Original Research Article

Changing trends over 5 years in indications of caesarean section as per Robson's group classification in a tertiary care centre

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ABSTRACT

Background: Caesarean section is the most common obstetric operation that saves lives of countless mother and babies. However, its inappropriate usage may also be a reason for circumstantial increase in maternal and perinatal morbidities and mortalities. Aim of this study was to examine Changing trends in indications of Cesarean delivery rates based on Robson's groups classification in the Department of Obstetrics and Gynecology, MLN Medical College, Prayagraj over 5-year period.
Methods: Our study was a retrospective observational study over 5 years (January 1, 2016 to December 31, 2020) period in Department of Obstetrics and Gynecology, SRN Hospital, MLN Medical College, Prayagraj. All women who came to SRNH labor room for delivery during the duration of study. All vaginal deliveries including operative vaginal deliveries and all C section done after 28weeks of pregnancy. Analysis of C section indication according to Robson Classification.
Results: There were 10,332 vaginal deliveries and 5306 cesarean deliveries during this 5 year of study period. The 5-year overall CSR of our tertiary care hospital was 33.9 %, which varied from 38 % in 2016 and has steadily fallen to 26.8 % in 2019-2020. Robson's group one had the maximum number of subjects (n = 3800), out of which 37% (n =1441) had cesarean section followed by group 3, of which, 15 % (n = 546) underwent cesarean section.
Conclusions: The ten-group classification relies on well-defined parameters, and it may well be easily applied to the present dataset of 15638 deliveries. It helped to spot the main groups of subjects who contribute most to the overall CS rate. It also aided to identify subgroups which required closer monitoring for in-depth investigation of the indications for cesarean section. It is important to target the first four groups of TGCS which constitute about 75 % of all deliveries.

Keywords: Caesarean section, Multipara, Nullipara, Previous LSCS, Robson group

INTRODUCTION

Caesarean section is the most common obstetric operation that saves lives of countless mother and babies. However, its inappropriate usage may also be a reason for circumstantial increase in maternal and perinatal morbidities and mortalities.[1,2] Caesarean section rates in a center have been defined as an important indicator for measuring efficacy of obstetric services in that particular set up.[3]

It is worth mentioning that in last 150 years, caesarean section has evolved from an operation of last resort to a method of delivery by maternal choice. With evolution of safer caesarean practices, decreasing tolerance of birthing women, increasing fear of consumer forums, decreasing patience of obstetricians and for endless reasons the rates

of C-section rose exponentially during past many years. In many countries including high-income countries, reaching to a rate in excess of 30%. To check this WHO issued a statement in year 1985 based on evidences available that regional caesarean section rates should not exceed 10-15% in any delivery facilities regardless of the level of care. However, the validity of this threshold has since been questioned, especially in tertiary referral hospitals, where most of the labouring women are complicated referred ones.[4]

In 2015, WHO proposed the use of Robson classification as a global standard for assessing, monitoring, comparing and auditing the determinants of C sections caesarean section rates rate within and between healthcare facilities. Robson classification of pregnant women based on parity and other obstetrical parameters was introduced in 2001 and was validated in 2011.[5]

The Robson ten-group classification system is as follows: 1) Nulliparous, singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour, 2) Nulliparous, singleton, cephalic, ≥37 weeks' gestation, induced labour or caesarean section before labour, 3) Multiparous (excluding previous caesarean section), singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour, 4) Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, induced or caesarean section before labour, 4a) Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, induced labour, 4b) Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, caesarean section before labour, 5) Previous caesarean section, singleton, cephalic, ≥37 weeks' gestation, 6) All nulliparous with a single breech, 7) All multiparous with a single breech (including previous caesarean section), 8) All multiple pregnancies (including previous caesarean section), 9) All women with a single pregnancy in transverse or oblique lie (including those with previous caesarean section), 10) All singleton, cephalic, <37 weeks' gestation pregnancies (including previous caesarean section).[4,6,7]

Certain Robson groups like group 6 and group 9 are exclusively delivered by caesarean, but other groups are the ones in which we are able to work on to avoid C section rates by all possible means, and these are the groups on which we must focus if we wish to cut back the c section rates in any setup. Aim of this study was to examine changing trends in indications of caesarean delivery rates based on Robson's groups classification in the Department of Obstetrics and Gynecology, MLN Medical College, Prayagraj over 5-year period.

