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**Original Research Article**

# Need to focus on the small maternity homes from towns in India to reduce caesarean section rates in the private sector

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## ABSTRACT

**Background:** In India, the maternity services in the private sector are mainly provided by numerous small maternity homes, majority of them run by lady obstetricians, single handed. The purpose of the study is to classify the caesarean section (CS) rates at such maternity homes by applying Ten group Robson classification system (RTGS).
**Methods:** This study is based on the data collected from 10 randomly selected small maternity homes. The data includes the total number of vaginal births and CS done in each maternity home over a period of one year. The data was analysed by applying Robson classification, CS rate of each maternity home calculated and compared with Robson guidelines and MCS reference population.
**Results:** The average CS rate of the 10 small maternity homes was 55.09%. More percentage of CS were done in nulliparous women before labour than in spontaneous labour and after failed induction. The percentage of repeat CS was very high.
**Conclusions:** The CS rates in small maternity homes in the private sector, run by lady obstetricians single handed, in our study were very high especially in nulliparous and cases of previous CS. In the efforts to reduce CS rates in the private sector, we need to focus on the CS data from small maternity homes.

**Keywords:** CS rates, Small maternity homes, Private sector, Robson classification, Lady obstetricians

## INTRODUCTION

The increasing trend in caesarean section (CS) rates is a matter of concern not only for the obstetricians and people in the society, but also for the social scientists. The stakeholders of the problem are busy in finding measures to reduce the CS rates. In 1985 the World Health Organization (WHO) stated that there is no justification for

any region to have CS rates higher than 10-15%.[1,2] Latest study by Pandey et al states that the rising CS rates is not confined to India but it is a global phenomenon. The same study further emphasises the need to have uniform protocol to be set up to check the need for CS, especially when done before labour.[3] In the original research of trends and projections of CS rates, Bertan et al state that the use of CS has increased worldwide and would continue to increase over the current decade in certain regions in the world.[4] According to Mohan et al, factors other than medical indications such as place of delivery, economic incentives, and maternal request influence the CS rates.[5] According to another study CS rates are three times more in private sector as compared to public sector in India.[6] Several studies are found in the literature, finding different reasons behind more CS rate in the private sector. One of the studies states that the place of delivery has an impact on the rising rate of CS. It reports that the CS rate in India was 23.4%, out of which 63.3% and 36.7% CS were done in the private sector and public sector respectively. The study further mentions correlation of type of hospital, place of ANC visits and desire of the patients to be delivered by the same obstetrician play key role in CS delivery.[7] A qualitative study carried out in finding out reasons behind higher rates of CS rates in the private sector in Delhi, India, explains two main factors. One is economic benefit and secondly single handed obstetrician has to hassle a lot to maintain high patient loads with inadequate staff.[8]

A study based on the data from Bangladesh, India and Nepal observed that the rise in CS in the private sector is a contributing factor for increasing CS rates in these South Asian countries The study further suggests that for rise in CS rate factors like individual-level and provider-level interaction play an important role.[9] The study based on the data of NHFS 3 and 4 by Bhatia et al mentions that the private sector is the main contributor to a rapid increase in CS rates in India.[10]

The CS rate has increased from 17.2% to 21.5% in 2019-21. CS was more than twice (40.9%) amongst the private healthcare facilities during the fourth round of NFHS which has shown a considerable increase during the fifth round of NFHS (47.4%). It is essential to explore factors regarding emergency or elective caesarean section and to understand if the health facilities are following the recommended protocols for performing CS deliveries.[11] In the study of for profit heath facilities carried out in urban Bangladesh found alarmingly high CS rates. The Robson TGCS was found to be useful tool for identifying the obstetric groups of women contributing to elevated CS rates. The major contributing Robson groups for the high CS rates were group 5 (previous CS), group 10 (preterm) and group 2 and four combined (elective term). CS rates were reported to be high amongst nulliparous women.[12] In another comparative study of CS rates applying Robson classification to public and private hospital data, carried out in Ethiopia finds that the CS rate was significantly high in private hospitals than in public hospitals. They found that repeat CS (group 5) was a major contributing group in private hospitals.[13] All hospital and health authorities can use Robson Ten group classification system to monitor CS rates. This classification system identifies relevant areas of interventions to reduce rates of CS.[14] A study done by Dogra et al at a tertiary care centre in Uttarakhand, India emphasizes the importance of modified Robson's classification stating that it is easily implementable, can be effectively utilized in analysing delivering women and determinate contributors to caesarean sections to guide the health care providers to form strategies to avoid unnecessary caesarean sections.[15]

