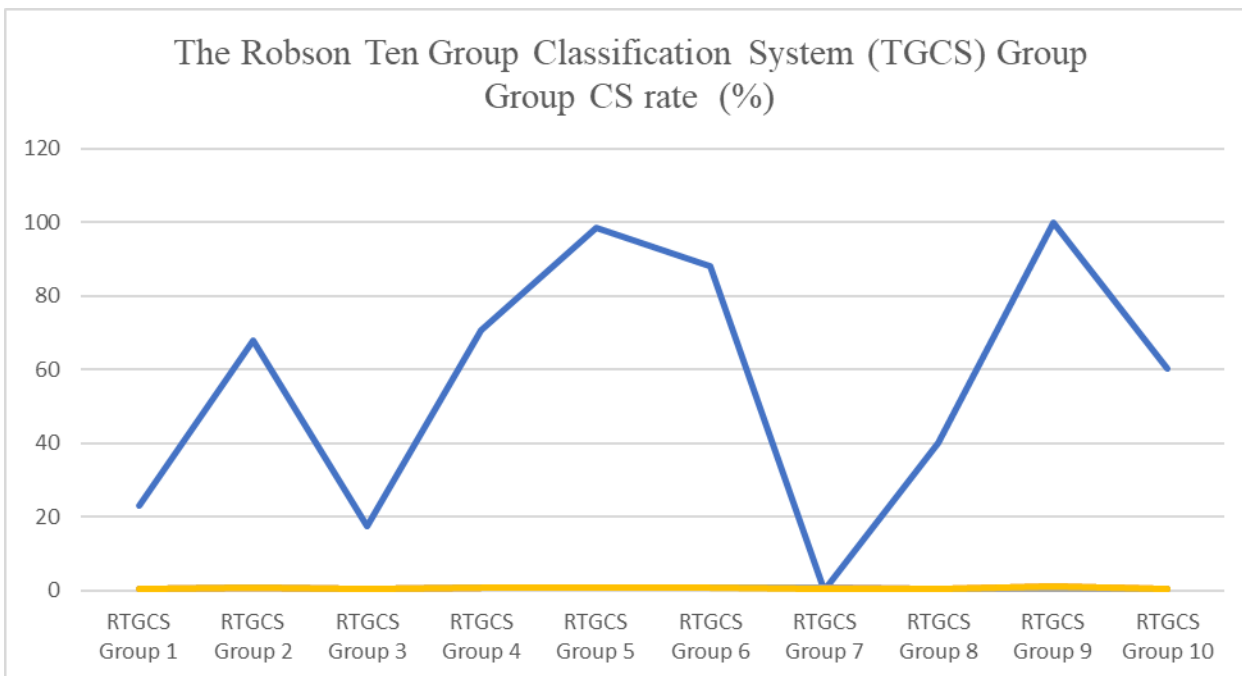**Figure II:** The Robson Ten Group Classification System (TGCS) Group Size (%)

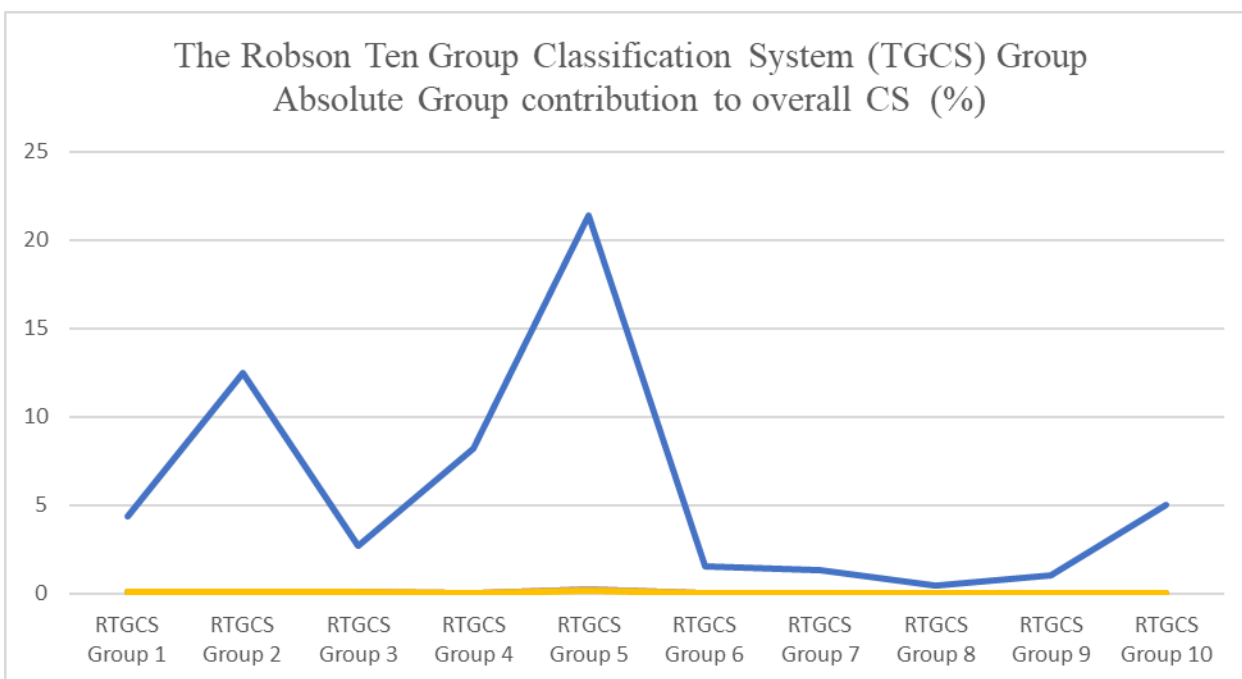**Figure III:** The Robson Ten Group Classification System (TGCS) Group CS rate (%)

