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ANALYSIS OF CESAREAN SECTION RATE USING THE 10-GROUP ROBSON CLASSIFICATION SYSTEM AT ABU ALI SINA TEACHING HOSPITAL

Background: Cesarean section (CS) rate is rising worldwide including in Afghanistan. Access to CS indicates maternal quality care in a healthcare system, but higher rates are associated with increased maternal-fetal mortality due to CS severe complications. The WHO recommends the Robson classification to monitor the rational use of CS. This study aims to analyze the CS rate at Abu Ali Sina Hospital based on the 10-Group Robson classification.

Methods: This retrospective cross-sectional study was conducted at Abu Ali Sina Hospital, a tertiary care teaching hospital in Balkh, Afghanistan. The data was collected from medical documents of all women who delivered in February-March 2022. Women were classified into Robson 10 groups then the total rate of CS, absolute, and relative contribution of each group to the overall CS rate was calculated.

Results: Among 2858 women delivered during the study period, 567 (19.8%) had CS. Group 5 (35.8%) was the largest contributor to the overall CS rate. 122 (61%) of women in this group had undergone pre-labor CS. Group 1 (18.5%), and Group 3 (13.2%) were the second and third largest contributors to the total CS.

Conclusion: This study revealed that Group 5 was the main contributor to the overall CS. The previous CS scar was the most common indication of repeated cesarean delivery. Furthermore, high rates of CS were observed in low-risk group women. We also identified that the Robson classification can be implemented as a monitoring tool in all settings in Afghanistan even those with a lack of facilities.

Key words: Cesarean section (CS), Robson, childbirth, complications with CS.

Introduction

World Health Organization (WHO) declares increasing rates of cesarean section globally without any sign of a downtrend. Worldwide cesarean section rate was 1/14 (7%) in 1990 and has risen 3 times in the last three decades as it accounts for more than 1/5 (21%) of childbirths today. Whether this trend continues the cesarean section is likely to compose 1/3 (29%) of all births at the end of the current decade. Despite the worldwide projection, there is a significant difference between high-income countries with an average of 27.2% and low-income countries with an average of 8.2% rates. That shows over-intervention and lack of access to CS in different countries of the world [1-2].

WHO recommends efforts to provide CS for women when medically indicated rather than striving to achieve a specific rate. On the other hand, WHO also considered a rate of between 10-15% as an ideal and reasonable rate for CS, and a rate higher than this is unjustified [3]. A longitudinal study on 19 developed countries conducted in 2014 indicated that a higher CS rate of more than 10-15% cannot decrease maternal and perinatal morbidity and mortality rate [4].

Reasons for the increasing rate of cesarean deliveries differ among countries and include maternal request [5], fear of pain and trauma to the genital tract and fetus during labor and delivery, fear of prolonged delivery, fear of repeating traumatic delivery, and history of infertility [6]. In addition factors like doctor's encouragement, urban lifestyle, having first pregnancy at older ages, weight gain during pregnancy, and unnecessary cesarean sections in private practices for financial benefits of both doctor and hospital are included in the extent of the rise of cesarean deliveries. [7,8].

So far an increase in maternal-neonatal quality care, implementation of standard programs, physical changes in delivery rooms for increasing mothers' privacy, utilization of pain-reducing birth methods, and preparation classes have not seemed to significantly impact on CS rate. Thus FIGO suggests some strategies including equal fee for doctors in case of assuming both vaginal or cesarean delivery, mandatory publication of CS rates, awareness of women on advantages and risks of CS, allocation of obtained money from decreasing CS rate for

resources that favors vaginal delivery, and use of a classification system for proper monitoring of rational use of CS [9]. These strategies must be implemented in all governmental and private hospitals to reduce the rate of CS.

