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Using the Robson's Classification System to Analyze the Trend of Cesarean Section in a Tertiary Care Hospital: An Observational Study from Bangladesh

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Abstract **Original Research Article**

Introduction: A caesarean section (CS) is an obstetric procedure often performed when it is determined that vaginal delivery could be harmful to either mother or the baby. There is a growing concern about the increasing percentage of CS globally and this is particularly dramatic in many middle- and high-income countries, but at a lower degree in low-income countries. Hence, this study aimed to analyze the trends in cesarean section rates at a tertiary care hospital in Bangladesh using the Robson's classification system. ***Methods:*** This cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Islami Bank Hospital, Dhaka, Bangladesh from January 2023 to September 2024. Our study included 486 pregnant women who underwent a caesarean section under the Department of Obstetrics and Gynaecology of our hospital during the study period. ***Result:*** In this study, we found that group 5 (multiparous with previous CS, single cephalic, ≥37 weeks- with one previous CS and two or more CS) had the highest frequency with 220 cases (45.27%). Most of our patients (68.72%) were aged between 18-30 years and the majority (95.47%) of the deliveries occurred at gestational ages >37 weeks. Out of 229 caesarean sections, 67.08% were elective, and 32.92% were emergency cases. The most common indication for CS was PCS (45.27%), followed by poor progress in labour (21.60%) and foetal distress (13.37%). ***Conclusion:*** Our study found that the use of the Robson's classification of CS is increasing, and Robson group 5 is the main contributor to the overall CS rate.

Keywords: Caesarean section, Robson's classification, Delivery, Rate.

INTRODUCTION

A caesarean section (CS) is a life-saving intervention for both the mother and infant if a complication occurs during late pregnancy and childbirth. It is the most frequent surgical intervention in many nations [1].

CS is an obstetric procedure often performed when it is determined that vaginal delivery could be harmful to either mother or the baby [2,3]. It essentially involves delivering a foetus by making an incision on the mother's abdomen and the uterus after the age of viability [4]. A survey of 150 countries reported the average worldwide CS rate to be 18.6%, ranging from 6 to 27.2% in the least and most developed countries respectively [5]. Among the regions of the world, Africa has the lowest population level CS rate (7.3%) while Latin America and Caribbean regions have the highest (40.5%) [5]. Caesarean section rate also varies from one health facility to the other within the same country [6].

The WHO uses the proportion of women giving birth by CS as an indicator of the provision of life-saving services for both mothers and newborns [7]. WHO suggests that in normal populations CS rates should not exceed 10%–15% [8]. However, there is a growing concern about the increasing percentage of CS globally and this is particularly dramatic in many middle- and high-income countries, but at a lower degree in low-income countries [5,9]. The factors responsible for the

rising CS rates are still subject to debate. Factors such as fear of litigation, changing maternal characteristics, use of electronic foetal monitoring, and changing professional practice styles have been implicated by some authors [4,5,10].

Compared with vaginal delivery, the procedure is also associated with increased healthcare costs [4,11]. Hence, it is very important to examine the reasons for the CS trend in different health facilities and populations of women [12]. To achieve this, there is a need for the adoption and consistent use of an internationally accepted classification system that has been proven to enhance the analysis and comparison of CS rates in various settings in a consistent manner and transform this data into useful information [13,14]. The International Federation of Gynecology and Obstetrics (FIGO) and the World Health Organization (WHO) currently endorse the Ten-Group Robson classification system as a useful monitoring tool for evaluating CS rates over time both within and between different obstetric units [15,16]. This system uses obstetric characteristics like parity, gestational age, previous CS, labour onset (spontaneous or induced), presentation, and several foetuses (singleton or multiple) to classify women into ten groups [17]. There is some evidence to suggest that the use of the Robson classification system for auditing CS in healthcare facilities may result in reduced CS rates [18].

The Robson classification system provides a standardized framework for analyzing cesarean section rates by categorizing deliveries based on obstetric characteristics. This system, developed by Robson *et al.*, in 2001, divides all deliveries into ten groups based on factors such as parity, gestational age, and the presence of previous cesarean sections [17]. By using this classification, healthcare providers can identify the specific groups contributing to high cesarean rates and implement targeted interventions.

In Bangladesh, the rise in cesarean deliveries has prompted urgent scrutiny, particularly within tertiary care hospitals where specialized maternal health services are available. Understanding the trends in CS rates through the lens of the Robson classification can help elucidate the underlying causes and inform policies aimed at optimizing delivery practices.

This observational study aimed to analyze the trends in cesarean section rates at a tertiary care hospital in Bangladesh using the Robson's classification system.

METHODOLOGY & MATERIALS

This cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Islami Bank Hospital, Dhaka, Bangladesh from January 2023 to September 2024. Our study included 486 pregnant women who underwent a caesarean section under the Department of Obstetrics and Gynaecology of our hospital during the study period.

These are the following criteria to be eligible for enrollment as our study participants: a) Patients aged more than 18 years; b) Patients who underwent caesarean section; c) Patients with complete details available to classify CS according to Robson's classification were included in the study And a) Patients with recent surgery; b) Patients with any history of acute illness (e.g., renal or pancreatic diseases, ischemic heart disease, asthma, COPD, etc.); c) Patients who were unwilling to participate were excluded from our study.

