

Classification of Caesarean Section: A Scoping Review of the Robson classification

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ABSTRACT

Caesarean section (CS) rate is rising dramatically worldwide. WHO recommended CS rate of 10-15% at populational level would not be the ideal rate at the hospitals level due to the differences on population they have been serving. At the hospital level, a perfectly effective system is necessary to understand the trends and causes of rising trends of CS as well as to implement effective measures where necessary to control the same. Hence, WHO recommended the Robson classification, which is also called the 10-group classification of CS (TGCS) as a global standard tool to assess, monitor and compare CS rates within healthcare facilities over time, and between health facilities. The Robson classification, proposed by Dr Michael Robson in 2001, is a system that classifies all women at admission at a specific health facility for childbirth into 10 groups based on five basic obstetric characteristics (parity, gestational age, onset of labour, foetal presentation and number of foetuses). This classification is easy and simple and mutually exclusive, highly reproducible, easily applicable, and useful to change clinical practice. It has many strengths such as simplicity, flexibility (further subdivisions can be made to increase homogeneity within groups). This classification helps to identify and analyse the contribution of each group to overall CS rates. It also allows distinguishing the main group of women who contributes most and least to the overall CS rates; so that the CS rates can be monitored in a meaningful, reliable, and action-oriented manner in each health facilities for optimal use of CS.

Key words: Caesarean section, Classification system, Robson classification.

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INTRODUCTION

The Caesarean section (CS) rate is rising dramatically worldwide.^{1,2} The rising CS rate has been a major global public health issue because of its association with potential health risks to mother and baby,^{3,5} and adverse risks in subsequent pregnancy,⁴ Additionally, the rise of CS unnecessarily can cause an financial burden in the health system.⁶

CS rates are also rising in South Asian city hospitals.^{7,8} Obstetricians and hospitals need evidence-based information regarding how or why the CS rate has increased and what

needs to be done for stemming the rise. The World Health Organization (WHO) recommended CS rate of 10-15% at population level in 1985.⁹ Although, a debate is ongoing about the optimal rate of CS,¹⁰ a CS rate greater than 10% at population level¹¹ does not contribute to the preservation of maternal and foetal health.¹² The population-based recommended CS rate 10 – 15% would not be realistic at the hospital level due to the complexity of the population they serve.¹³ Monitoring CS rates at hospital level by using overall CS rates is also difficult for inter-

pretation and comparison due to variations in several factors such as differences in hospital practice, the characteristics of the local obstetric population they serve and clinical management protocols.¹³ The Robson classification system is a vital tool at the centre of the debate around defining the optimal rate of CS. In April 2015, WHO proposed the Robson classification to assess, monitor and compare the rates of CS rates within a health institution over-time, between different health institutions, countries and regions in a meaningful, reliable, and action-oriented manner.^{10,13-15} The objective of this article is to explore basic information on the Robson Classification and its use in South Asia.

METHODS

A short scoping review of articles¹⁶ highlighting the issues around Robson's Classification were searched using several bibliographic electronic databases such as PubMed, MEDLINE, EMBASE, SCOPUS, CINAHL and Web of Science as well as open access journals. Articles on Robson's Classification were searched using Medical Subject Headings (MeSH) heading such as caesarean, cesarean, c-section was combined with the specific key words such as Robson Classification using Boolean operators (and/or). Additional articles were searched from the reference list of the selected articles and organizational websites such as WHO, and open access journal databases such as Nepal journals on-line (NepJOL) and Bangladesh journals on-line (BanglaJOL) were also searched. Titles and abstracts of the identified articles were initially scanned and then, eligible full-text articles were appraised, and relevant data was extracted, then simple content analysis performed.¹⁷ Quantitative studies conducted in South Asia using the Robson classification from January 2010 to December 2020 and written in English language were included in this review. A total of 1,170 articles were found and on appraisal 26 were used in this scoping review.