In 2001, Dr. Michael Robson of the National Maternity Hospital, Dublin, proposed the new Ten group classification system (TGCS). These 10 groups are mutually exclusive, simple to use and read, yet include the total sample. The Robson 10-group way of classification (Table 1) facilitates the comparative analysis of caesarean sections between hospitals/centres nationally, internationally, and globally.

**Table 1: Description of M. Robson Ten group classification system.**

| Group | Description |
|---|---|
| **1** | Nulliparous, ≥37 weeks, cephalic in spontaneous labour |
| **2 A** | Nulliparous, ≥37 weeks, cephalic, labour induced |
| **2 B** | Nulliparous, ≥37 weeks, cephalic, before labour |
| **3** | Multipara, singleton, cephalic pregnancy, ≥37 weeks in spontaneous labour |
| **4 A** | Multipara, singleton cephalic, ≥37 weeks induced labour |
| **4 B** | Multipara, singleton cephalic, ≥37 weeks, before labour |
| **5.1** | Previous one caesarean section, singleton, cephalic, ≥37 weeks |
| **5.2** | Previous two caesarean sections, singleton, cephalic, ≥37 weeks |
| **6** | All nulliparous breech pregnancies |
| **7** | All multiparous breeches (including previous caesarean section) |
| **8** | All multiple pregnancies (including previous caesarean section) |
| **9** | All abnormal lies (including previous caesarean section but excluding breech) |
| **10** | All singleton cephalic, ≤36 weeks (including previous caesarean section) |

In India, the maternity services in the private sector are mainly provided by numerous small maternity homes located in urban and semi-urban areas. The CS rates in the private sector in India would be influenced by the number of CS done in these maternity homes. Therefore, it is essential to analyse the data of CS from small maternity homes to understand the status of CS rates of small

maternity homes. Analysis of the CS data by applying Robson classification is a worldwide accepted way to assess the CS rates. The reasons behind choosing this segment of the private sector for the study are peculiar. Majority of such maternity homes are run by lady obstetricians single handed. Along with the job of monitoring the labour case and eventually conducting vaginal births or caesarean sections, they need to carry out few more clinical responsibilities, such as attending OPD patients, doing procedures like, tubal ligations, and MTPs. Most of such maternity homes are not well equipped and the obstetricians need to rely on untrained staff in monitoring the patients admitted in the labour ward. Such a situation can influence the monitoring of a case in labour and thereby the CS rate in the private sector. The studies based on this concept are hardly seen in the present literature.

On this background, we decided to undertake a study of analysing the CS data of 10 small maternity homes. The aim of the study was: to know the CS rate in small maternity homes of the private sector; to classify all the patients admitted in labour wards eventually undergoing either vaginal births or caesarean sections, by applying Robson classification; and to compare the CS rates of our study with the CS rates of expectation of Robson guideline and with MCS reference population.

## METHODS

Nanded is a district of Maharashtra in western India. There are about 50 small maternity homes run by lady obstetricians single handed in the city. The study is based on the data collected from randomly selected 10 such maternity homes from the city. Initially, a meeting of all the 10 lady obstetricians was organised by the author. The aims and objectives of the study were explained to them in detail. The first step was to understand all the subtle aspects of the various groups of Robson classification. Next step was to assign a group to every patient right at the time of admission in the labour ward according to Robson Classification. Eventually, the patient would undergo either vaginal birth or CS. The documentation of the group in the delivery register against the name of the patient in a separate column was done. For this study, we followed the unanimous criteria to define the onset of spontaneous labour. The cervical dilatation of more than or equal to 4 centimetres in presence of uterine contractions 5 minutes apart for 1 hour was the criteria decided. The study period was between 01 June 2022 to 30 May 2023.

