Section: Obstetrics and Gynaecology

Original Research Article

ANALYSIS OF CAESAREAN SECTION BY ROBSON'S 10 GROUP CLASSIFICATION -A COMPARISON BETWEEN A RURAL AND URBAN TERTIARY CENTRE OF WEST BENGAL

Nishat Parveen Begg[1], Subhankar Dasgupta[2], Sreemanti Bhattacharyya[3], Swarup Chowdhury[4]

[1]Senior Resident, Department of Obstetrics and Gynaecology, Rampurhat Government Medical College and Hospital, Rampurhat, West Bengal, India.
[2]Associate Professor, Department of Obstetrics and Gynaecology, Rampurhat Government Medical College and Hospital, Rampurhat, West Bengal, India.
[3]Previous affiliation- Post Graduate Trainee, Department of Obstetrics and Gynaecology, Medical College and Hospital, Kolkata, West Bengal, India.
[4]Assistant Professor, Department of Obstetrics and Gynaecology, Rampurhat Government Medical College and Hospital, Rampurhat, West Bengal, India.

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Corresponding Author:
Dr. Swarup Chowdhury,
Email: swarupch2023@gmail.com

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Abstract

Aims: To estimate and compare caesarean section rates at an urban and a rural tertiary care institute. To determine relative contributions of each Robson groups. **Materials and Methods:** It was a retrospective observational study where data was collected on participant features and indication of cesarean section from hospital records of all antenatal patients between January 2020 to June 2021 at Rampurhat medical college and January 2017 to December 2017 at Medical college, Kolkata. **Results:** The rural population was malnourished, had low education rate and mostly unbooked as compared to its urban counterpart. They were better motivated for vaginal delivery, had shorter admission to delivery interval and had lower cesarean section rates (35.67% in rural vs 49.55 %.in urban). Robson group 5 (40.67%) and group 2 (29.8%) were highest contributor from the urban and rural centers respectively. The commonest indication for cesarean section from the rural center was pregnancy with previous cesarean birth, while the same from urban center was foetal distress. The rural patients had higher postoperative complications. **Conclusion:** Increased frequency of health checkups for antenatal mothers, increased manpower of doctors for labor monitoring at the rural center and motivation of mothers for normal delivery at urban centers can decrease the overall C/S rates.

INTRODUCTION

The use of caesarean section has increased dramatically worldwide in the last decades particularly in middle and high-income countries. Although estimates at country level are useful for policy-makers to assess overall progress in maternal and infant health, they are merely averaging and conceal important inequalities within countries. WHO proposed in 2015 the use of the Robson Classification system (RTGCS) as a global standard for assessing and comparing caesarean rates. This classification allows analyses of caesarean rates according to important maternal and fetal variables to understand differences in caesarean rates per groups between facilities or regions and over time. We have applied the RTGCS at two tertiary care study centers in two different regions of India, one an urban one and another a rural one and observed the differences.

Robson Group Classification

1. Nulliparous, single cephalic, ≥37 weeks, in spontaneous labour
2. Nulliparous, single cephalic, ≥37 weeks induced (including prelabour Caesarean section).
3. Multiparous (excluding previous Caesarean section), single cephalic, ≥37 weeks, in spontaneous labour
4. Multiparous (excluding previous Caesarean section), single cephalic, ≥37 weeks, induced (including prelabour Caesarean section).
5. Previous Caesarean section, single cephalic, ≥37 weeks
6. All nulliparous breech
7. All multiparous breech (including previous Caesarean section)

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8. All multiple pregnancies (including previous Caesarean section)
9. All transverse / oblique lies (including previous Caesarean section)
10. All preterm single cephalic, <37 weeks, including previous Caesarean section.

MATERIALS AND METHODS

This was a retrospective observational study. Data was collected from hospital records on all antenatal patients admitted from outpatient or emergency department who underwent caesarean delivery between –

- January 2020 to June 2021 at RGMCH located in a rural district of West Bengal
- January 2017 to December 2017 at MCH, Kolkata, an urban medical college at Kolkata, capital of west Bengal

Participants with incomplete information, those admitted with missed or inevitable abortion or those willing for induced abortion were excluded. Data were collected on the following parameters from each of the participants - age, booking status, parity, number and route of previous deliveries, gestational age, presentation. The two groups were compared with respect to their baseline demographic and clinical characteristics. Participants selected in each centre undergoing caesarean section were classified according to the RTGCS and relative proportions of participants in each of the groups in the two hospitals were determined. Data were also collected on indications of Caesarean section.

