Original Article

Analysis of Caesarean Section Trends in a Northern Nigerian Teaching Hospital using Modified Robson Classification

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Abstract

Background: Caesarean section (CS) rate is a key indicator of the quality of obstetric care within a health facility or region. Although rates are generally reported to be low in Sub-Saharan Africa, an increasing trend has been observed in many tertiary hospitals, including those in Nigeria. The contributing factors are multifactorial and sometimes controversial, and there is often no standardized method for comparison across settings. The Robson classification has been recommended as a uniform tool for assessing and comparing CS rates, but its use remains limited in our environment. This study aimed to determine the trend of CS rates over a five-year period and to evaluate the indications for CS using a modified Robson classification. **Methodology:** This retrospective cross-sectional study was conducted at Ahmadu Bello University Teaching Hospital, Zaria. Delivery records from January 2016 to December 2020 were reviewed, with a retrieval rate of 82%. Annual CS rates were calculated, and indications were categorized using the modified Robson classification. Ethical approval was obtained from the hospital's research and ethics committee. **Results:** The overall CS rate was 28%, with a rising trend from 21% in 2016 to 31.2% in 2020. The highest CS rates were observed in Robson Groups 9, 7, and 5. Notably, the CS rate among women with a previous CS was 70%. **Conclusion**: CS rates increased steadily over the study period. The Robson classification proved to be a practical and reproducible tool for evaluating and comparing CS rates across settings.

Key words: Caesarean section, Caesarean Section Rates, Robson classification

Introduction

Caesarean section is currently one of the commonest surgical procedures in the world. It significantly reduces maternal and perinatal morbidity and mortality when performed for clear obstetric indications. However, since 1985, concerns about increasing caesarean sections with associated adverse outcomes led to the specification of a 10-15% threshold for caesarean section.[1,2]

Caesarean section rates vary widely in Nigeria ranging from 11.3% in Sokoto to 35.5% in Ado-Ekiti.[3,4] Seven years ago caesarean section rate for our centre was 24.5% .[5] Though the national caesarean section rate was observed to be 10.4%, there was a remarkable increase of 108% across various health facilities in the country.[6] There are a number of indications for caesarean section which could be maternal or foetal, including previous caesarean deliveries, cephalopelvic disproportion, pre-eclampsia, malpresentations, antepartum haemorrhage, labour dystocia, foetal distress among others.[3,5,7]

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How to cite this article: Gumbi HS, Zubairu UD, Madugu NH, Bawa US. Analysis of Caesarean Section Trends in a Northern Nigerian Teaching Hospital using Modified Robson Classification. Niger J Basic Clin Sci. 2026. 23 (1): 72-76. doi: 10.65843/gxkwgq86

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Access this article online

Quick Response Code:

Website: www.njbcs.net

DOI: 10.65843/gxkwgq86

A global standard for assessing, monitoring and comparing caesarean section rates within and between healthcare facilities over time, which is the Robson classification, was developed by WHO and FIGO in 2014 and 2016 respectively.[8] The classification makes use of five characteristics of pregnancy: single or multiple pregnancy; nulliparous, multiparous, or multiparous with previous CS; cephalic, breech presentation or other malpresentation; spontaneous or induced labour or pre-labour caesarean section; term or preterm births; and number of foetuses.[4,8,9,10]

The classification was developed to help health care facilities optimize the use of caesarean section and also to determine the quality of care and outcomes of caesarean sections between the health facilities.[4, 8, 10, 11]

Several modifications to the original classification have been recommended by users depending on the nature of data available for analysis. These include splitting of groups into sub-groups, merging of groups, or addition of missing data groups.[12]

This study thus sought to determine the trend and determinants of caesarean section rate in Ahmadu Bello University Teaching Hospital (ABUTH), Zaria, over a five-year period, as well as assess the indications for caesarean section using the modified Robson classification with merging of some groups.

Methods

The study was a retrospective cross-sectional study carried out at the Ahmadu Bello University Teaching Hospital, Zaria. Data was obtained from the delivery records for the period of January 2016 - December 2020.

The data collected included parity, estimated gestational age at delivery, whether labour was spontaneous or induced, number of fetuses, fetal lie and presentation, presence of a previous caesarean section, and mode of delivery. All the deliveries were categorised into Robsons groups 1 - 10. Subsequently, groups one and two as well as groups three and four were merged into two groups respectively. This was due to a large number of missing data on induction of labour, which is a key component that separates groups 1 and 2, and groups 3 and 4. Instead of excluding such large volume of data, the groups were merged as outlined. All missing data and those that could not be categorized were put in an unclassified group.

Data were collected and analyzed using the Microsoft excel® software. Data accuracy was ensured by verification with original records, and double data entry. Data was presented using frequency tables and appropriate charts.