CLASSIFICATIONS OF CS

There are mainly four types of classification systems commonly used to classify CS. Classification based on indications lacks of uniform definition of indications of CS, low reproducibility and insufficient comparison; based on degree of urgency has many weaknesses such as the lack of clear and unambiguous definitions that could compromise inter-

rater reproducibility, comparability, and interpretation; and other bases like site and surgeon are limited by their utility.¹⁸ A systematic review conducted by WHO in 2011 determined that the Robson classification that is based on obstetric characteristics at admission is the most appropriate classification system to achieve current international and local needs.¹⁹

ROBSON CLASSIFICATION

The Robson classification, which is also called the 10-group classification of CS (TGCS), proposed by Dr Michael Robson in 2001²⁰ 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 absolutely comprehensive. 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). The 10 groups with specific obstetric characters as Robson Classification¹⁶ are tabulated. [Table-1]

The Robson Classification categorizes all women who give birth in any health institution irrespective of route of delivery. It can be applied prospectively on admission. Every woman who gets admitted to the hospital for childbirth can be directly classified based on maternal obstetric characteristics as described above. These characteristics are usually collected routinely in maternity wards everywhere.^{13-15,19-22} This classification provides common initial platform for further detailed analysis within perinatal events, so that outcomes can be measured and compared.¹³⁻¹⁵

STRENGTHS AND WEAKNESSES OF THE ROBSON CLASSIFICATION

In 2014, WHO conducted a second systematic review and explored several strengths and weaknesses of Robson classification from the users of this classification.¹⁹ The main strengths of the Robson classification are: simple to implement, robust, reliable, flexible and directness of initial interpretation. Other many studies also reported that the

Table-1: The Robson Classification

Group	Obstetric population
1	Nulliparous women with a single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour
2	Nulliparous women with a single cephalic pregnancy, ≥ 37 weeks gestation who had labour induced or were delivered by CS before labour
3	Multiparous women without a previous CS, with a single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour
4	Multiparous women without a previous CS, with a single cephalic pregnancy, ≥ 37 weeks gestation who had labour induced or were delivered by CS before labour
5	All multiparous women with at least one previous CS, with a single cephalic pregnancy, ≥ 37 weeks gestation
6	All nulliparous women with a single breech pregnancy
7	All multiparous women with a single breech pregnancy including women with previous CS(s)
8	All women with multiple pregnancies including women with previous CS(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 gestation, including women with previous CS(s)

Robson classification has been found to be easily applicable.^{18,21,22,24-51} The main weaknesses of the Robson's classification are: (1) missing data by which it cannot be classified in any 10 group as an indicator of quality of data; some suggest to create a group "99" and WHO recommends to report at footnote; (2) misclassification of women and; (3) lack of definition or consensus on core variables of the classification.

WHO has developed and published a Robson classification Implementation Manual¹⁴ in 2017 to support and guide healthcare facilities worldwide for adopting and implementing this classification. The WHO manual¹⁴ can improve common understanding to resolve the weakness of the Robson Classification, because it describes a standard approach in implementation and interpretation of the classification, including standardization of terms and definitions of core variables as well as the way of manag-

ing missing data.¹⁴ Misclassification and missing data can be minimised by providing training/guidelines, educational inputs and regular audit.¹⁰

MODIFICATIONS OF ROBSON CLASSIFICATION

WHO (Robson Classification Implementation Manual) has introduced the sub-classifications in Robson group 2 (2a: Labour induced and 2b: Pre-labour CS), group 4 (4a: Labour induced and 4b: Pre-labour CS) and group 5 (5a: With one previous CS and 5b: With two or more previous CSs) to bring common point on classification.¹⁴ For the improvement of the classification for local use and to increase homogeneity within the groups, several subdivisions in each of the 10 groups have been suggested. However, group 5 (women with previous CS) has received the largest number of suggestions for sub-division.¹⁹

The Society of Obstetrics and Gynaecologists of Canada (SOGC) recommended the modified Robson criteria, which can be used to enable comparison of CS rates and indications. This modified classification of CS allows evaluation and comparison of the contributors to the Caesarean section rate and their impact. Group 2 and 4 each subdivided into A (induced labour) and B (CS before labor); Group 5 to 10 each subdivided into A (induced labor), B (CS before labor) and C (spontaneous labor).²³

Use of the Robson Classification in South Asia

Use of Robson classification is growing in South Asia as witnessed by many hospital-based studies.²⁴⁻⁴⁵ Only a few studies have used modified Robson classification. Out of a total of 21 studies, 19 studies were retrospective and 2 were prospective. Out of a total 19 studies²⁴⁻⁴³ conducted for assessing CS rates, one study⁴⁴ was conducted for assessing trends and another⁴⁵ for comparison of protocols of foetal heart rate monitoring (intermittent and continuous). However, there is paucity of large-scale studies comparing between institutions, countries and multi-centre interventions as well as further analysis of all perinatal events and outcomes adding significant epidemiological variables.