Ethical Clearance was obtained from Institutional Ethical Committees of respective institutes.

Data were checked for normality using Shapiro-wilk test. Between groups comparisons were done for continuous variable by using T Test or Mann-Whitney U Test depending on data normality. Categorical variables were compared using Chi Square test. Analysis had an ά error of 0.05 and β error of 0.2. Statistical analysis was done by medcalc version 6.1.

RESULTS

Table 1 compares demographic characteristics of the two-study population. At rural center mean age of the study population was 21.54 ± 5.55 years, BMI was 17.53± 0.72 Kg/m2 and Hb% was 8.448 ± 0.5288 gm/dl. 56□ of women had booking and 44□ had secondary level education. At the urban center mean age of the study population was 20.54 ± 7.85 years, BMI was 20.23± 1.16 Kg/m2 and Hb% was 9.7 ± 0.71 gm/dl. 89□ of women had booking and 77□ had secondary level education. 2785 (60%) participants opted for a trial of labor (TOL) at the rural center while in the urban center 2808 (42%) participants opted for TOL. Admission-delivery interval in rural center was 28.01±11.31 hours and in urban center was 39.10 ± 8.48 hours. 5.7 % of the babies were low birth weight (LBW), 3.53 % babies were preterm in the rural center while 26.31% of the babies were LBW and 22.1 % were preterm at the urban center.

Table II shows classification according to indications and figure I shows their distribution as per the Robson criteria. Caesarean section proportion at the rural center was 35.67%. and at the urban center was 49.55%. The group having maximum contribution to C-section at our rural center was Robson group 5 (40.67%), while group 2 (29.8%) contributed to the major bulk of C-section from the urban setup. The most common indication for C-section from the rural center was a post C-section pregnancy, while the same from our urban center was foetal distress. Women undergoing C-section at the rural center had increased post-partum haemorrhage (PPH) (4.3 % in rural vs 1.1 % in urban), obstetric hysterectomy (0.64 % vs 0.14%), sepsis (0.86 % vs 0.17 %) and pulmonary embolism (0.1 % vs 0.02 %), as compared to its urban counterpart which had a higher incidence of surgical site infections (1.07 % vs 2.9 %). Neonatal complications like transient tachypnoea of newborn and respiratory distress syndrome were higher in patients who underwent C-section at term in comparison to patients having vaginal delivery at term in both populations (0.5 % vs 0.09%). Incidence of low birth weight (5.7 % vs 26.31 %) and preterm babies (3.53 % vs 22.1 %) were more in the urban group.

Table 1: Showing The Demographic Parameters of Women Undergoing Cesarean Section at The Two Centers

Participant parameters	Rural medical college N=4644	Urban medical college N= 6685	P value
Age (in years)	21.54± 5.55	20.54± 7.85	n.s
BMI (Kg/m2)	17.53± 0.72	20.23± 1.16	≤ 0.001
At least 3 antenatal visits	2600 (55.9%)	5950 (89%)	≤ 0.001
Education (secondary level)	3576 (77)	5147 (76.9)	n.s
Monthly Family income (in Rupees)	4961 ± 353.55	10110±707	≤ 0.0001
Parity	0 (0-4)	0 (0-3)	n.s
Women with previous vaginal delivery	135 (2.9%)	755 (11.3%)	0.02
Period of gestation (in weeks)	38 ± 2	37±3	n.s
Hb□	8.45±0.5	9.7±07	≤ 0.001

