

Assessing Caesarean Section rates using the Robson Ten Group classification system in the western rural center of Nepal

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ABSTRACT

Introduction: Rising caesarean sections (CS) have been a global concern. The World Health Organization, as a global standard for assessing, monitoring, and comparing the caesarean rate, has adopted the Robson or ten-group classification system. The study aimed to know the caesarean section rate in Karnali Academy of Health Sciences (KAHS) using the Ten Group Classification System, or Robson Classification, and evaluate major contributing group to overall caesarean rate.

Methods: This was a hospital-based retrospective study conducted in KAHS, Nepal, from April 2022 to March 2023. The population data were retrieved from the maternity ward and classified using the Ten Group classification system. The overall caesarean rate, the largest population group, the caesarean section rate in each group, and the primary and least contributing groups were analysed.

Results: The total number of deliveries during the study period was 505, with a caesarean section rate of 16.4%. The highest delivery population was in group 1, 174 (34.4%), followed by group 3, 143 (28.3%). The significant contribution to the CS rate was from group 5 (88.2%). All women with a single pregnancy with a transverse or oblique lie, including those with a previous caesarean section in Group 9, had 100%, but all the deliveries by convention were caesarean.

Conclusion: The classification has effectively identified the group with a large number in delivery and also has identified the major contributing group. This has provided a clear depiction of the need for strategic intervention, mapping institutional policies and effective clinical decision-making to optimize the caesarean rate.

Keywords: Caesarean section rate, High altitude, KAHS, Maternal health, Rural Nepal, Robson Ten Group Classification System

Introduction

A progressive rise in caesarean section (CS) rates has been a global concern regarding potential maternal and neonatal adverse outcomes. CS, though, is a life-saving intervention. The World Health Organization (WHO) has marked an ideal caesarean rate range between 10-15% of total births [1]. Traditionally, the overall percentage of deliveries was analysed to monitor the CS rate, which was challenging to interpret and compare. The Ten Group Classification System is designed to provide a standardized and consistent method to assess CS rates [2]. The classification is robust, relevant, and yet simple, which facilitates comparisons across different institutions and over time [3]. Factors such as socioeconomic status, healthcare access, and clinical practices have contributed to the rise in global CS rates, from 12% in 2000 to 21% in 2021

[4]. In Nepal, the CS rate is approximately 15%, with a higher prevalence in urban settings compared to rural regions [5]. Potential adverse outcomes could occur with overuse of CS in urban settings, leading to maternal complications, increased healthcare costs, and unnecessary surgical risks. Conversely, in low-resource settings, inadequate access to CS can increase maternal and perinatal mortality [6].

The classification system categorizes women based on obstetric characteristics into ten exclusive groups [2]. The classification enables healthcare institutions to analyse CS trends systematically, compare data across different hospitals and regions, and implement targeted interventions to optimize CS rates [7]. WHO and various international organizations recommend using the Robson Classification as the standard framework for CS audit and monitoring, considering its adaptability and applicability [8].

Private institutions often have higher CS rates than public hospitals, ranging from 10-30% [9]. The most significant contributors to CS rates were previous CS and nulliparous women with labour induction [10]. However, CS rates are more focused on urban tertiary hospitals, leaving a gap in the literature regarding rural and remote healthcare settings. Karnali Academy of Health Sciences (KAHS), situated in a rural province of Nepal, serves as a referral centre for high-risk pregnancies. This study aims to assess the caesarean section rate in rural settings, comparing it with national and global trends and highlighting the areas of need to optimize the CS rate.

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METHODS

A retrospective, descriptive cross-sectional study was conducted in KAHS, Nepal, from April 2022 to March 2023. The study included women with gestational age above 22 weeks and fetal weight above 500 g, with live or stillborn fetuses, with or without malformation. Women with previous caesarean sections were also included, while women with uterine scars from other procedures (e.g., myomectomy) were excluded from the study. The women who delivered in the maternity ward were categorized by the ten-group classification as described in Table 1 [2]. The women were classified on admission before their delivery. All deliveries were categorized based on six basic obstetric variables: parity, gestation age, onset of labour (spontaneous or induced), previous caesarean section, number of fetuses, and fetal presentation. The data were retrieved from the maternity ward records. Data analysis was performed using SPSS version 16. The number of deliveries and caesarean deliveries in each Robson group was calculated. The caesarean rate in each group, as well as the absolute and relative contributions to the overall caesarean rate, were also calculated.