Only one study, Mittal et al (2019)⁴⁴ reported the CS trend using Robson classification in North India to assess the trend of CS rate for 3 years and it shows a static rate of CS in each group over the years. [Figure-1]

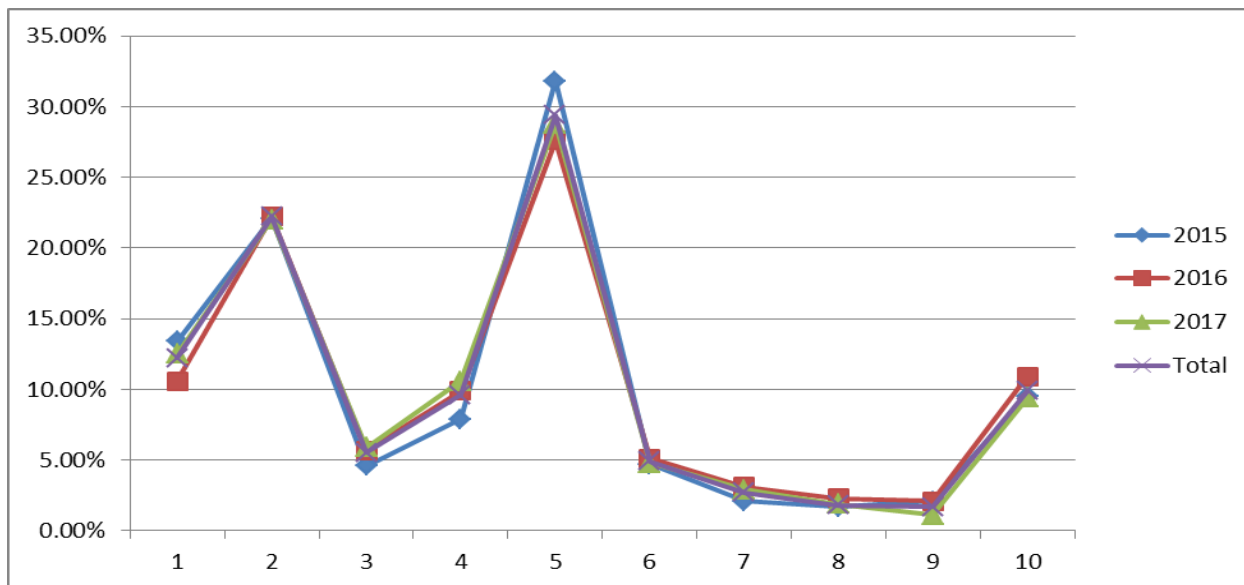


Figure-1: Trends of CS rates in Robson Groups by Mittal et al (2019)⁴⁴

Many hospital-based studies adapt the Robson Classification for monitoring CS rates.²⁴⁻⁴³ The group 5 is found to be the high risk group and the major contributor to overall CS rates by several studies.^{24-26,28-34,38,40,41} Few studies found Robson groups 1 to be the greatest contributor to overall CS rate.^{27,37,42-44} The other major contributor to overall CS rate were group two,^{24,25,28,31-33,43,44} group three^{35,39,42,44} group four,²⁷ and group ten.^{27,44} Kandhari et al conducted a hospital-based study in 2019 using Robson classification among low risk cases to compare intrapartum monitoring protocols (intermittent and continuous foetal monitoring) and found decreased operative intervention and a better neonatal outcome in continuous monitoring group.⁴⁵ Neonatal outcome was improved in Robson group 2A, 4A, 7A and 10A and CS was decreased in Robson group 2A.⁴⁵ [Table-2]

Table-2: Contribution of each group of Robson classification to the overall CS rates.