Continuous variable – expressed as mean ±s.d or Median with range

Categorical variables expressed in absolute number and percentage in parenthesis

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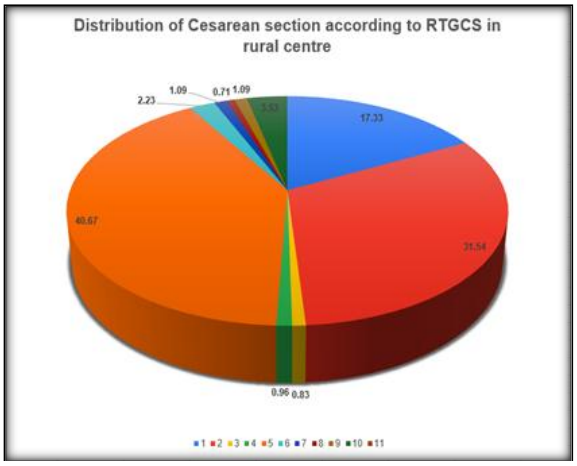
Table 2: Indication of caesarean section in each center

Indication of caesarean section	Rural medical college N=4644	Urban medical college N= 6685
OBSTRUCTED LABOUR	211 (4.54%)	200 (3%)
FETAL DISTRESS	663 (1.59%)	1972 (28.7%)
POST C/S	1943 (41.83%)	1871 (28%)
INDUCTION FAILURE	1137 (24.5%)	1256 (18.8%)
PROM	170 (3.6%)	347 (5.2%)
POST DATED	325 (7 %)	267 (4%)
PIH	928 (20 %)	601 (9%)
PLACENTA PREVIA	128 (2.7%)	127 (1.9%)
ABRUPTIO PLACENTA	74 (1.66%)	20 (0.3%)
CPD	183 (3.95%)	260 (3.9%)
NON-PROGRESS	667 (14.95%)	388 (5.8%)
BREECH	90 (1.9%)	321 (4.8%)
CORD PROLAPSE	12 (0.25%)	80 (1.2%)
TRANSVERSE LIE	51 (1.09%)	37 (0.6%)
FACE	4 (0.08%)	37 (0.6%)
TWIN	33 (0.71%)	161 (2.4%)



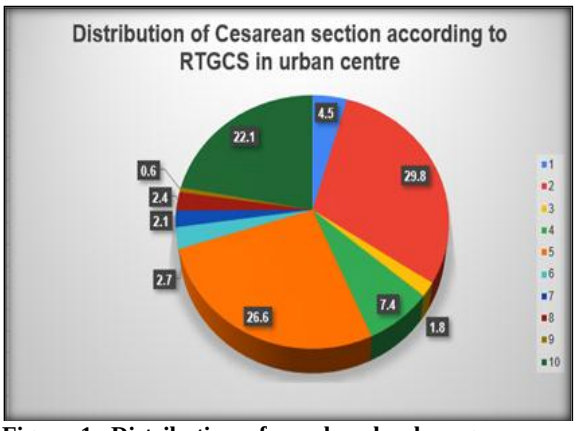


Figure 1: Distribution of rural and urban groups as per RTGCS

DISCUSSION

The present study compares indications of caesarean deliveries as per RTGCS in two tertiary care hospitals, one in a rural district, and one in urban district of West Bengal, India. Both these hospitals being tertiary care government run hospitals had high yearly delivery rate and antenatal patients mostly belonged to low socioeconomic strata. Present study also compared demographic and clinical characteristics of women undergoing C-section in these two centres. Caesarean delivery proportion was around 36% in rural centre and 49.55% in urban centre. Overall 54.78 %, i.e. more than half of participants underwent C-section following induction or due to history of previous C-section. Groups 1, 2 and 5 accounted for almost 90□ of C-sections in the rural centre and 2, 5 and 10 accounted for almost 80□ of C-sections in the urban centre. This result is comparable to a similar study done in Brazil by Nakamura-Pereira et. al.[1] in the year 2011-2012 where exactly the same sequence of groups were the largest contributors of the overall C-section rates. RTGCS has recently been used to make international comparisons in C-section rates. In a multicentre study in Latin America by Betran et al.[2] and North America, Europe, Australia, and New Zealand by Brennan et al.[3], the classification system was easily implemented across different countries, hospital sites, and data collection systems, suggesting its usefulness as a tool for ongoing surveillance.