The data from all the 10 small maternity homes collected for this one year was gathered by the author. Subsequently, we analysed the data in three steps. Firstly, as per the criteria mentioned in Table 1 the data from each small maternity home was classified in Ten Robson groups, including the subgroups and CS rate calculated. Secondly, the number of CS against number of deliveries, in the respective groups, from all the ten small maternity homes added together to understand the group wise distribution of our observations. Next, we calculated group CS rate (%)=no. of CS in the group/total no. of women in the group x100, as per the Robson classification report table, provided in Robson classification implementation manual. The group CS rate thus calculated from each small maternity home was added together to get an average performance of group CS rate of our observation. Our observations were compared with the expected CS rates given in Robson guideline and multicounty survey (MCS) reference population created by WHO. MCS reference population was the population of multicounty survey with relatively low CS rates and at the same time, with good outcomes of labour and childbirth as mentioned in 'steps to assess caesarean section rates' Robson classification implementation manual on page number 45 to 47.[16]

## RESULTS

The data which includes the total number of deliveries, number of CS and vaginal births from 10 small maternity homes during one year of study period was collected. Initially, we calculated the CS rate of the one year from each maternity home. Table 2 shows the total number of deliveries, number of CS, vaginal births and the percentage of CS in each small maternity home. The range of total number of deliveries amongst the 10 maternity homes varied between 75 to 674 and that of CS between 50 to 299. The average CS rate of the 10 small maternity homes was 55.09% during the study period. The lowest CS rate in one of the hospitals was 33.68% while the highest was 77.11% in another hospital.

Later on, we analysed the data by applying Robson classification. Every woman from all the 10 small maternity homes during the one-year study period who either had vaginal birth or delivered by CS was classified according to Robson classification. While assigning the case and distributing the same in one of the 10 groups of the Robson classification, care was taken to classify some of the cases in subdivisions of some of the groups as suggested in the latest edition of Ten group classification system by Robson. The data from each small maternity home tabulated in this way was added together and studied further.

Table 3 shows the number of CS against number of deliveries, in the respective groups, from all the ten small maternity homes added together.

Amongst the 629 women classified in group 2, CS was done in 523 women (83.14%). Almost 70% of the CS done in group 2 were before labour and 30% for failed induction (Table 4). Seventy CS were done out of 200 women in group 4 (Table 3). The figures of subdivision of group 4 show that 42.85% CS were done after failure of induction and 57.14% before labour (Table 4). Out of the 633 women who were assigned in group 5 (group of previous CS) repeat CS was done in 616 women (97.31%). Amongst these 616 previous CS cases, 466 (73.61%) and 150

(23.69%) were after previous one and two CS respectively (Table 4).

As depicted in Figure 1, the X axis of the graph shows the expected group wise percentage of CS as per Robson guidelines. It is observed that in all groups shown in the graph the CS rates in our study were much above than the expected guidelines by Robson.

The Y axis of graph shows expected group wise CS rates, (%) as per MCS reference population (blue bar) and the average group wise CS rates (%) of 10 small maternity homes observed in our study (red bar).