METHODS

This was retrospective observational study conducted at Department of Obstetrics and Gynecology, SRN Hospital, MLN Medical College, Prayagraj for 5 years from January 1, 2016 to December 31, 2020. All antenatal women

attending labour room of SRN Hospital, Prayagraj were included in the study over 5 years and data was analyzed subsequently.

Inclusion criteria

Inclusion criteria were the all women who came to SRNH labor room for delivery during the duration of study.

Parameters assessed

All vaginal deliveries including operative vaginal deliveries and all C section done after 28weeks of pregnancy. Analysis of C section indication according to Robson classification. History, bio-data, symptoms, clinical examination, management outcomes, pregnancy-related information (gestational age, fetal presentation, number of fetus and onset of labour) and maternal and fetal outcomes at discharge (complications, APGAR score at five minutes, birth weight) were recorded. All the study information was noted on a predesigned proforma. Patients were classified based on Robson classification and statistical analysis was done.[8,9]

Statistical analysis

P value was calculated using chi square with 95 % confidence intervals. Statistical significance was set at 0.05.

RESULTS

There were 10,332 vaginal deliveries and 5306 cesarean deliveries during this 5 year of study period (Figure 1).
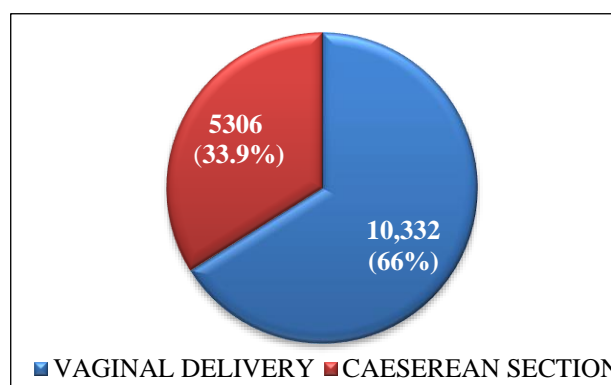

Figure 1: Cumulative caeserean section rate at our tertiary care hospital over 5 years.

The 5-year overall CSR of our tertiary care hospital was 33.9 %, which varied from 38% in 2016 and has steadily fallen to 26.8% in 2019–2020. The number of total institutional deliveries has risen from 2473 in 2016 to 3647 in 2020 which may be contributed to the increasing awareness of benefits of institutional deliveries and so many government programs across the country and their monetary benefits (Figure 2).
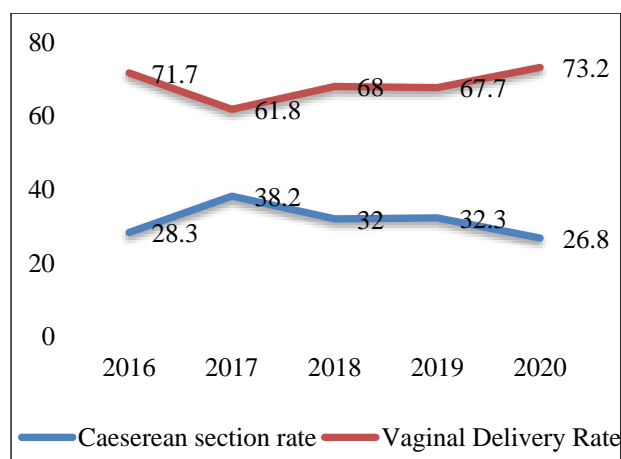
Figure 2: Vaginal delivery and caesarean section rates over 5 years (2016-2020).

