Minal Dhanvij
Department of Obstetrics and Gynecology, Nowrosjee Wadia Maternity Hospital, Mumbai, Maharashtra, India

Sujata Dalvi
Department of Obstetrics and Gynecology, Nowrosjee Wadia Maternity Hospital, Mumbai, Maharashtra, India

Classification of caesarean-sections according to Robsons 10 group classification and analysis of indications: A 5 year study at tertiary care hospital

Minal Dhanvij and Sujata Dalvi

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Abstract
Background: Caesarean section rates are on the verge of rise as more high risk pregnancies are diagnosed. WHO proposes the Robsons 10 group classification for each indication of caesarean section to analyse the caesarean section rates. This will help in finding the solution to decrease the caesarean section rates.
Methods: We performed a retrospective cross sectional study in a tertiary women hospital on the data of 5 years for caesarean sections and its indications. Women who underwent caesarean section in this period are included in the study and they were classified in the 10 groups according to WHO guidelines and each group's percentages were calculated. The comparison and analysis of CS rates within and across these groups of women was done according to Robsons classification.
Results: We found out that group 5, 2 and 1 are the major investing groups for the caesarean section rates and contributes total of 69.87%. Group 5 contributes about 32.97% followed by group 2 and group 1. Group 1 is the major group where caesarean section rates can be reduced and hence we can bring down the rates from group 5.
Conclusions: Robsons classification is simple, robust, reproducible and clinically relevant criteria for caesarean section rates. Every effort should be made to provide caesarean sections to women in NEED, rather than striving to achieve a specific rate.

Keywords: Robsons classification, ten group classification system (TGCS), caesarean section rate, caesarean section classification

Introduction

Caesarean section is becoming the most common performed surgery and that is raising the concern worldwide. WHO states that, caesarean sections done for Obstetrical indications are effective for saving maternal and infant lives. However, rates higher than 10% are not associated with any reductions in maternal and new-born mortality rates, on population basis. WHO's 2015 statement does not recommend any specific rates for caesarean sections but it insist on the efforts to provide caesarean sections to women in need (medically indicated caesarean sections). This raised the need of classification system to monitor and compare CS rates at facility level in a standardized, reliable, consistent and action-oriented manner [1].

In 2001, Dr. Michael Robson commented that caesarean section rates should be appropriate and based on indications rather than high or low rates. So he developed a statutory, standardized collection of information and suggested the ten group classification system (TGCS) for categorizing the caesarean sections also known as Robsons classification [2].

In 2015, WHO proposed the use of the Robson classification as a global standard for assessing, monitoring and comparing caesarean section rates [1]. The system classifies all women into one of 10 categories that are mutually exclusive and are based on obstetric characteristics that are routinely collected in all maternities. The five basic characteristics are parity, number of foetuses, previous caesarean section, onset of labour, gestational age, and fetal presentation. SOGC committee also recommended the modified Robsons criteria for the classification of caesarean section rates [3].

The Robson classification expected to help in identifying the groups which contribute most and least to overall caesarean section rates. It allows the comparison between groups of women, their outcome and help in change of practice to achieve desirable results. It analyses the outcomes by assessing quality of care and clinical management and hence helps in optimizing effectiveness of strategies.

Corresponding Author:
Minal Dhanvij
Department of Obstetrics and Gynecology, Nowrosjee Wadia Maternity Hospital, Mumbai, Maharashtra, India

The Robson Classification is not only for the women who deliver by CS but also for all who delivers in specific setting. As this is based on the obstetric variables like parity, singleton, previous uterine scar, fetal presentation, onset of labour and gestational age, every woman is classified in 1 single group and none is left out. Thus it helps in interpretation of the quality of data collection, the risk population served by hospital, the CS rates of each group, how each of the individual 10 groups contributes to the overall rate of CS in particular setting and also quality of care of in a maternity unit. Hence, Robson classification is proven to be ideal one for interpretation of caesarean section rates.

Robsons groups classification type
- Group 1- Nulliparous, singleton, cephalic, >37 weeks in spontaneous labour
- Group 2 -Nulliparous, singleton, cephalic, >37 weeks
- A. Induced labour.
- B. Caesarean section before labour
- Group 3- Multiparous (excluding previous Caesarean section), singleton, cephalic, >37 weeks in spontaneous labour.
- Group 4 -Multiparous without previous uterine scar, singleton, cephalic, >37 weeks.
- A. Induced labour
- B. Caesarean section before delivery.
- Group 5- Previous Caesarean section, singleton, cephalic, >37 weeks
- Group 6 - All nulliparous with a single breech
- Group 7 - All multiparous with a single breech (including previous Caesarean section)
- Group 8 - All multiple pregnancies (including previous Caesarean section)
- Group 9 - All women with a single pregnancy transverse or oblique lie (including previous caesarean section)
- Group 10 - All singleton, cephalic, < 37 weeks (including previous caesareans).