**Table 2: Individual performance of 10 small maternity homes.**

| S. no. | Name of hospital | Total no. of deliveries | Total no. of CS | Total no. of VBs | Percentage of CS |
|---|---|---|---|---|---|
| **1** | MM | 75 | 50 | 25 | 66.66 |
| **2** | TO | 352 | 182 | 170 | 51.7 |
| **3** | VD | 156 | 115 | 41 | 73.71 |
| **4** | SP | 163 | 89 | 74 | 54.6 |
| **5** | AL | 674 | 299 | 375 | 44.36 |
| **6** | VN | 118 | 91 | 27 | 77.11 |
| **7** | SuP | 190 | 64 | 126 | 33.68 |
| **8** | BI | 208 | 131 | 77 | 62.98 |
| **9** | JA | 212 | 139 | 73 | 65.56 |
| **10** | BU | 618 | 364 | 254 | 58.89 |
| | Total | 2766 | 1524 | 1242 | 55.09 |

**Table 3: Number of CS against number of deliveries, in the respective groups, from all the ten small maternity homes added together.**

| Robson groups | Total no. CS | Total no. deliveries | CS rate of the group (%) |
|---|---|---|---|
| **1** | 159 | 577 | 27.55 |
| **2** | 523 | 629 | 83.14 |
| **3** | 16 | 499 | 3.2 |
| **4** | 70 | 200 | 35 |
| **5** | 616 | 633 | 97.31 |
| **6** | 42 | 46 | 91.3 |
| **7** | 15 | 18 | 83.33 |
| **8** | 19 | 26 | 73.07 |
| **9** | 6 | 6 | 100 |
| **10** | 58 | 132 | 43.93 |
| **Total** | 1524 | 2766 | 55.09 |

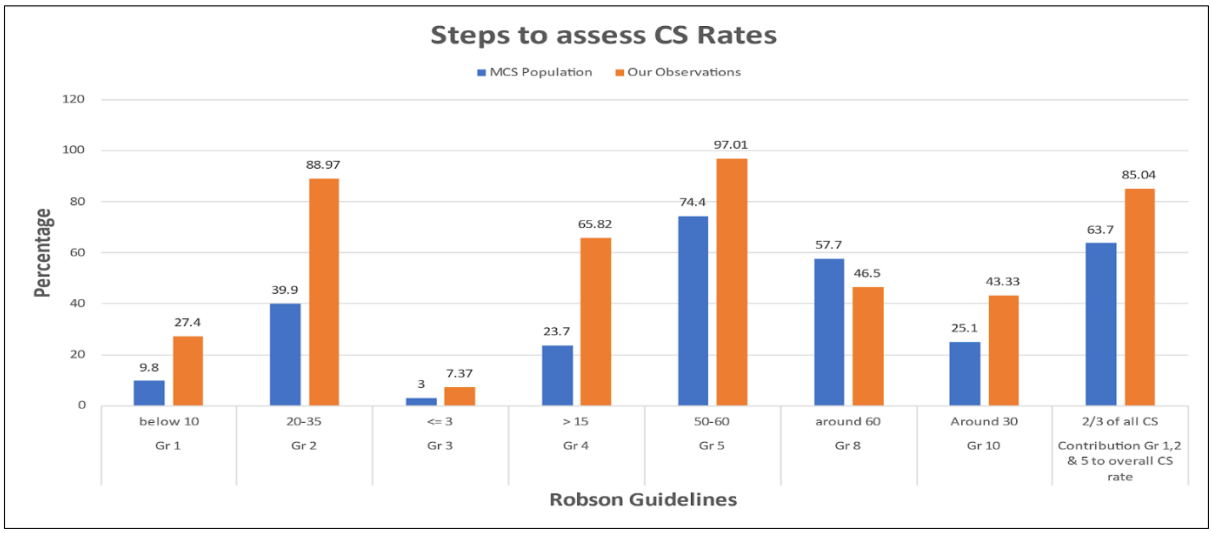


**Figure 1: Steps to assess CS rates.**

**Table 4: Additional observations in subdivisions of group 2, 4 and 5.**

| Robson groups | Total no. CS | Total no. deliveries | Percentage |
|---|---|---|---|
| **2** | 523 | 629 | 83.14 |
| **2A** | 159 | | 30.4 |
| **2B** | 364 | | 69.59 |
| **4** | 70 | 200 | 35 |
| **4A** | 30 | | 42.85 |
| **4B** | 40 | | 57.14 |
| **5** | 616 | 633 | 97.31 |
| **5.1** | 466 | | 73.61 |
| **5.2** | 150 | | 23.69 |