As per our analysis of caesarean section at our institution, Robson's group 1 (nulliparous, single cephalic, >37 weeks in spontaneous labor) had the maximum number of subjects (n = 3800), out of which 37% (n =1441) had caesarean section. The second largest group of subjects were in group 3 (multiparous excluding previous cs), single cephalic, >37 weeks in spontaneous labor) of which, 15% (n = 546) underwent caesarean section. The group CSR for induced labors in nulliparae and multipara were high at 52% (95% CI 1.78–2.057) and 41% (95% CI 1.22–1.5), respectively (Figure 3).

The rates of caesarean section was 100% for group 9 (≥37 weeks, abnormal lie), 52% for group 6 (>37 weeks, primi breech), and 53.3% for group 5 (previous CS, single cephalic, >37 weeks). The largest contributions to the total CS rate are group 1 (30%) and group 5 (18.4 %). Group 3 which was the third largest group contributed 11.3 % to the overall CSR (Figure 4).
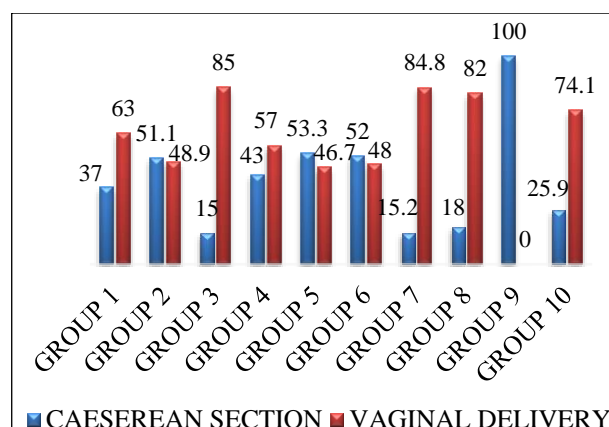

Figure 3: Cumulative vaginal delivery vs caesarean sections in different Robson groups.
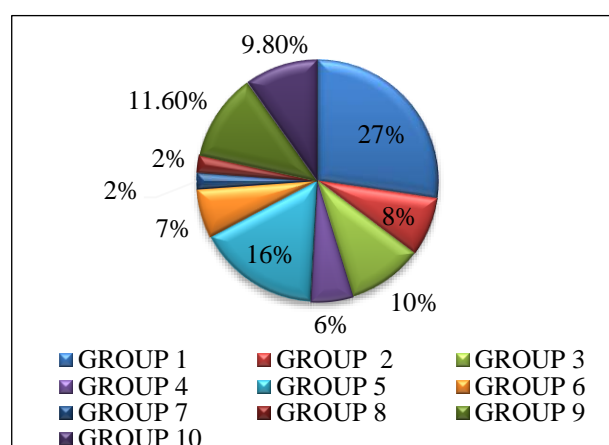

Figure 4: Relative contribution of each Robson group to total caesarean section rate over 5 year.

On analyzing group 1 we found that most common indication for caesarean section was fetal distress and labour dystocia contributing to approximately 70% of the indications.

Table 1: Changing trends in caeserean section patterns based on Robson group classification from 2016-2020.