In a systematic review of 27 classification systems conducted in 2011, Robson's 10-Group classification system was the best method with all the characteristics to meet the international and local requirements. The Robson classification system is applicable in both high and low-income nations and is capable of evaluating, analyzing and comparing obtained CS rates within and across the health facilities with the purpose to improve care [10]. Furthermore, the classification system is accepted internationally, and WHO as well as FIGO recommend the system implementation as a worldwide standard for practice in various facilities responsible for delivery. The Robson Ten-Group classification system is well-defined, robust and easily implementable with mutually exclusive and totally inclusive groups of women. Women are categorized based on 6 basic obstetric parameters (parity, previous cesarean sections, gestational age, type of labor onset, presentation of fetus, and the number of fetuses) (Table 1).

Table 1 – The Robson Classification with subdivisions

Groups	Obstetric population
1	Nulliparous, single cephalic, >37 weeks in spontaneous labor
2	Nulliparous, single cephalic, >37 weeks, induced or CS before labor
2a	Labor induced
2b	Pre-labor CS
3	Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labor
4	Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labor
4a	Labor induced
4b	Pre-labor CS
5	Previous CS, single cephalic, >37 weeks
5.1	With one previous CS
5.2	With two or more previous CSs
6	All nulliparous breeches
7	All multiparous breeches (including previous CS)
8	All multiple pregnancies (including previous CS)
9	All abnormal lies (including previous CS)
10	All single cephalic, <36 weeks (including previous CS)

Assessment of data collection, quality control, clinical management and assessment of strategies for optimizing rate of CS where necessary are the advantages of this Robson classification [3].

The overall CS rate in Afghanistan has raised from 2.7% in 2015 to 6.6% in 2018 [11]. Although this is an optimal rate of CS and rates below 5% indicate a lack of access to the lifesaving procedure, it shows a sharp increase (2fold) in a short time interval and an alarm for the future. Moreover, there is a wide disparity in CS rates within the country and urban/rural regions. Health surveys indicate a rate of 8.2% utilization of CS in urban areas while only 1.9% in rural areas [12]. War, international conflicts, drought and the famine within four decades ruined the healthcare infrastructure and have resulted in Afghanistan being among the 10 countries having the highest maternal mortality rate [13]. Higher rate and unjustified use of CS in a low-income country with limited resource settings, low obstetric quality care, and maternal poor access to the health facilities [14] are associated with potential risk and a dramatic increase in maternal mortality rate that can harm an already challenged health care system.

We, therefore, aim to analyze the overall rate of CS and target groups that make the highest contribution to the overall cesarean sections using the Ten-Group Robson classification system in the maternity department of Abu Ali Sina teaching hospital, Balkh, Afghanistan.

Materials and Methods

This retrospective cross-sectional study was conducted for two months from 1 February to 30 March 2022 at Abu Ali Sina Regional hospital in Balkh, Afghanistan. This hospital is the largest public and teaching healthcare center in the northern region of Afghanistan with approximately 20000 deliveries per year and serves as a tertiary center for referred high-risk cases from fourteen relevant districts. The study population included women who gave birth to a live or stillborn baby of ≥28 weeks gestational age. Cases with rupture of the uterus, gestational ages before the fetal viability (<28 weeks), and cases with incomplete information of variables preventing classification to one of ten groups were excluded. The Robson classification implementation manual organized by WHO was used as a tool for guidance [15]. The data was collected from the patients' medical records by an experienced nurse using a chart with relevant core variables utilized for the Robson 10-Group classification. The variables included parity (nullipara or multipara), number of previous cesarean deliveries (none, one or more), gestational age (term or preterm), the onset of labor (spontaneous, induced, or pre-labor cesarean section), number of the fetus (single or multiple), and presentation or lie of the fetus (cephalic, breech or oblique). Based on the variables, all women were categorized into one of the Robson 10-Group classifications. Data were entered in IBM SPSS Statistics version 28.0 data view and then analyzed. For each Robson group, the total number of CS and vaginal deliveries were calculated, then the rate of cesarean sections within each Robson ten group, absolute group contribution, and relative group contribution to the overall CS rate was calculated. The results were shown according to the Robson report table introduced by WHO [15].