Mean age of study population undergoing C-section at both centres were low and didn't differ between groups. Abdella et al.[4] conducted a study from Ethiopia, where women belonged to a wide age range varying between 20-35 years. In the rural set up, women less than 20 years were the second largest contributor of caesarean birth. Lack of proper nutrition and education added with poverty were the primary reason for low BMI, prevalence of anaemia, teenage pregnancy and unbooked status of the patients as compared to their urban counterpart. These differences between urban and rural population was reflected in the study by Mangla et al.[5] from Punjab, India where the author concluded that discrimination against women, right from birth in availability of food and education (more prevalent in rural India) was an important cause for such differences. Women in rural areas rarely got to choose when they could marry or timings and spacing of child birth. It was observed that, only 56% of women were booked in the rural population as compared to 89 % in urban population. Lack of

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proper transport, poor road conditions and inadequate medical facilities in rural areas were some of the reasons for irregular antenatal visits by pregnant women. Better motivation by the ASHA's and Anganwadi workers and proper counselling could help to improve attendance.

Caesarean rates were higher at the urban centre in our study. As per the analysis by Dr Sanchita Ghosh et al.[6] from NFHS 1-3, there was a large rural-urban difference in occurrence of caesarean deliveries in India. This is because access to private medical institutions, lack of knowledge on spectrum of complications and better standards of living make the urban mother more likely to have a caesarean delivery. According to the most recent estimates by Betrán et al.[2], the average global rate of caesarean section is 18.6%, ranging from 6.0% in the least developed to 27.2% in more developed regions. The lowest rates are found in Africa (7.3%), more specifically Western Africa (3%). The highest rates are found among Latin American and Caribbean (40.5%) population. South America is the region with the highest average caesarean section rates in the world (42.9%). Their conclusion was adoption of C-section practice has increased to unprecedented levels although the gap between availability of caesarean deliveries in high and low resource settings remained poor. Although the "WHO Statement on Caesarean Section Rates".[7] published in 2015, emphasized that "Every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate", it is impossible to overlook how fast global caesarean rate is nearing that of Brazil (56 %), which is the highest in the world. In comparison, although the national average in India is around 17% at population level (NFHS-4).[8] but there are marked variations between states, in some states percentages are higher viz. Telangana (58% caesarean births) while in some of the north-eastern states it is below 10%.

For urban medical centres of West Bengal caesarean rates have risen at an alarming rate of over 50 while rural centres had a comparatively lower caesarean rate. The primary reason behind the high caesarean rates in both hospitals seems to be -

a. Rural centre had high proportions of induced labor and women with previous caesarean birth
b. Urban centre had high proportion of induced labor, previous C-section and referred preterm cases.

Rural centre had a higher induction rate because of pressure on the treating obstetrician to accomplish delivery within a specified time. Reason for this pressure came both from patient and her family as well as a poor doctor patient ratio. Low staffing pattern compelled the doctor to undergo induction and achieve quick delivery. Greater numbers of inductions (mostly with prostaglandins) resulted in higher numbers with failed induction and caesarean birth. Poor doctor–patient ratio plagues the quality of treatment in most rural centres in west Bengal. It has been hypothesized by Tampakoudis et al.[9] that the rising trend in C-section may be due to performance at "a lower threshold of abnormality to be on the safe side", which is the scenario at our urban centre.

Group 5 i.e women with history of previous caesarean birth was the largest contributor to the overall C-section rate (40.6 %) at our rural setup and second largest contributor in our urban set up (26.6%). This group has been the most common overall indication for C-section worldwide as per the study by Naidu et al.[10], Abdel-Aleem.[11] in Egypt, Kelly S et al.[12] in Canada and Delbaere et al.[13] in Belgium. As C-section rates increase in the other groups, Group 5 will increase in size and therefore it will become an even more important contributor to the overall C-section rate. However, reducing C-section in this group is likely to be the most difficult, because having a previous delivery by C-section increases the likelihood of caesarean delivery in the next pregnancy. Therefore, the best way to reduce the overall rate of C-section in this group is to prevent the first C-section. This is one of the reasons for such a high percentage in our rural setup with this medical college functioning since the last 4 years, there is a huge bulk of population in this area who have had previous C-section deliveries in private set ups without undergoing any trial for vaginal delivery. Fear of litigation, the physician's convenience, and economic incentives may determine the choice of caesarean delivery in the private setups. Only 10.1 % women underwent a vaginal birth after undergoing a Caesarean delivery at our rural setup, and 12 % in our urban setup. Enhanced access to VBAC has been recommended based on current findings on the safety of VBAC compared to repeat C-section, indicating that 60% to 80% of women can achieve a safe vaginal delivery after a previous lower uterine segment C-section as per the study by Gyamfi et al.[14] But logistical and liability concerns has led to avoidance of VBAC in many cases for both of our study settings.