## DISCUSSION

The present study was undertaken in an attempt to understand the CS rates in the small maternity homes, run by lady obstetrician single handed. In our study the average CS rate of the small maternity homes was found to be 55.09%. There was a wide variation in the CS rates amongst the 10 small maternity homes. In one it was as high as 77.11%; and in another it was found to be 33.68%. The reason behind such variation may be, because the situation in each small maternity home while making decision of CS may be different. Another reason may be no uniform protocol is designed for arriving at the decision of CS in private sector. After further analysis of our data by applying Robson classification, we found that a greater number of CS in nulliparous women were done either before labour or after induction of labour (Table 4) as compared to those after they are into spontaneous labour (Table 3). The same observations were made in relation to multiparous women having no previous scar. In other words, nulliparous women or multiparous women (having no previous scar) when got admitted in the hospital in labour, underwent CS in less percentage as compared to those who reported before labour. The average percentage of repeat CS was as high as 97.31%. The old concept of 'once CS is always CS' appeared to be practised by the obstetricians almost every time in our study. The Robson classification implementation manual mentions expected percentage of CS rate for each group according to Robson guideline and the multicentric study (MCS) done by WHO. It also includes the expected percentage of CS for some groups when combined together.[16]

After analysis of our data in this perspective, a wide gap was observed between the average group wise CS rates of our study and the expected CS rates suggested by Robson guidelines and figures of MCS reference population in almost all the groups including group 10 which belongs to preterm pregnant women having vertex presentation (Figure 1). The contribution of the combined percentage of CS percentage of groups 1, 2 and 5 in our study is 85.04%. which is also much more than expected (about 66%).

The place of delivery is an influencing factor on CS rates. The possible reasons mentioned under the 'place of delivery 'in study carried out by Rayhan et al, are applicable to small maternity homes, run single handed by a lady obstetrician.[7] The factors such as economic benefit and working with the support of untrained staff are mentioned behind the rise in CS rates in the qualitative analysis done by Peel et al.[8] Such factors are also applicable to the solo obstetrician running a small maternity home in our study. The lady obstetricians in such maternity homes are engaged in multiple tasks, therefore as a matter of convenience they perform CS even before the labour starts. They prefer doing this to avoid working in odd hours. They are afraid of possible negative maternal and neonatal outcome as monitoring of labour for vaginal births to take place with the help of untrained staff in less equipped infrastructure. Therefore, they are inclined to choose CS. In addition, there is a fear of litigations from the relatives in case of negative outcome.[8] The obstetricians running small maternity homes single handed in our study also face similar situation.

### *Limitations*

This study is based on quantitative analysis of the data from small maternity homes. A qualitative analysis based on the in-depth interview of the lady obstetricians who run small maternity homes in compromised circumstances would have given us better understanding of the issue of high CS rates more explicitly.

## CONCLUSION

On the background that the private sector is the main contributor to a rapid increase in C-sections in India, this pilot study attempts to understand the CS rates in small maternity homes, run single handed by lady obstetricians located in a town in India. The study was done by classifying the data of all the patients admitted in labour ward, eventually either had CS or had vaginal birth, by applying Robson classification; it guides us to focus on Robson group 1 (nulliparous at term in spontaneous labour), group 2 (nulliparous at term before labor) and group 5 (previous CS), as these groups are the main contributors for high CS rates in such maternity homes. In the efforts to reduce CS rates in the private sector, we need to focus on the CS data from numerous such small maternity homes, located in smaller towns of India. The setting up of a system which can collect the data of CS

done from all the small maternity homes all over India, using the WHO recommended Robson's ten group classification system is the first step in determining the range of caesarean rates in the private sector. This would be helpful to develop uniform protocol for such small maternity homes to regulate CS rates. This study introduced RTGS classification to the obstetricians of all the ten small maternity homes about which they were not aware earlier.

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