Year	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	Total (%)	P Value for the trend over 5 year
Robson class							
1	189 (23.5)	281 (27.3)	287 (27.7)	356 (31.1)	408 (31)	1441 (27.1)	<0.001
2	51 (6.3)	52 (5)	86 (8.3)	102 (8.9)	125 (9.5)	416 (7.8)	0.005
3	60 (7.4)	106 (10.4)	128 (12.4)	147 (12.8)	150 (11.4)	546 (10.2)	0.0016
4	64 (7.6)	58 (5.5)	66 (6.3)	58 (5)	69 (5.2)	299 (5.6)	0.008
5	160 (19.9)	170 (16.7)	145 (14.2)	184 (16)	201 (15.3)	870 (16.3)	0.04
6	56 (7)	70 (7)	58 (5.6)	75 (6.5)	106 (8)	350 (6.5)	0.08
7	18 (2)	23 (2.2)	23 (2.2)	29 (2.5)	27 (2)	118 (2.2)	0.006
8	27 (3.3)	29 (2.8)	28 (2.5)	27 (2.4)	29 (2.2)	120 (2.2)	0.054
9	113 (14)	128 (12.6)	153 (15)	139 (12.1)	177 (13.4)	620 (11.6)	Na
10	66 (8)	96 (9.4)	148 (14.3)	127 (11.1)	120 (9.1)	521(9.8)	0.07
Total	804	1013	1032	1144	1313	5306	
P value	0.00001	0.00009	0.00001	0.00009	0.000006		

Table 1 shows that the increases in Caesarean rates are seen primarily within groups with a high likelihood of getting spontaneous vaginal deliveries (Robson's classes 1 and 3) and in groups where planned intervention had been instituted (Robson's classes 2 and 4). Significant rising trends are seen in group 5 and group 7. This rising trends in these groups are highly significant (P Value <0.05) in over 5 years.

DISCUSSION

In the last few decades there has been increasing concern about the rising trend in the rate of caesarean section which has differed from country to country. WH0 in 2015 has said that the C-section rate of any institution must not exceed 15% regardless of level of care but it is very difficult for a tertiary care centre to define a fixed delivery/C-section rate and also the rate of C-section in any of the tertiary care centre depicts the quality and quantity of referrals. Out of total deliveries over five years; 59.3% were the referred cases from public as well as private sectors for one or more obstetrical complications needing operative deliveries. Majority of the non high risk cases are dealt at the peripheral hospitals or district women hospital. Cumulative C section rate over 5-year was 33.9%, that was higher; 38% in 2016 and fell significantly to 26.8% in 2019-2020 (P value <0.05). (Figure 2). The number of total deliveries has also risen from 2473 in 2016 to 3647 in 2020. These rates are comparable or better than similar studies conducted in different parts of our country like Mittal et al, 27.36%, Koteshwari et al, 37.65%, Patel et al, 40% and Katke et al, 25.7%.[1]

Inspite of all these conditions we are making continuous effort to decrease CSR which is evident by statistically significant continuous falling trend of CSR from year 2017-2020.[2]

Similarly, our study has shown that the most important contributor to the C sections are the primigravidas (group 1 and 2) i.e. 34.9% followed by the previous C sections (group 5) i.e. 16.7% and hence indicates the special care in these groups to cut back the C section rates. Other Robson's group of concerns are group 3 and 4; the group of multigravidas.

Le Ray et al conducted a study in France in 2015 and found that Robson group 1 and 2 contributed almost 1/3rd of all CS performed. Overall group 1, 2 and 5 contributed to more than half of all CSR (51.7%). all over the globe, various studies showed these three groups as a major contributor of CSR.[2]

Higher rates of C section in nulliparas (1 and 2) are most majorly attributed to overdiagnosis of labor dystocia and fetal distress. Injudicious uses of fetal surveillance modalities like ultrasonography, doppler velocimetry and NST creates unnecessary panic whereas strict consumer laws, growing violence incidences against doctor, increasing fear of litigations and patients' intolerance to

bearing labour pains create a sense of stress and anxiety in obstetrician that leads to inappropriate decisions to do primary C sections without due trial for vaginal delivery. These kind of working environment affects the boldness of obstetricians' practice and they are bound to interfere too soon especially in cases of previous caesarean section. Although there are no Indian survey available to show changing mindsets and trends of managing labour amongst Indian obstetricians, American College of Obstetricians and Gynaecologists Survey on professional liability done in 2012–2014 refects a negative liability environment causing 50% of obstetricians to make one or more changes to their practice as a result of the risk of fear of professional liability claims or litigation. It was seen that 17% reported increase in caesarean deliveries while 13.4% stopped performing or offering VBACs as a result of risk of fear or professional liability claims or litigations. Thus, it is the necessity of the hour to provide a fearless working environment to the practicing obstetricians so that their bold decision-making approach is not affected.[2]