Materials and Methods
Aim
To study the distribution of indication of caesarean section by classifying according to Robsons Ten Group Classification system. The primary aim was to see contribution of each group to the overall caesarean section rate and the secondary aim was to identify the main contributors to the caesarean section rates in this centre.
We performed a cross sectional retrospective analysis of 5 years on the indication of caesarean section at our institute. Each caesarean section was classified according to Ten group classification system. Each groups' relative size was calculated in percentage and its contribution to the overall Caesarean section rate.
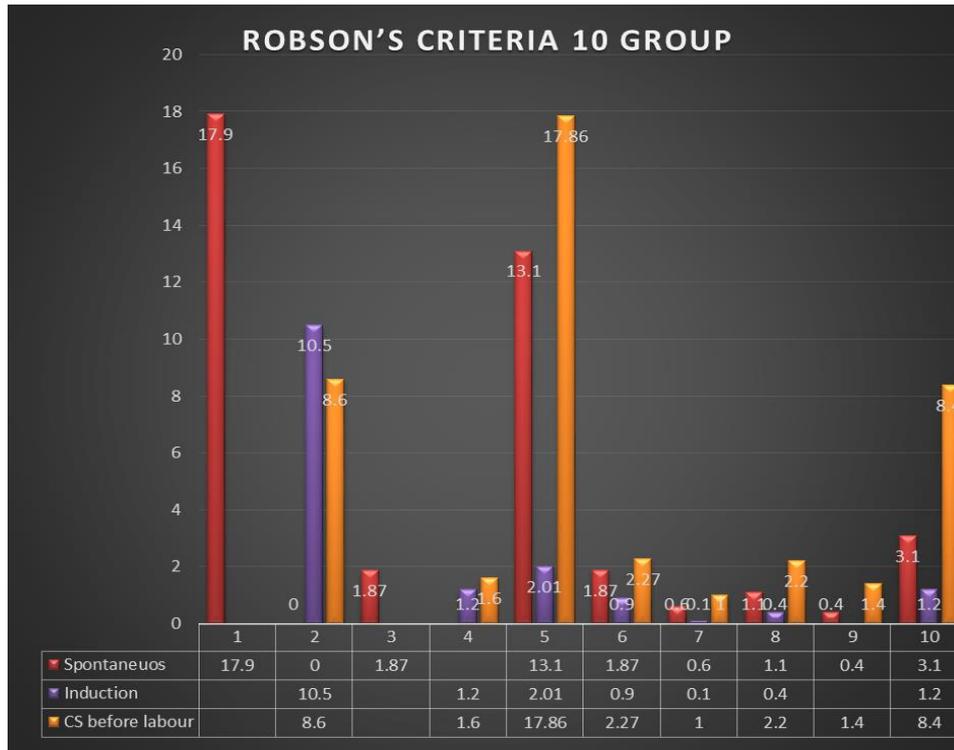
Results
From August 2012 to August 2016 five year data was collected, among 19054, 10278 were delivered by caesarean section who delivered neonates weighing more than or equal to 500g. All women were classified according to Robsons ten group classification system as shown in the Table no. 1. Among the women studied, 42.92% were nulliparous and as table 1 suggests group 1 and 2 contributes to 25.9%. It is seen from this data that incidence of induction and pre-labour caesarean deliveries is high in nulliparous women groups. Group 3 and 4 contributes to 1.87% and 2.8% respectively.

Table 1: Showing distribution of Caesarean section rates according to Robsons Ten group classification System.

ROBSON'S 10 GROUPS	Spontaneos	Induce	CS before labour	Total
1 .Nulliparous women with single cephalic pregnancy, ≥37 weeks gestation	17.9			17.9%
2. Nulliparous women with single cephalic pregnancy, ≥37 weeks gestation		10.5	8.5	19%
3. Multiparous women without a previous uterine scar, with single cephalic pregnancy, ≥37 weeks	1.87			1.87%
4. Multiparous women without a previous uterine scar, with single cephalic pregnancy, ≥37 weeks		1.2	1.6	2.8%
5. All multiparous women with at least one previous uterine scar, with single cephalic pregnancy, Group ≥37 weeks	13.1	2.01	17.86	32.97%
6. All nulliparous women with a single breech	1.85	0.09	2.4	5.04%
7. All multiparous women with a single breech pregnancy, including women with previous lscs	0.6	0.1	1	1.77%
8.All women with multiple pregnancies, including women with previous lscs	1.1	0.4	2.2	3.7%
9. All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars	0.4	0	1.4	1.8%
10. All women with a single cephalic pregnancy	3.1	1.2	8.4	12.7%

Table 2: Graphical representation of Robsons Ten group classification with distribution of women with Spontaneous labour, Induction of labour and CS before labour that contributed to CS rates.

ROBSON'S CRITERIA 10 GROUP

	1	2	3	4	5	6	7	8	9	10
Spontaneuos	17.9	0	1.87		13.1	1.87	0.6	1.1	0.4	3.1
Induction		10.5		1.2	2.01	0.9	0.1	0.4		1.2
CS before labour		8.6		1.6	17.86	2.27	1	2.2	1.4	8.4

Group 5 shows the highest rate of Caesarean section incurring approximately 32.97%. The groups 6 and 7 denotes the caesarean section rates in breech delivery and in total in shows the rate of 6.81%. Group 8 compiles the indication for multiple pregnancy which is 3.7%. Group 9 includes all women with abnormal fetal presentation which indicates the 1.8% of overall CS rates. Group 10 forms the 12.7% that includes all the women who underwent CS was less than 37 weeks period of gestation for any indications. Table 2 also shows that 15.5% of women with caesarean section also undergone for induction of labour.