Figure IV: The Robson Ten Group Classification System (TGCS) Group Absolute Group contribution to overall CS (%)

DISCUSSION

This cross-sectional observational study was carried out in the Department of Obstetrics and Gynaecology at Sylhet MAG Osmani Medical College Hospital (SOMCH), Sylhet, with varying degrees of contribution from different obstetric groups. Study time near about 1 year including protocol acceptances, data collection and analysis. The data from the Robson Classification Reports for 4 months (September 2022 to December 2022) and the study population included all

pregnant women admitted for delivery at SOMCH during the study period.

In our study, across all four months, Group 5, the group of women with a previous cesarean section is the most prominent, comprising 22.76% of the total deliveries and exhibiting an exceptionally high CS rate of 90.61%, making it the largest contributor to the overall CS rate at 20.62%. However, this trend also raises questions about the potential for increasing the rates of Vaginal Birth After Cesarean (VBAC) as a strategy to reduce the overall CS rate. Studies in other settings have shown that with appropriate selection criteria and careful monitoring, VBAC can be a safe alternative to repeat CS, potentially lowering the CS rate in this group [8].

In a study from a university hospital in Cote d'Ivoire, the most prevalent groups were 1, 2, and 3 [9]. The significance of group 2 in the Cote d'Ivoire trial could be attributed to differences in indications for vaginal delivery inductions or CS between the two settings. In most high-income contexts, groups 5, 2, and 1 account for the majority of the total CS rate, as opposed to low-income studies [10].

In this present study, group 2 which comprises nulliparous women with a single cephalic pregnancy who were induced or underwent CS before labor, showed consistently high CS rates across all four months representing 11.85% of the deliveries with a high CS rate of 72.61%, contributing 8.60% to the overall CS rate. The high CS rates in this group underscore the impact of labor induction on CS rates, as induction often leads to prolonged labor or fetal distress, which in turn increases the likelihood of CS. These findings are consistent with other studies that have reported higher CS rates associated with labor induction, particularly in nulliparous women [11].

The efficacy of CS in low-risk categories (groups 1, 2, 3, and 4) for non-absolute medical indications should be investigated further. The majority of facilities, including HFSUH [16], have minimal birth monitoring, with only a low fetal heart rate recorded on partograph [12]. The lack of suitable facilities for measuring fetal heart rate, as well as a lack of close monitoring, make relying on such indicators difficult [13]. Opportunities for instrumental delivery and staff training to boost its uptake are needed to reduce primary cesarean births in low-risk groups. Limiting the CS rate in low-risk pregnancies is critical to slowing the trend of rising CS [14]. Because TGCS does not assess the appropriateness of CS indications, a continuous audit of CS indications should be established to attain the highest level of suitable CS rates [15]. Possible causes of the increase in CS among groups 1 and 3 should be investigated in order to reduce overall CS rates and the need for future cesarean sections (group 5).

Breech presentations, which are categorized into Groups 6 and 7, consistently showed high CS rates, also show high CS rates of 77.04% and 69.76%, respectively, although their contributions to the overall CS rate are smaller, at 1.89% and 1.20%. However, the variation in CS rates across the months suggests differences in clinical practice or patient characteristics. The management of breech presentations continues to be a topic of debate in obstetrics, with some studies advocating for a more conservative approach to CS in breech cases, while others emphasize the safety of CS as the preferred mode of delivery. The data from SOMCH align with global trends, where CS remains the predominant mode of delivery for breech presentations, but the variations observed warrant further exploration.