Data Collection: Relevant data was gathered from the case files of every woman who participated in the study. The study employed a data capture sheet that was specially created to collect information on maternal characteristics, such as age, parity, gestational age, number of fetuses, foetal presentation, clinical indications for surgery, induction of labor (yes or no), type of CS (elective or emergency), and fetal outcome (live or stillbirth). The Robson's ten-group classification system with subgroups was used to categorize the CSs completed throughout the study period [Table 1].

Robson Classification: The Robson classification, which is also called the 10-group classification of CS (TGCS), proposed by Dr Michael Robson in 2001 is a system that classifies all women admitted at a specific health facility for childbirth into 10 groups based on five basic obstetric characteristics which are mutually exclusive and comprehensive [17]. The system does not include the indications for CS. The maternal obstetric characteristics are: parity (nulliparous, multiparous with and without previous caesarean section); gestational age (preterm or term); onset of labour (spontaneous, induced or pre -labour caesarean section); foetal presentation (cephalic, breech or transverse); and number of foetuses (single or multiple).

Statistical Analysis: All data were recorded systematically in preformed data collection form. Quantitative data was expressed as mean and standard deviation. Qualitative data was expressed as frequency distribution and percentage. The Robson implementation manual by WHO was used to interpret the results of this study. Statistical analysis was performed by using SPSS 23 (Statistical Package for Social Sciences) for Windows version 10. The Ethical Review Committee of Islami Bank Hospital approved the study.

RESULTS

Table 1: Robson's classification with subdivisions in our study participants

Robson Group	Clinical characteristics	Frequency	Percentage
1	Nulliparous, single cephalic, ≥ 37 weeks, spontaneous labor	80	16.46
2	Nulliparous, single cephalic, ≥ 37 weeks, induced labour or CS before labour	85	17.49
3	Multiparous without previous CS, single, cephalic, ≥ 37 weeks, spontaneous labour	5	1.03
4	Multiparous without previous CS, single, cephalic, ≥ 37 weeks, induced labour or CS before labour	10	2.06
5	Multiparous with previous CS, single, cephalic, ≥ 37 weeks	220	45.27
6	All nulliparous breeches	22	4.53
7	All multiparous breeches (including previous CS)	15	3.09
8	All multiple pregnancies (including previous CS)	17	3.50
9	All transverse or oblique lies (including previous CS)	10	2.06
10	All preterm single cephalic, < 37 weeks (including previous CS)	22	4.53

Table 1 shows the following distribution of clinical characteristics based on the Robson's Classification. Group 5 (multiparous with previous CS, single cephalic, ≥37 weeks- with one previous CS and two or more CS) had the highest frequency with 220 cases (45.27%). Group 2 (nulliparous, single cephalic, ≥37 weeks, induced labor or CS before labor-) followed by 85 cases (17.49%). Group 1 (nulliparous, single cephalic, ≥37 weeks, spontaneous labor) had 80 cases (16.46%). Other groups, such as Group 6 (all nulliparous breeches) and Group 10 (preterm single cephalic, <37 weeks) each had 22 cases (4.53%), while smaller group like Group 3 (multiparous without previous CS) had 5 cases (1.03%).

Table 2: Demographic and obstetric characteristics of our study patients

Variable	Frequency	Percentage
Maternal age (years)		
18-30	334	68.72
≥ 30	152	31.28
Parity		
Primigravida	197	40.53
Multigravida	289	59.47
Gestational age (weeks)		
< 37	22	4.53
> 37	464	95.47
Presentation		
Cephalic	439	90.33
Non-Cephalic	47	9.67
Number of foetuses		
Singleton	469	96.50
Multiple	17	3.50
Caesarean Section (n = 229)		
Elective	326	67.08
Emergency	160	32.92

Table 2 shows demographic and obstetric characteristics of the respondents. The study included 486 respondents, 68.72% aged between 18-30 years and 31.28% aged ≥30 years. Primigravida had 40.53%, while multigravida had 59.47%. A majority (95.47%) of the deliveries occurred at gestational ages >37 weeks, with 90.33% having a cephalic presentation. The number of foetuses was singleton (96.50%), and only 3.50% had multiple foetuses. Out of 229 caesarean sections, 67.08% were elective, and 32.92% were emergency cases.

Table 3: Indications for caesarean section in our study patients

Indications	Frequency	Percentage
PCS (Previous caesarean section)	220	45.27
PPL (Poor progress in labour)	105	21.60
CPD/OL (Cephalopelvic disproportion/ Obstructed labour)	20	4.12
FD (Foetal distress in labour)	65	13.37
MR (Maternal request)	20	4.12
BP (Breech presentation	37	7.61
M/AL (Another malpresentation / abnormal lie)	10	2.06
MP (Multiple pregnancy),	17	3.50
PTL (Preterm labour)	22	4.53

Table 3 shows the most common indication for caesarean section was PCS having 45.27% of cases. Poor progress in labour was 21.60% of cases. Foetal distress (FD) was for 13.37% of cases, while breech presentation had 7.61%. Cephalopelvic disproportion and maternal request each had 4.12% of cases. Preterm labour occurred in 4.53% of cases, multiple pregnancy in 3.50%, and other malpresentations in 2.06% of cases.