Ethical clearance for the study was obtained from the ABUTH Health Research and Ethics Committee, approved on the 24th of January, 2025, with assigned number ABUTHZ/HREC/C28/2025.

The Robson Ten Group Classification System [8]

1 Nulliparous (excluding previous caesarean section), singleton, cephalic, > 37 weeks, in spontaneous labour.
2 Multiparous (excluding previous caesarean section), singleton, cephalic, > 37 weeks, induced or caesarean section before labour
3 Multiparous (excluding previous caesarean section), singleton, cephalic, > 37 weeks, in spontaneous labour.
4 Multiparous (excluding previous caesarean section), singleton, cephalic, > 37 weeks, induced or caesarean section before labour.
5 Previous caesarean section, singleton, cephalic, >37 weeks.
6 All Nulliparous singleton breeches.
7 All multiparous singleton breeches (including previous caesarean section).
8 Multiple pregnancies (including previous caesarean section).
9 All abnormal lies (including previous caesarean section).
10 All singleton, cephalic, <37 weeks (including previous caesarean section).

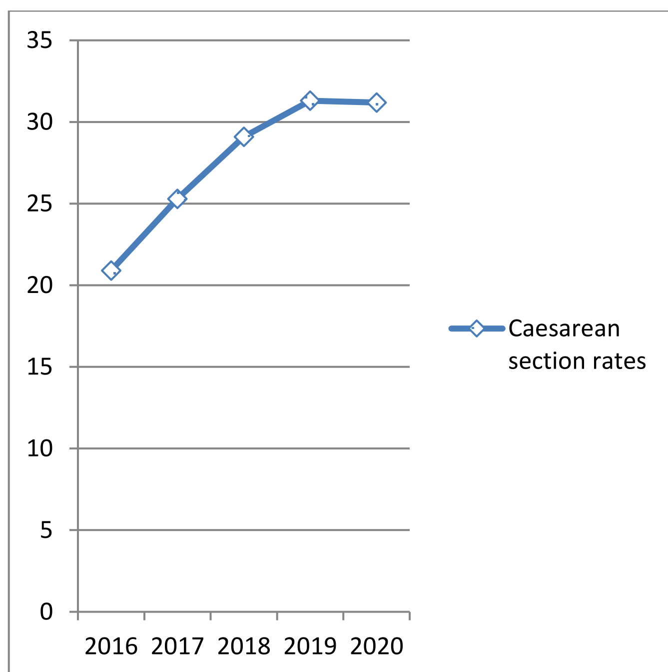
Results

Over the five-year period, 8318 women presented for labour and delivery. The mean age at delivery was 29.0 ± 6 years. Among these, 2,333 women had caesarean section; hence the caesarean section rate over this period was 28%. Only records for 6807 deliveries were retrieved for analysis, with a retrieval rate of 82%.

Women in the modified group 2 (merged group three and four) comprising all multiparae with singleton, cephalic presentation and gestational age of >37 weeks irrespective of labour onset or mode of delivery were the largest group and accounted for 45.8% of deliveries.

Women in modified group 1 (merged group one and two) comprising all singleton, cephalic, > 37 weeks were the second largest obstetric population and accounted for 15.67%. These two groups accounted for 61% of the obstetric population.

FIGURE 1: YEARLY TREND IN CAESAREAN SECTION RATES (JAN 2016-DEC 2020)



There was a steady rise in caesarean section rates over the study period from about 22% in 2016 to 31.2% in 2020.

FIGURE 2: FREQUENCY DISTRIBUTION OF THE MODIFIED ROBSON GROUPS CAESAREAN SECTION RATES FOR EACH YEAR. (2016-2020)

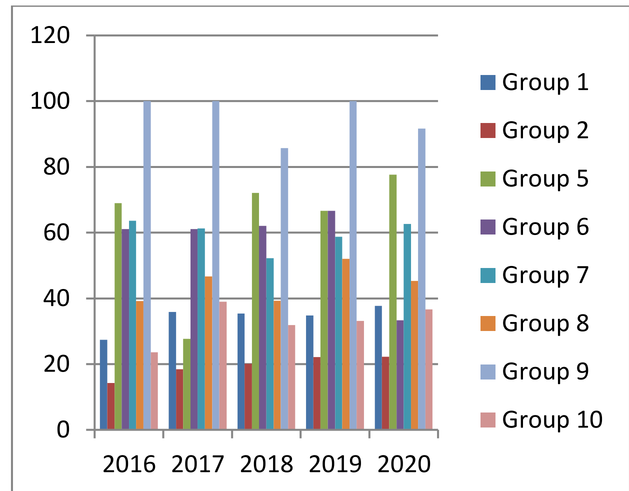


Table 1: THE ROBSON CLASSIFICATION REPORT TABLE (JAN 2016-DEC 2020).