Limitations of the study

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

CONCLUSION

The evaluation of Cesarean Section rates at Sylhet MAG Osmani Medical College Hospital using the Robson Ten Group Classification System over the four-month period has highlighted significant trends and contributing factors to the high prevalence of CS at the institution. The analysis revealed that the most substantial contributors to the overall CS rate were women with previous cesarean sections (Group 5), nulliparous women with induced labor (Group 2), and multiparous women with induced labor (Group 4). These findings underscore the need for targeted interventions to reduce unnecessary CS procedures, particularly through the promotion of VBAC, re-evaluation of induction practices, and standardization of clinical decision-making processes.

The consistently high CS rates at SOMCH, particularly in Groups 5, 2, and 4, reflect a broader trend of increasing CS rates that is seen not only in Bangladesh but globally. However, with the implementation of the recommendations provided, SOMCH has the potential to reduce its overall CS rate, improve the quality of maternal and neonatal care, and align with global best practices. Continuous monitoring and evaluation using the TGCS will be essential to ensure that progress is made and that CS is used appropriately.

The findings from this study contribute to a better understanding of CS trends at SOMCH and offer valuable insights that can inform obstetric care strategies both at the hospital and in similar settings across Bangladesh. By addressing the factors driving the high CS rates, SOMCH can play a leading role in promoting safer childbirth practices and improving maternal and neonatal health outcomes in the region.

RECOMMENDATION

This study can serve as a pilot to much larger research involving multiple centers that can provide a nationwide picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

ACKNOWLEDGEMENTS

REFERENCE

1. 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 Nov 1;123(2):119-23.
2. Betrán AP, Torloni MR, Zhang JJ, Gülmezoglu AM, Aleem HA, Althabe F, Bergholt T, De Bernis L, Carroli G, Deneux-Tharaux C, Devlieger R. WHO statement on caesarean section rates. Bjog. 2016 Apr;123(5):667.
3. Betran AP, Vindevoghel N, Souza JP, Guelmezoglu 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): e97769.
4. World Health Organization. Robson classification: implementation manual.
5. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, Merialdi M. Classifications for cesarean section: a systematic review. PloS one. 2011 Jan 20;6(1): e14566.
6. Calverton M. National Institute of population research and training (NIPORT). Mitra and associate and ORC macro. 2005.
7. Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, Tunçalp Ö, Mori R, Morisaki N, Ortiz-Panozo E,

Hernandez B. 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 1;3(5): e260-70.

8. WHO H. WHO statement on caesarean section rates. Geneva, Switzerland. 2015 Apr.

9. Loue VA, Gbary EA, Koffi SV, Koffi AK, Traore M, Konan JK, N'Drin D, Abauleth RY, Kouakou F, Boni SE. Analysis of caesarean rate and indications of university hospitals in sub-Saharan African developing countries using Robson classification system: the case of Cocody's hospital center, Abidjan-Cote d'Ivoire. Int J Reprod Contracept Obstet Gynecol. 2016 Jun 1;5(6):1773-7.

10. Kelly S, Sprague A, Fell DB, Murphy P, Aelicks N, Guo Y, Fahey J, Lauzon L, Scott H, Lee L, Kinniburgh B. Examining caesarean section rates in Canada using the Robson classification system. Journal of Obstetrics and Gynaecology Canada. 2013 Mar 1;35(3):206-14.

11. Robson SJ, De Costa CM. Thirty years of the World Health Organization's target caesarean section rate: time to move on.

Medical journal of Australia. 2017 Mar;206(4):181-5.

12. World Health Organization. Robson classification: implementation manual.

13. Kelly S, Sprague A, Fell DB, Murphy P, Aelicks N, Guo Y, Fahey J, Lauzon L, Scott H, Lee L, Kinniburgh B. Examining caesarean section rates in Canada using the Robson classification system. Journal of Obstetrics and Gynaecology Canada. 2013 Mar 1;35(3):206-14.

14. Delbaere I, Cammu H, Martens E, Tency I, Martens G, Temmerman M. Limiting the caesarean section rate in low-risk pregnancies is key to lowering the trend of increased abdominal deliveries: an observational study. BMC pregnancy and childbirth. 2012 Dec; 12:1-0.

15. Robson M. The Ten Group Classification System (TGCS)-a common starting point for more detailed analysis. BJOG: An International Journal of Obstetrics & Gynaecology. 2015 Apr 1;122(5).

16. Kibret H, Tadesse B, Debella A, Degefa M, Regassa LD. The Association of Nurses Caring Behavior with the Level of Patient Satisfaction, Harari Region, Eastern Ethiopia. Nursing: Research and Reviews. 2022 Feb; Volume 12:47–56.