Discussion
We found out that in the study we carried out for five years is quiet comparable with other studies across the world. Among the 10,278 caesarean sections done at our institute, group 5 was a major factor contributing 32.97% and similar results noted from the study of Palestine, it stated that the largest contributors to the overall caesarean section rate were multiparous women with single cephalic full-term pregnancy who had undergone at least one caesarean section (group 5, 42.6%) [4].
Also group 2 is one of the highest contributing indication for the CS rates worldwide, as seen from our studies also, it was 19% and similar results quoted by the study in Spain with group 2 contributing to 29.4%. The caesarean delivery rate in group 2 is high, suggesting a slightly high pre-labour caesarean delivery rate [5]. Group 3 and 4 comprises 1.87% and 2.8% that is pretty standard, reflecting a more balanced ratio between the induction of labour and pre-labour caesarean delivery rates. Groups 1 and 2 subdivided into spontaneous, induced labour, and pre-labour caesarean deliveries that contributes to 17.9% and 19%. It is crucial to confirm these relative proportions by size before interpreting the caesarean delivery rates in groups 1 and as induction of labour rate is 10.5%. It is high because caesarean was perform mostly for fetal outcome or maternal indications. The rates in groups 6 are 5.04% and group 7 are 1.77% that are standard internationally as compared with results from Australia

that have group 6 with 0.8% and group 7 with 1% [6].
In our study group 8, CS rates were 3.7% and it shows increasing trend steadily everywhere as chances of multiple pregnancies are increasing due to assisted reproductive techniques (ART) increasing worldwide. As our centre is attached to infertility centre high rates are seen in this group. A surveillance from United States found that the percentage of multiple-birth infants was higher among infants conceived with ART (31.5%) than among all infants born in the total birth population (3.4%) [7].
Group 9 women are with oblique, transverse lie that contributes 1.8%, none delivered vaginally with rate of 100% in group 9 and that is the unavoidable indication for the caesarean section. Group 10 adds 12.7% rate to total CS rates and is one of the raising concern as this include all the women with less than 37 weeks of gestations. With changing lifestyle, increasing age for child birth and increasing rates of ART are associated with raising maternal and fetal complications and can cause preterm delivery. A study from Florence, Italy concluded that C-section rate and pregnancy complications seem to be higher in the ART group where they studied the outcome in early preterm delivery compare to spontaneous delivery [8]. Overall, groups 1, 2, and 5 contributes to approximately two-thirds of the overall caesarean delivery rate of 69.7%, which is very standard [9].
Le Ray and colleagues have demonstrated that the Robson classification can be applied effectively at national level and over multiple time points, despite changes in practices and population characteristics. The Robson classification can be useful at facility and population levels to identify which specific groups to target and to help develop policy options to reduce unnecessary CS [10].
From our study we come to conclusion that Ten Group Classification System (TGCS) can be used to analyse all labour events and outcomes, while taking into account any significant epidemiological variables. The advantage of TGCS is to demonstrate that it can be used as a common starting point to

routinely audit induction of labour and caesarean deliveries. This will benefit to audit all perinatal outcome globally. The sheer numbers of women in these databases will inevitably help to improve the quality of perinatal care. Women who have previously had a caesarean section are an increasingly important determinant of overall caesarean section rates in countries with a moderate or low HDI. Strategies to reduce the frequency of the procedure should include avoidance of medically unnecessary primary caesarean section [11].

This can be done by observing the modifiable factors and major contributors to the CS rates. As group 1 and 2 are the major contributors, increasing successful induction rates will definitely improve CS rates and in future will help in reducing the group 5 CS rates. As group 5 is the highest contributors for CS rates, vaginal delivery after CS should be encouraged vigilantly for nonrecurring indications of Caesarean sections.

The drawback of classification is that it does not include parameters like fetal distress, maternal age and pre-existing conditions like maternal morbidity which are the major determining inevitable factors for CS rates. Thus, every women should be made to provide Caesarean section than achieving specific rates.

Conclusion
We conclude that on the basis of our study, Robsons classification is a simplified, robust, reproducible and clinically relevant classification system to monitor and compare CS rates and its trends. The Robson's 10-group classification is based on simple obstetrical parameters like parity, previous CS, gestational age, onset of labour, fetal presentation and number of foetuses. Caesarean sections (CS) rates continue to increase worldwide without a clear understanding of the main drivers and consequences. If TGCS is used uniformly, CS rates can be compared over time both nationally and internationally. To monitor the CS rates and take appropriate actions it is recommended that Robson's TGCS be used continuously in all health institutions. Despite some limitations, this classification is easy to implement and interpret.

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