Results

A total of 2873 women attended the obstetric ward for labor and delivery during the 2 months. Fifteen patients were excluded from the study for uterine rupture, gestational age lower than 28 weeks, and missing or questionable data. Therefore, a total of 2858 deliveries were analyzed. Table 2 summarizes the basic characteristics of those women delivered at Abu Ali Sina Hospital during the study period.

Table 2 – Characteristics of women giving birth at Abu Ali Sina Hospital Balkh, Afghanistan, February-March 2022

Characteristics	(N)	(%)
Parity		
0	726	25.4
1-4	1646	57.6
≥5	486	17
Gestational age		
<37	95	3.3
≥37	2763	96.7
Fetal presentation/lie		
cephalic	2778	97.2
Breech	66	2.3
Transverse/oblique	14	0.5
Number of fetus		
Single	2828	99
Multiple	30	1
Prior C/s scar		
none	2552	89.3
1	219	7.7
>1	87	3
Onset of labor		
Spontaneous	2426	84.9
Induced	302	10.6
Pre-labor C/s	130	4.5
Mode of delivery		
Vaginal	2291	80.2
Cesarean section	567	19.8
Mode of C/s		
Emergency	461	81.3
Elective	106	18.7

The Proportion of each Robson groups, CS rate, and their relative and absolute contribution to overall CS rate in Abu Ali Sina Hospital, Afghanistan, February-March 2022 were presented on table 3. The overall rate of CS was 19.8%.

Table 3 – Proportion of each Robson groups

Robson Group	Total Number of CS in each group	Total number of women in each group	Group size[1] (%)	Group CS rate[2] (%)	Absolute group contribution to overall CS rate[3] (%)	Relative group contribution to overall CS rate[4] (%)
Group 1	105	526	18.4	19.9	3.7	18.5
Group 2	45	142	4.9	31.6	1.6	7.9
2a	33	130	4.5	25.4	1.2	5.8
2b	12	12	0.4	100	0.4	2.1
Group 3	75	1558	54.5	4.8	2.6	13.2
Group 4	44	168	5.9	26.1	1.6	7.8
4a	22	146	5.1	15.1	0.8	3.9
4b	22	22	0.8	100	0.8	3.9
Group 5	203	281	9.8	72.2	7.1	35.8
5.1	122	200	7	61	4.3	21.5
5.2	81	81	2.8	100	2.8	14.3
Group 6	20	26	1	76.9	0.7	3.5
Group 7	22	37	1.3	59.5	0.8	3.9
Group 8	10	30	1	33.3	0.3	1.8
Group 9	13	13	0.5	100	0.4	2.3
Group 10	30	77	2.7	38.9	1	5.3
Total	**567**	**2858**	**100**	**19.8**	**19.8**	**100**

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 women in the group x 100
3. Absolute contribution (%) = n of CS in the group / total N of women delivered in the hospital x 100
4. Relative contribution (%) = n of CS in the group / total N of CS in the hospital x 100

Group 3 (multiparous women without a previous CS, single cephalic pregnancy, ≥37 weeks, spontaneous labor) made the greatest proportion among the women who attended for labor and delivery accounting for 54.5% followed by Group 1 (Nulliparous women, single cephalic pregnancy, ≥37 weeks, spontaneous labor) which accounted for 18.4% (Table 3).

Women in group 5 (multiparous women, one or more previous CS, single cephalic pregnancy, ≥37 weeks) (35.8%) made the largest contributor of CS to the overall CS rate. Group 1 (18.5%), and Group 3 (13.2%) were the second and third contributors of CS to the overall CS rate. These 3 groups accounted for approximately 68% of CS (Table 3).

