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Use of the Robson classification to assess, normal delivery and caesarean section trends in a Tertiary Care Hospital

[1]Dr. Shohela Perveen, [2]Prof. Dr. Ferdousi Bagum, [3]Dr. Beauty Rani Roy, [4]Dr. Aysha Sheddika, [5]Miss Monira Jahan Moni

1. Consultant, Department of Obstetrics and Gynaecology, OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, Bangladesh
2. Chairman, Department of Obstetrics and Gynaecology, OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, Bangladesh
3. Consultant, Department of Obstetrics and Gynaecology, OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, Bangladesh
4. Consultant, Department of Obstetrics and Gynaecology, OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, Bangladesh
5. Medical Assistant, Department of Obstetrics and Gynaecology, OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, Bangladesh

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ABSTRACT

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Background: Robson ten-group classification system is recommended by WHO (World health organization) as a global standard for assessment and monitoring caesarean section (CS) rates. This classification is simple and robust. It is prospective, easily reproducible and clinically relevant. The Robson classification, or Ten Group Classification System (TGCS), is a widely recognized framework for evaluating caesarean section rates and delivery trends in maternity care settings. By categorizing women into ten distinct groups based on key obstetric characteristics, the classification allows for a standardized and systematic approach to monitoring and comparing delivery practices. **Objectives:** The aim of the study was to evaluate the use of the Robson classification to assess, normal delivery and caesarean section trends in a tertiary care hospital. **Methods:** This cross-sectional observational study was conducted over one year at OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, Bangladesh during January 2023 to December 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 group of Nullipara single cephalic ≥ 37 weeks spontaneous labor (Group 1) had 150 CS and 320 deliveries. The group size, CS rate, and absolute group contribution to overall CS were 0.41%, 0.132%, and 0.211%, respectively. Another notable category includes nulliparous women with single cephalic pregnancies at 37 weeks or more who had induced labor or a CS before labor (category 2), which accounted for 0.03% of deliveries, had a high CS rate of 0.30%, and contributed 0.23% to the total rate. **Conclusion:** The utility of the Robson classification in identifying areas where caesarean sections may be overused, particularly in low-risk groups, and in evaluating the effectiveness of clinical interventions aimed at promoting normal deliveries. The regular use of the Robson classification in clinical practice can provide valuable insights into delivery trends, support evidence-based decision-making, and contribute to improved maternal and neonatal outcomes in tertiary care settings.

Corresponding author
Dr. Shohela Perveen *

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INTRODUCTION

The crude rate of caesarean section surgery is an important global measure for assessing obstetric service availability. [1] Concerns over such increases have prompted the World Health Organization to recommend that Caesarean Section (CS) rates do not exceed 15%. [2] There is some evidence that Caesarean Section rates above 15% are not connected with a further reduction in maternal and newborn mortality and morbidity. [3] Robson's classification would aid in understanding the internal structure of these rates within individual health facilities and population categories. [4] Identifying the indicators that lead to each group's contribution to section rates would aid in developing guidelines for rate reduction. These groups are designed in such a way that they are both mutually exclusionary and completely inclusive. In 2016, WHO and FIGO applauded the ten-group Robson categorization for its simplicity, robustness, repeatability, and adaptability, and recommended it for both tracking rates over time and between facilities. [5]

The Robson classification provides a planned and systematic technique to determining and monitoring typical delivery rates. It enables healthcare providers to discover patterns, evaluate the quality of care, and apply targeted interventions to encourage vaginal deliveries when appropriate. The Robson classification helps to understand the underlying causes of variances in delivery procedures by dividing women into separate categories based on criteria such as parity, previous cesarean sections, gestational age, fetal presentation, and labor initiation. Caesarean section is a popular surgical technique in Obstetrics. In recent years, the number of cesarean sections has increased [6]. Contractions in the pelvis, malpresentations (transverse lying and brow), and placenta previa are all absolute indications for caesarean section. When comparing the two modes of delivery, CS delivery poses higher dangers to the patient than vaginal delivery.