Authors & year (Total delivery & CS)	Contribution made by each Robson group to the overall CS rate %									
	1	2	3	4	5	6	7	8	9	10
Nazneen et al. 2011 ²⁴ (21149; 58.8%)	5.06	15.65	4.33	14.46	22.15	1.60	1.34	1.18	2.42	2.32
Dhodapker et al. 2015 ²⁵ (1123; 32.6%)	24.0	14.2	3.5	2.5	40.1	5.4	2.7	3.5	1.4	7.4
Das et al. 2016 ²⁶ (4392; 33.1%)	6.37	3.7	3.46	2.1	11.9	0.9	1.3	0.6	0.2	2.2
Yadav et al. 2016 ²⁷ (40986; 17%)	37.62	4.23	15.0	1.6	17.06	5.83	3.44	1.17	1.0	12.9
Ray et al. 2017 ²⁸ (162428.9%)	1.52	4.93	0.73	1.34	8.29	2.43	1.21	3.78	1.21	3.41
Kant et al. 2018 ²⁹ (531; 58.86%)	7.34	36.71	1.04	2.4	36.0	2.09	0.6	3.14	0.6	9.7
Mehta et al. 2018 ³⁰ (4785; 41.96%)	9.69	2.08	2.02	0.71	21.98	1.19	0.71	0.83	0.58	2.13
Jogia et al. 2019 ³¹ (650; 28.3%)	7.61	21.20	0.54	4.35	36.96	8.15	7.61	2.17	3.26	8.15
Shenoy et al. 2019 ³² (655; 27.24%)	15.60	24.33	0.26	2.26	27.24	3.70	1.32	4.23	1.85	18.78
Senanayake et al. 2019 ³³ (7504; 30.0%)	4.2	6.1	1.4	1.7	8.9	1.5	1.2	0.8	0.6	3.4
Gilani et al. 2020 ³⁴ (6155; 33.3%)	4.8	4.2	2.0	2.7	13.8	0.8	1.0	1.2	0.16	2.7
Das et al. 2020 ³⁵ (4394; 33.40%)	7.73	9.84	2.66	3.29	5.75	1.45	0.65	0.20	0.27	1.52
Mittal et al. 2019 ⁴⁴ (81784; 23.7%)	12.2	22.2	5.2	9.6	29.4	4.9	2.7	1.8	1.7	9.9

DISCUSSION

The Robson classification/TGCS is an internationally accepted classification system for monitoring CS rates. The review found that use of Robson classification is rising in South Asia. It reported that Robson group 5 (All multiparous women with at least one previous CS, with a single cephalic pregnancy, ≥ 37 weeks gestation) is the most vulnerable group and greatest contributor to overall CS rate. Similar findings are reported in Turkey,¹⁵ Australia,⁴⁶ Canada⁴⁷ and Brazil.⁴⁸ Trend analysis showed Robson group 5 is expanding because of performing CS for group 1 – 4 which may then require repeat CS.¹⁵ Although, the Robson group 1 (Nulliparous women with a single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour) is low risk pregnancy group, this group was also reported as the main contributor to overall CS rate by some studies in South Asia. A similar finding is reported by other studies.^{49,50,51} Robson group 2 (Nulliparous women with a single cephalic pregnancy, ≥ 37 weeks gestation who had labour induced or were delivered by CS before labour),^{48,50,51} group 3 (Multiparous women without a previous CS, with a single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour),^{48,50} group 4 (Multiparous women without a previous CS, with a single cephalic pregnancy, ≥ 37 weeks gestation who had labour induced or were delivered by CS before labour) and group 10 (All women with a single cephalic pregnancy < 37 weeks gestation, including women with previous CS (s))⁵² also are major contributor to overall CS rate. These groups are those which are most likely to contribute to the high CS rate and therefore need close monitoring and could be targeted for reduction of CS rates. For example, unnecessary primary and elective CS should be avoided in low risk pregnancy such as group 1 and provision of evidence-based practice for vaginal birth after CS (VBAC).

The Robson classification itself does not show the reasons of CS but can be the common starting platform to identify the reasons of performing CS by performing further analysis of indications for CS in Robson group as required.⁵⁵ Likewise, this classification can be the starting point for further detailed analysis and comparison of all perinatal events and outcomes and adding epidemiological variables.⁵⁶

A study conducted by Robson et al in Dublin (2015) showed that the Robson Classification can be used as the common starting point to analyse all labour events processes (for example: rates of oxy-

tocin usage, postpartum haemorrhage, neonatal outcomes, and duration of labour) along with outcomes (stillbirth rate, low birth weight rate, incidence of preeclampsia, and maternal mortality) by incorporating significant epidemiological variables (age, body mass index).⁵⁷ This classification would be useful for auditing all perinatal events worldwide and it could provide an opportunity for obstetricians to learn from each other.⁵⁷

The review noted that there is a deficit of large-scale studies in South Asia (as in other countries) such as comparison across health institutions or regions using the Robson classification including CS trend analysis,^{15,47,48,51,53,54} multi-centre interventional studies⁵⁴ and perinatal auditing using the Robson classification.

CONCLUSIONS

The use of the Robson classification of CS is increasing in South Asia and Robson group 5 is found to be the main contributor to overall CS rate followed by group 1 and 2. The clinical strategies/practice could be modified to optimize CSs in health facilities.

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