Group 5 was further analyzed related to the number of previous cesarean scars, the onset of labor, and indications for CS. The analysis showed that 81 (100%) of women with 2 or more previous cesarean scars and 61% of women with on previous cesarean scar had pre-labor CS. 78 (39 %) women with one previous cesarean scar were able to deliver vaginally. Among women who had undergone repeated CS at present delivery, 76 (37.4%) had pre-labor CS while 126 (62.6%) women had spontaneous onset of labor, and none of the women were induced (Table 3).

Previous cesarean scar, cephalo-pelvic disproportion, and contracted pelvis were the most common indications of cesarean delivery in women belonging to Group 5 (Table 4).

However, in Group 1 and Group 3 cephalo-pelvic disproportion and fetal distress were the most common indication for cesarean section.

Of the remaining groups, CS was higher in Group 2 and Group 4 accounting for 7.9% and 7.8% of the overall CS rate, respectively. Cesarean section in each group is more than 26% (Table 3). Women with breech presentation either nullipara (Group 6) or multipara (Group 7) had high group CS rates of 76.9% and 59.5%, respectively. Nearly 67% in both multiparous and nulliparous had CS for breech presentation. All women with an abnormal lie in group 9 (single pregnancy with a transverse or oblique lie including women with previous CS) had undergone cesarean delivery.

Table 4 – Indication for cesarean section (Group 5)

Indication for cesarean section	Frequency	Percentage
Previous cesarean sections	92	45.3
Cephalo-pelvic disproportions	19	9.3
Contracted pelvis	18	8.9
Prolonged labor	13	6.4
Postdate pregnancy	10	4.9
Antepartum Hemorrhage	7	3.4
Fetal distress	6	2.9
Maternal request	5	2.5
BOH	2	1
HTN disorder of pregnancy	1	0.5
Others (sever oligo-hydroamnious, mal-presentation)	30	14.8
Total	203	100

Further groups and subgroups analysis indicated that among women with CS at present gestation 53.9% (306) had a previous cesarean scar. Out of these, 71.5% (219) had 1 and 28.5% (87) had more than 1 cesarean scar. In addition, in women with the cesarean section at present gestation 22.9% (130) had undergone pre-labor CS and 10.2% (58) induced for the onset of labor whereas the majority (66.8%; 379 women) had a spontaneous onset of labor. CS rates were higher in multiparous (68%) than nulliparous women (32%).

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Discussion

Cesarean section is a lifesaving surgical procedure but can result in short and long-term complications including hysterectomy, placenta previa, placental adhesions, rupture of the uterus, and maternal mortality. The risk of abnormal placentation increase with the number of previous CS scars [16]. Severe complications are more common in low-income countries due to higher fertility rates, limited resources, and women's poor access to health facilities.

Our study indicated that Groups 5, 3, and 1 were the main contributors to the overall CS rate in Abu Ali Sina Hospital. Among them, women in group 5 (Multiparous women with previous CS) made the highest contribution to the CS rate accounting for 35.8% of the overall CS rate approximately 1/3 of all cesarean deliveries in the hospital.

Although women in Group 5 belong to high-risk groups, the CS rate within this group must not exceed 50-60%. Meanwhile, the Group size is lower than 10% which indicates the CS was overall low in the past years (Table 3). Furthermore, the study revealed that 57.3% (70/122) of women with only one previous cesarean scar attending the labor ward with spontaneous onset of labor and cervical dilatation ≥4 cm had an emergency CS without any trial of labor and 27% (33) of them had a pre-labor cesarean section. Considering the 93% success rate of trial of labor and no significant difference in duration of labor and postpartum complication between vaginal birth after cesarean section (VBAC) and vaginal birth of the non-cesarean (VBNC). Moreover, the risk of early PPH, puerperal complications, and hospital stay is higher in repeated CS than in VBAC [17]. A trial of labor must be considered as an option for these women. Lower quality levels of routine intrapartum and postpartum care e.g. continuous fetal monitoring [18], lack of resources and number of on-duty staff for emergency obstetric cases [19], and a lack of information on their previous Cs can be the factors for physician's reluctancy in the trial of labor. Our finding is consistent with two studies conducted in Egypt where Group 5 made the highest contribution to the overall Cs rate with a high proportion of repeated CS in women with one previous CS who started labor spontaneously and had favorable cervix [20,21].