The TGCS is intended to address the diversity in CS rates by providing a consistent vocabulary for categorizing births, making it easier to identify which groups of women are most at risk of receiving needless CS. By

analyzing CS rates in these well-defined categories, healthcare practitioners can gain a better understanding of the underlying causes of the rise in CS rates and devise tailored treatments to prevent unnecessary procedures. [7] This method is especially useful in low-resource settings, where access to complete obstetric care may be limited, and abuse of CS can have serious consequences for maternal and newborn health.

Rising CS rates have far-reaching implications for maternal and neonatal health. While CS is an important intervention in circumstances where vaginal birth is risky, excessive use can lead to a variety of problems, including infections, blood clots, and prolonged recovery times for women. Newborns delivered via CS may also be at a higher risk of respiratory problems and other difficulties linked with bypassing the natural birth process. [8] Furthermore, the economic burden associated with needless CS treatments is significant, affecting not just the hospital system but also families and society in general.

METHODOLOGY

This study was designed as a cross-sectional observational analysis conducted over a twelve-months period following the acceptance of the study protocol. The primary aim was to evaluate the use of the Robson classification to assess, normal delivery and caesarean section trends in a tertiary care hospital. 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 OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, Bangladesh. The study population included all pregnant women admitted for delivery 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. 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 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

Table 1. Robson Classification Report for the twelve months

Group	NVD	Number of CS	Number of Delivery	Group Size (%)	Relative CS Rate (%)	Absolute CS Rate (%)
1. Nullipara single cephalic ≥ 37 weeks Spontaneous labour	147	150	320	0.41	0.132	0.211
2. Nullipara single cephalic ≥ 37 weeks induced or CS before labour	14	340	352	0.03	0.300	0.232
3. Multipara (exclude previous CS) single cephalic ≥ 37 weeks Spontaneous labour	144	19	161	0.40	0.007	0.106
4. Multipara (exclude previous CS) single cephalic ≥ 37 weeks induced or CS before labour	12	47	50	0.005	0.041	0.044
5. Previous Caesarean section single cephalic ≥ 37 weeks	3	430	439	0.008	0.379	0.290
6. All nulliparous breeches	1	15	16	0.002	0.013	0.010

7.	All Multiparous breeches (including previous caesarean section)	2	13	15	0.005	0.011	0.009
8.	All multiple pregnancies (including previous caesarean sections)	0	14	14	0	0.012	0.009
9.	All abnormal lies (including previous caesarean sections)	0	7	7	0	0.006	0.004
10.	All Single cephalic < 37 weeks (including previous caesarean sections)	33	98	139	0.092	0.086	0.091
Total		356	1133	1513			

Group Size (%) = n of NVD in the group/total N of NVD in the hospital X 100
Group CS rate (%) = n of CS in the group/total N of in the group X 100
Absolute contribution (%) = n of delivery in the group / Total N of women delivered in the hospital X 100

Table 1 illustrates that the Robson Classification Report for September 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 150 and number of deliveries was 320. And the group size, group CS rate and absolute group contribution to overall CS was 0.41%, 0.132% and 0.211%. 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 0.03% of the deliveries with a high CS rate of 0.30%, contributing 0.23% 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 0.041%, contributing 0.044%. The group of women with a previous cesarean section (Group 5) is the most prominent, comprising 0.008% of the total deliveries and exhibiting an exceptionally high CS rate of 0.379%, making it the largest contributor to the overall CS rate at 0.290%. Breech presentations, both in nulliparous and multiparous women (Groups 6 and 7), also show high CS rates of 0.013% and 0.011%, respectively, although their contributions to the overall CS rate are smaller, at 0.010% and 0.009%. 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 0.009% and 0.004% 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.

DISCUSSION

This cross-sectional observational study was carried out in the Department of Obstetrics and Gynaecology at OGSB Hospital and Institute of Reproductive & Child Health, Dhaka, with varying degrees of contribution from different obstetric groups. Study time

near about 1 year including protocol exceptencs, data collection and analysis.