In order to avoid overdiagnosis of failed induction, non-reassuring NST and labour dystocia, there should be corresponding set labour induction protocols, judicious and proper usage of NST and adopting newer WHO portogram together with patient's counselling and painless labour management protocols will definitely encourage more of the vaginal deliveries, automatically reducing the C section rates.[10]

Checking primary C section rates will automatically reduce the number of patients with repeat C section and reduced reapteted C sections will also check the rapid rising incidences of PAS.

Group 3, multiparous women with a singleton foetus in a normal cephalic presentation, who enter labor spontaneously at term, one of the largest group among all delivering women representing 21% of the total population in the present study. Obstetric complications are generally low in these patients. Hence, the CS rate in this group can be expected to be low. However, in our study, the CS rate in this group was 15%. Hence proper case selection and proper labor management will definitely reduce C section rates in multigravida.

In group 4 we have analysed statistically significant decreasing trend over the period of 5 years i.e. 2016-2020 with total contribution of 5.6% to total C section rate which can be due to availability of effective labour inducing drugs and better monitoring of labour.[11-13]

If we focus on decreasing the number of primary CS, it would automatically result in lowering a repeat caesarean delivery rate (i.e., group 5) which contributed second maximum 16.1% to the overall CS rate in our study. Similar results were seen in group 5 as one of the significant contributor group by Mittal et al with 26% contribution to overall 23% CSR, Roberge et al. with 35% contribution of overall 22.9% CS rate.[14]

On further analyzing group 5, 80.4% were found to have previous-one CS. Thus, promoting and offering vaginal birth after caesarean (VBACs) and judicious fetal heart monitoring in large figure of 80.4% is definitely going to work to some extent in controlling CS in this group.

The rate of CS has decreased over the past 5 years due to efforts made to conduct more VBAC and use of ultrasound and electronic fetal monitoring as aids to predict scar dehiscence and selecting eligible patients for VBAC has led to this change.[15]

Primigravidas with breech presentation and all the patients with transverse lie (Groups 6 and 9) present high rates of CS due to the particular obstetric conditions for caesarean section as suggested by current guidelines and preterm pregnancies (Group 10) c section rates may vary depending upon the degree of level of care for premature new-borns. Availability of better NICU facilities at a tertiary care centre automatically increase the C section rates in this group as well.

The most common indications for primary caesarean delivery include labor dystocia, abnormal FHR, malpresentations, multiple gestation and suspected fetal macrosomia. As suggested by ACOG and SMFM (American College of Obstetricians and Gynaecologists and Society of Maternal and Fetal Medicine), it is high time to revisit the definition of labor dystocia. Moreover, improved fetal heart rate (FHR) interpretation and management must be stressed upon.[10] External cephalic version (ECV) for breech presentation and trial of labor for females with twin gestation with first in cephalic presentation can also contribute to safe lowering of primary CS. All these steps can help in controlling the CS rate contributed by minor contribution groups. If CS rates in individuals are controlled, it will reflect in lowering of overall rates.[10]

This study has limitations. Our centre being tertiary center deal with majority of referred case in which caesarean section is needed so our study has higher percentage of caesarean section.

CONCLUSION

The Ten-group classification is based on well-defined parameters, and it could be easily applied to this dataset of 15638 deliveries. It helped to identify the main groups of subjects who contribute most to the overall CS rate. Moreover, it helped in the identification of subgroups which require closer monitoring for more in-depth investigation of the indications for cesarean section. It is important to focus on the first four groups of TGCS which constitute about 75 % of all deliveries. It is in the low-risk groups that one is likely to find the highest and most inappropriate indications for cesarean sections.

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