Group 2 i.e nulliparous women with single cephalic term induced or planned caesarean section was the second largest contributor to overall caesarean delivery in the present study. 70 of the C-section in our urban study group was done before the onset of active phase of labour and rest 30 were induced labours, which is concerning. In our rural set up on the other hand out of the 31 % of the women in Group 2 who underwent a caesarean delivery, 2/3rd underwent induction of labour, and 1/3rd women underwent C-section before onset of labour. Women undergoing C-section without a TOL mostly had short stature or preferred an elective C-section. By reviewing the indications for planned C-section one could identify gaps in the application of evidence-based clinical practices and potential of reducing unnecessary C-sections in these groups. Persistent demand of caesarean delivery by the women before labour, despite informed counselling with risk benefit analysis is another reason for taking the

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decision for C-section which is more prevalent in our urban study group as evident from our results (65 % having preference for C-section in urban group vs 35 % in rural group).

Group 1 was the third largest (17.3%) contributor of C-section in our rural setup and fourth largest contributor (4.5 %) in our urban setup. The most common cause for C-section in this group in the rural centre was non-progress of labour (14.95 % in rural set up vs 5.8 % in urban set up) and in the urban group was foetal distress (28 % in urban setup vs 1.5 % in rural set up). Better management of labour with administration of fluid, early referral from peripheral centres, maintaining partograph properly could prevent cases of non-progress in the rural set up where such monitoring is not always possible due to inadequate supporting staff. Similarly, a low threshold for diagnosis of fetal distress in the urban setup leads to the increased caesarean rate in group 1 in this setup. Another noteworthy factor was, mean admission-delivery interval in the rural setup was 28.01±11.31 hours while the same in the urban setup was 39.10 ± 8.48 hours which implied that adequate trial was not been given in cases where the indication of C-section has been non-progress of labour and induction failure.

Group 10 (22.1%) was the third largest contributor in the urban study group and 4th largest contributor (3.1%) in the rural study group. It included preterm women with a singleton cephalic pregnancy carrying < 37 weeks of gestation, including women with previous scars. These women mainly presented with premature rupture of membranes, antepartum hemorrhage, reduced fetal movement, scar tenderness in women with previous one or two C-section, pregnancy induced hypertension, severe pre-eclampsia and eclampsia, gestational diabetes mellitus (GDM), chronic hypertension. Better antenatal management in case of pregnancy induced hypertension, GDM, infection control to prevent PROM, can again prevent the need for urgent earlier termination by C-section in these cases. We can see a significantly higher percentage in our urban set up, possibly due to lack of induction in these cases due to fear of litigation or patient demand.

To improve maternal and perinatal outcomes, C-section should be done only when there is an obstetric indication. There have been numerous studies on the same like the study by Rosa et al.[15] and Kamath et al.[16] where risk of maternal and perinatal morbidity was increased for all types of C-section. This is also evident from our study, where a significant percentage of the population in both study settings had post-operative complications. These complication rates are more in the rural set-up although the C-section rate in lower in this group. This can be explained by the relatively higher number of patients in this set up who had anaemia and malnourishment, were unbooked and presented with antepartum haemorrhage, pre-eclampsia and eclampsia. They had poor post-operative monitoring, hydration management and mobilization. All of these contribute to higher incidence of complications like PPH, obstetric hysterectomy, sepsis and thrombo-embolic complications in this group. Prevalence of LBW and preterm babies were more among the urban group, again hinting towards a low threshold for C-section even in preterm mothers. Complications like transient tachypnoea of newborn are seen more among the C-section patients in both the study group.

CONCLUSION

Increasing manpower of doctors at the rural level, avoiding unnecessary induction of labour, maintaining partogram, efficiently utilising Anganwadi and ASHA workers to mobilise antenatal mothers for health check-ups are measures we can take to decrease the C-section rate at the rural level.

Proper supervision of junior doctors by seniors while assessing patients in labour and motivating patients for vaginal delivery can improve the urban C-section rates.

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