In our study, across all twelve months, Group 5, The group of women with a previous cesarean section is the most prominent, comprising 0.008% of the total deliveries and exhibiting an exceptionally high CS rate of 0.379%, making it the largest contributor to the overall CS rate at 0.290%. However, this tendency raises concerns regarding the possibility of raising the rate of vaginal birth after cesarean (VBAC) as a method for lowering the overall CS rate. Other studies have demonstrated that, with proper selection criteria and close monitoring, VBAC can be a safe alternative to repeat CS, potentially lowering the CS rate in this population. [8]

Analyzing the Cesarean Section (CS) rate is critical for determining the quality of maternal healthcare and guaranteeing the safety of both the mother and the baby during childbirth. A high CS rate may indicate overuse of the procedure, putting the mother and newborn in unnecessary danger and complicating problems. [9] On the other side, low CS rates may indicate underutilization of the surgery, which, in specific patient populations, may result in unnecessary maternal and neonatal morbidity and death. [10] As a result, examining the CS rate is an important tool for assessing the effectiveness and efficiency of maternal healthcare systems, identifying areas for improvement, and ensuring that women receive enough and timely treatment during childbirth.

In a study conducted at a university hospital in Cote d'Ivoire, the most common categories were 1, 2, and 3. [11] The importance of group 2 in the Cote d'Ivoire study could be related to differences in indications for vaginal delivery inductions or CS between the two sites. In most high-income situations, groups 5, 2, and 1 account for the vast majority of the total CS rate, in contrast to low-income studies. [12]

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 0.03% of the deliveries with a high CS rate of 0.30%, contributing 0.232% to the overall CS rate. The high CS rates in this cohort highlight the effect of labor induction on CS rates, as induction frequently results in protracted labor or fetal distress, which increases the chance of CS. These findings are consistent with previous research that found greater CS rates related with labor induction, particularly in nulliparous women. [13]

The efficacy of CS in low-risk groups (groups 1, 2, 3, and 4) for non-absolute medical purposes should be studied further. The majority of facilities, including HFSUH, provide minimal birth monitoring, with only a low fetal heart rate recorded on the partograph. [14] The lack of appropriate facilities for measuring fetal heart rate, as well as a lack of close monitoring, make reliance on such signs challenging. [15] Opportunities for instrumental delivery and staff training to increase its use are required to reduce primary cesarean births in low-risk populations. Limiting the CS rate in low-risk pregnancies is crucial for curbing the rise in CS. [16] Because TGCS does not evaluate the suitability of CS indications, a continual audit of CS indications should be implemented in order to achieve the highest level of suitable CS rates. [17] Possible explanations of the rise in CS among groups 1 and 3 should be addressed in order to lower overall CS rates and the necessity for future cesarean procedures (group 5).

Breech presentations, which are categorized into Groups 6 and 7, consistently showed high CS rates, also show high CS rates of 0.013% and 0.011%, respectively, although their contributions to the overall CS rate are smaller, at 0.010% and 0.009%. However, the fluctuation in CS rates over time indicates

variances in clinical practice or patient characteristics. The management of breech presentations remains a source of discussion in obstetrics, with some studies arguing for a more conservative approach to CS in breech situations, while others emphasize the safety of CS as the preferred technique of delivery.

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 Robson classification system proved to be an effective tool for categorizing and analyzing delivery trends, offering valuable insights into the patterns of normal deliveries and caesarean sections. The study highlighted specific groups within the classification that contributed most to the caesarean section rates, providing a clear target for interventions to reduce unnecessary caesarean sections. The application of this system allows for a standardized comparison over time and between institutions, facilitating the identification of trends, assessing the impact of implemented policies, and promoting best practices in maternal care. Ultimately, the consistent use of the Robson classification in this hospital setting could contribute to optimizing delivery practices, enhancing maternal and neonatal outcomes, and ensuring the appropriate use of caesarean sections.

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.

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