Women in Groups 1 and 3 made the second and third contributors to the overall CS rate. As such, women in these two groups were the two largest

proportion who attended for labor and delivery. Similar results were observed in studies conducted in Ethiopia and Tanzania [22,23]. Although CS rates within these groups are less prevalent than in Groups 10, 8, 2, and 4. Large group sizes contributed that both groups account for a considerable CS rate to the overall rate. Furthermore, Group 1 and 3 together account for 30% of all CS deliveries. This is merely important hence women participating in these groups represent low-risk women and high rates of CS within these groups call into question the indication of the procedure. Studies already conducted in Tanzania and Brazil with the same classification usage indicated a similar finding of high group CS rate in Groups 1 and 3 [23, 24].

Group 4 also revealed a high rate of CS (26.1%) within the group. CS rate in this group rarely should be higher than 15% [15] and a higher CS rate in this group indicates high rates of failure of induction or pre-labor CS per maternal request. Further group analysis showed that half of the women (50%) in Group 4a with a cesarean mode of delivery had a failure of induction followed by fetal distress (31%). Pre-labor CS was observed in 13.1% of women in Group 4. The result of our study is in accordance with the studies conducted in Zagazig University Hospital, Egypt, and in Brazil with a high Group 4 CS rate of 49.3% and 51.1%, respectively. However, the women proportion in the group was low [21,24].

Whereas the study was conducted in a tertiary care center with a maternal unit and referred cases of obstetric complications from near relevant districts, Group10 showed a high rate (38.9) of CS within the group.

Groups 6 and 7 showed a high rate of CS in breech presentations. Only 33% of breech presentations both in nulliparous and multiparous were delivered vaginally. Due to the high rate of perinatal mortality, neonatal morbidity, and mortality in vaginal term breech delivery compared to planned CS, there is a trend toward elective CS, particularly in settings with no skilled and experienced obstetrician for vaginal breech delivery [25]. Elective Cs in term breech regardless of fetal weight and parity is associated with a decrease in perinatal mortality and better neonatal outcome. However, it is associated with a high rate of CS [26]. Nearly 9.5% of breech presentations with a cesarean mode of delivery had preterm gestations in our study.

To our knowledge, this is the first study conducted in Balkh, Afghanistan to analyze the rate of CS using the Robson Ten-Group classification. The collected data for analysis from the hospitals' medical records was complete. However, the study population is small and carried out in a short time interval and covers only one setting, but it can be an initial point for the following studies to monitor the trend of CS rate in Abu Ali Sina Hospital and compare the result with other hospitals. Maternal age, demographic factors and neonatal outcome that indicates the overall healthcare quality were not included in our study. In future studies, these variables must be considered to have a better knowledge of the care, and early intervention if required to improve the outcome.

Conclusion

In this study, Groups 5, 1, and 3 were identified as the main contributor to total CS at Abu Ali Sina Hospital. We revealed that a previous CS scar was the most common indication of repeat cesarean section. High rates of CS were also observed in women who belong to low-risk groups. In addition, we also identified that the Robson classification can be applied in the data collections system of all settings in Afghanistan even those with a lack of facilities. Further analysis of these target groups is required to recognize the contributing factors and sought for reducing primary CS by applying potential interventions such as evaluation of the current protocols, active management of labor, and mandatory use of partograph to allow women with previous CS scar to have a TOLAC, encourage the use of vacuum extraction, auditing CS decisions and increase patients about awareness of advantages and risk of CS.

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