DISCUSSION

The Robson categorization can be used as a common beginning point when identifying the grounds for CS by carrying out more research on the Robson group's indications for CS as needed, even though it does not by itself give the justifications for CS. Similarly, this classification can be used as a starting point by including epidemiological data and conducting a more comprehensive analysis and comparison of all prenatal occurrences and outcomes.

In the current study, Robson group 5 had the biggest contribution to cesarean delivery, followed by 2, 1, and 6. The WHO-recommended percentage of 45.27% is significantly lower than the CS rate [19]. Research carried out in Nigeria yielded a CS rate of 51.3%, according to Babah *et al.*, [20] Different CS rates, such as 21.4% in Abuja [21] and 42.4% in Bayelsa, have been recorded by other authors who work in public tertiary health facilities in Nigeria. [22]. According to studies, CS rates are frequently greater in private healthcare facilities than in public healthcare facilities [13,20]. According to the authors from private health institutions in Italy and Ethiopia, the respective CS rates were 59.2% and 34.5% [23, 24]. Remarkably, in these contexts, public health facility CS rates have been reported to be lower than private facility rates (25.7% in Ethiopia and 30.4% in Italy) [23,24].

Nevertheless, the relatively high CS rates in private facilities often suggest inappropriate use. Consistent use of the Robson classification in all health facilities will likely assist in identifying the obstetric population that disproportionately contributes to the high CS rate [13]. Monitoring these specific groups will allow interventions that may lead to a reduction in nonmedically indicated CSs.

Numerous hospital-based research has shown that the Robson categorization is becoming more and more popular in South Asia [25–30]. Modified Robson classification has only been used in a small number of research. Research was done to evaluate CS rates [25–30], another study was done to compare intermittent and continuous fetal heart rate monitoring procedures [31], and another was done to evaluate trends [32]. Large-scale studies that compare organizations, nations, and multi-center interventions are scarce, as is additional research on all prenatal occurrences and outcomes that includes important epidemiological characteristics.

Many hospital-based studies that adopt the Robson Classification for monitoring CS rates found group 5 to be the high-risk group and the major contributor to overall CS rates by several studies. [25-27,29,30] In this study the other major contributors were group 2 (nulliparous, single cephalic, ≥37 weeks, induced labor or CS before labor-) which was found in 85 cases (17.49%) and group 1 (nulliparous, single cephalic, ≥37 weeks, spontaneous labor) who had 80 cases (16.46%).

Few studies found Robson group 1 was the greatest contributor to the overall CS rate [28,31,33,34]. The other major contributors to the overall CS rate were group two, [25,26,29,31,34] group three [31,33, 35,36] group four,27 [28], and group ten [28, 31].

In the present study, other groups, such as Group 6 (all nulliparous breeches) and Group 10 (preterm single cephalic, <37 weeks) each had 22 cases (4.53%). Other studies found the CS rate for breech in group 6 (nulliparous women with singleton breech pregnancy) and group 7 (multiparous women with a singleton breech pregnancy including previous CS) [19,37-39].

Akadri *et al.*, found all women in groups 6 (nulliparous breech) and 9 (transverse or oblique lie) had caesarean births. Similar findings were reported in other studies [13, 23, 40, 41].

Smaller groups like Group 3 (multiparous without previous CS) had 5 cases (1.03%) in the present study. The lower group-specific CS rate in group 3

women (16.9%) compared to group 1 women (24.4%) was not unexpected since nulliparous women are more prone to labour dystocia than multiparous women [42].

The major indications for CS in these women were poor progress in labour, cephalopelvic disproportion, and foetal distress in labour. Of all indications, the most common indication for CS in this study was previous CS (45.27%). This was followed by labour dystocia which accounted for almost 20% of the indications. Previous CS was also the commonest indication in other similar studies, with reported rates of 32% in Lagos, 39% in Tanzania, 35% in Bangladesh, and 38% in Nigeria [12,13,20,41]. Similar indications have been reported from eastern Ethiopia [2] and elsewhere in Africa, Asia and Australia [11,13, 39].

Limitations of the study

Our study was a single-center study. We took a small sample size due to our short study period. After evaluating those patients, we did not follow up with them for the long term and did not know other possible interference that may happen in the long term with these patients.

CONCLUSION AND RECOMMENDATIONS

In our study, we found that the use of the Robson classification of CS is increasing and Robson's group 5 is found to be the main contributor to the overall CS rate. The clinical practices could be modified to optimize CSs in health facilities.

Interventions directed at reducing the first CS by improving the management of spontaneous and induced labours; and strengthening clinical practice around encouraging vaginal birth after caesarean section will have the most significant effect on reducing caesarean section rate in the future.

So further study with a prospective and longitudinal study design including a larger sample size needs to be done to validate the findings of our study.

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