Table 1: The Ten-Group Classification System

Group	Obstetrics population
1	Nulliparous women with a single cephalic pregnancy, ≥ 37 weeks of gestation in spontaneous labour
2	Nulliparous women with a single cephalic pregnancy, ≥ 37 weeks gestation with induced labour or pre-labour caesarean section
3	Multiparous women without a previous caesarean section, with a single cephalic pregnancy, ≥ 37 weeks of gestation in spontaneous labour
4	Multiparous women without a previous caesarean section, with a single cephalic pregnancy, ≥ 37 weeks gestation, with induced labour or pre-labour caesarean section
5	All multiparous women with at least one previous CS, with a single cephalic pregnancy, ≥ 37 weeks of gestation
6	Nulliparous women with a single breech pregnancy
7	Multiparous women with a single breech pregnancy, including those with previous caesarean section(s)
8	All women with multiple pregnancies, including those with previous caesarean section(s)
9	All women with a single pregnancy with a transverse or oblique lie, including women with previous CS(s)
10	All women with a single cephalic pregnancy < 37 weeks of gestation, including women with previous CS(s)

Table 2: Robson classification and its contribution to the CS rate.

Group	Number of CS in group	Number of women in group	Group size (%) *	Group CS rate (%) **	Absolute group contribution rate (%) ***	Relative contribution of group to overall CS rate (%) ****
1	17	174	34.4	9.7	3.4	20
2	12	53	10.4	22.6	2.4	14.4
3	10	143	28.3	6.9	2.0	12
4	6	57	11.2	10.5	1.2	7.2
5	15	17	3.36	88.2	3.0	18
6	6	10	1.98	60.0	1.2	7.2
7	3	9	1.78	33.3	0.6	3.6
8	4	8	1.58	50.0	0.8	4.8
9	4	4	0.79	100	0.8	4.8
10	6	30	5.94	20.0	1.2	7.2

* = number of women/total number delivered in hospital $\times 100$; ** = number of CS in the group/total number of women in the group $\times 100$; *** = number of CS in the group/total number delivered in the hospital $\times 100$; **** = number of CS in the group/total number of CS in the hospital $\times 100$

RESULTS

The total number of deliveries in the hospital was 505 in a year. Eighty-three (16.4%) women had a caesarean delivery, while 420 had a vaginal delivery. The major contributing group for CS was multiparous women with at least one previous CS, a single cephalic pregnancy, and a gestation of ≥ 37 weeks, i.e., Group 5 (88.2%). The large delivery population was nulliparous women with a single cephalic pregnancy, ≥ 37 weeks of gestation in spontaneous labour, Group 1 (34.4%). All women with a single pregnancy with a transverse or oblique lie, including those with a previous caesarean section, by convention require caesarean delivery; hence, Group 9 had a 100% CS rate (Table 2)

DISCUSSION

KAHS is an institution that lies in the western region of Nepal. It is the first-ever academic and tertiary care centre established in one of Nepal's most rural areas. Annually, it provides delivery services from 500 to 1,000. Being a referral centre, high-risk cases and prolonged pregnancy cases are delivered. There was a total of 505 deliveries, among them 83 had received a caesarean delivery in the study year. The CS rate at KAHS is 16.4%, which aligns with the WHO recommendation [2]. The data from KAHS, with an increasing caesarean rate, especially in women with a history of previous CS, Group 5 (88.2%), accounting for 18% of the overall caesarean sections, reflects the overall global and national trend [5,6]. This implies that clinical decision-making needs to be more customized. If the trial of labour criteria is met, women with a history of caesarean sections may be given an option for an attempt at vaginal birth after caesarean (VBAC), even though repeat caesarean sections are frequently considered required [11]. This could lessen the likelihood of needless caesarean sections.