MODIFIED ROBSON GROUP	No of CS/Group	Total No of Deliveries	% Group size	Group CS Rates	Absolute /Contribution to overall CS rates	Relative Contribution to overall CS rates
1	363	1068	12.8	34.0	4.4	15.6
2	979	3119	37.5	32.1	11.7	42.0
5	451	644	7.7	70.0	5.4	19.3
6	54	89	1.0	60.7	0.7	2.3
7	221	353	4.2	62.6	2.6	9.5
8	104	242	2.9	43.0	1.3	4.5
9	42	44	0.6	94.5	0.5	1.8
10	119	366	4.4	32.5	1.4	5.1
TOTAL	2333	5925	71.1		28.0	100

Discussion

A progressive rise in caesarean section rate was observed from 21% in 2016 to 31.2% in 2020. The overall caesarean section rate during the study period was 28%. This is higher than our previously reported rate of 24%.[5] It is also higher than the caesarean section rate of 21.4% from Abuja.[13] It is however lower than the 46.9% reported from University College Hospital Ibadan,[14] and 51.2% from a private tertiary hospital in Ogun.[15] This agrees with the evidence that suggests that caesarean section rates are higher in private than in public health facilities.[16]

Modified group 2 comprising of all multiparae had the largest contribution to the overall caesarean section rate (42%). This is not surprising as it is the largest group over the study period. This is different from the finding from Ogun where groups 3 and 4

made up 34.4% of the study population, and groups 1 and 2 followed closely with 27.7%.[15] This also differed considerably from the report in Ibadan, where group 5 was the largest contributor to their patient population, and also had the largest contribution (30.86%) to the caesarean section rate.[14] Robson group 1 however was the second largest contributor in the Ibadan study (17.7%).[14] The merging of groups 1 and 2, and 3 and 4 in this study, though an obvious necessity, limits a direct comparison with studies where there was no similar merger of groups. The WHO manual does allow for mergers of groups in special circumstances such as ours.[16] However, some comparison with other studies was still possible as detailed above.

This study also showed that Robson groups 6, 7, and 9 had the lowest contributions to the overall caesarean section rate, but were among the highest individual group caesarean section rates. This is not unexpected. Group 9 for example had the highest group caesarean section rate of 94.45%, which by convention in the presence of tranverse lie can be as high as 100%. This group is 0.55% of the study population which is consistent with the suggested recommendation that it should be < 1% of all deliveries.[16] This was similar to the findings from Ogun, where all the patients in group 9 had caesarean section, and contributed < 1% of the study population.[15] The report from Ibadan also show similar pattern in groups 6, 7, and 9 of their study population.[14]

The size of Robson group 5 is usually related to the ovearall caesarean section rate. This is because it is inclusive of previous caesarean sections done in the preceding years. A smaller group size of <10% as in our finding (7.74%) is suggestive of a low overall caesarean section rate in our hospital.[17] This is also much lower than the figures reported from Ogun and Ibadan, where group 5 alone contributed about one third of all caesarean sections in both studies.[14,15]

The high group caesarean section rate in group 7 calls for further exploration on effective application of external cephalic version for eligible multiparae with breech presentation, as well as assisted breech delivery. The size of groups 6 and 7 is 5.32% of our study population which is the prevalence of breech and is slightly higher than the baseline 4%. The high caesarean section rate in group 7 may be accounted for by the caesarean section for preterm breech especially in the presence of pre-eclampsia/eclampsia, while that of group 6 is not unexpected for nulliparous breech presentation. The size of group 8 is 2.91% with a group caesarean section rate of 43%. This is however still lower than the 55% reported from Ogun, and 60% and 88% reported from Ethiopia and Iran respectively.[15] The Robson guideline suggests a caesarean section rate of ≤60% in group 8. Our findings suggest that vaginal delivery in twin pregnancies is the norm rather than the exception, in agreement with the Twin Birth Study which recommends allowing vaginal delivery when the leading twin is cephalic.[18]

The percentage of unclassified deliveries was 28.77%. Women who had caesarean section were all classified as they had complete data. Exploratory laparotomy for uterine rupture accounted for 0.13%, operative vaginal deliveries was 3.1%. Majority, 96.8% (2316) of the unclassified deliveries were due to missing data.

The significant volume of missing data, comprising unretrieved delivery records, and unclassified deliveries, will likely have an impact on the reported distribution of the Robson groups. This could thus affect the accuracy of the results from the data, which is a limitation of this study. The descriptive nature of the data analysis may also be a limitation, as inferential statistics may have given a clearer picture of the outcomes. Other limitations include retrospective study design, and single centre study which limits generalization of the outcomes. These are gaps which can be explored to improve the validity of outcomes in future research.

Conclusion

The caesarean section rate showed a steady rise over the period under review, peaking at 31.2% with an average rate of 28%. Robson classification was practical, reproducible and comparable across different data sets.

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