The population size in group 2 is 10.4%, suggesting that labour induction and elective caesarean for nulliparous women are not as standard as in high-resource settings. A smaller Group 2 size might indicate a preference for expectant management over induction in nulliparous women. However, Group 2 typically has a higher CS rate than Group 3, as these are first-time mothers undergoing labour induction or planned CS [2]. The 22.6% CS rate in our study falls within expected ranges, although it is slightly higher than some global benchmarks (typically 15-20%) [3]. This group's significant contribution may be due to various factors, including maternal request, medico-legal concerns, or a physician's preference for a surgical delivery, although this is particularly relevant in low-risk cases [11,12]. Increasing efforts to promote vaginal deliveries in low-risk women and educating both healthcare providers and patients about the risks of caesarean could potentially reduce these numbers [13].

The large group size in group 3 (28.3%) indicates that a significant proportion of the obstetric population consists of multiparous women in spontaneous labour. This group represents a low-risk population, as these women have a history of vaginal birth and are in spontaneous

labour. The caesarean rate of 6.9% is relatively low and aligns with international benchmarks, which generally report rates between 2% and 10% for this group [6,14]. A low CS rate in this group reflects the overall good obstetric practices, where most women can deliver vaginally without complications. Factors such as fetal distress, labour dystocia, or maternal comorbidities might have influenced decision-making [15].

Repeat caesarean deliveries are common in Group 5, and they usually have the highest CS rate. Increases in VBAC rates have been shown to safely reduce overall CS rates without compromising the health of the mother or the fetus [6]. A CS rate in this group that is higher than 85–90% suggests a low level of VBAC adoption and calls for an institutional VBAC policy review. The term “breech trial” showed that planned CS for breech presentations improved newborn outcomes [16]. Hence, our institution reported high CS rates in Groups 6 and 7. Skilled providers, careful case considerations, and successful external cephalic version could facilitate vaginal birth, lowering the number of caesarean sections [16].

Multiple pregnancies in group 8 had CS (50%), either due to the leading twin being non-cephalic or maternal-fetal complications arising. Though studies have suggested that twin pregnancies with both fetuses in cephalic presentation can safely undergo vaginal delivery, overall CS rates remain high due to a high prevalence of complications [17].

Transverse and oblique lie being an absolute indication for CS, all pregnancies falling under this category had 100% caesarean deliveries. The nearly universal CS rate in this group is due to the high risk of complications, including cord prolapse and obstructed labour [14].

Preterm pregnancies present a unique challenge, as CS rates vary depending on gestational age and fetal condition. In our institution, vaginal delivery has been preferred in cases without contraindications. Caesarean rate (9.87%) is relatively low, but this group still represents a meaningful contribution (17.2%) to the overall CS rate. CS are often performed for fetal indications such as non-reassuring fetal status or extreme prematurity [16].

CONCLUSION

The overall result at KAHS has shown repeat CS in Group 5 as the major contributing factor to the overall CS rate. The study thus highlights the need to encourage the strategies to assess potential for safe vaginal birth after caesarean section (VBAC) to optimize the CS rate along with improvement in maternal and neonatal outcomes.

DECLARATION

Author contribution

SB, RS, and GB developed the concept of the research. SB, RS, GB, and KKC contributed to the design of the research. SB, RK, and SG performed the literature search and data collection. Data analysis was conducted by SB, GB, JB, and KKC, with data interpretation. SB, GB, and JB undertook drafting and reviewing of the manuscript for important intellectual content. SB, RS, GB, RK, SG, JB, and KKC gave final approval of the version ready for submission. All authors, SB, RS, GB, RK, SG, JB, and KKC, agreed to be accountable for all aspects of the work.

Conflict of interest

We have no conflicts of interest to disclose.

Ethical Approval

This research was approved by IRC Karnali Academy of Health Sciences with the reference number 2077/78/2.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Consent/Assent

Not applicable

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