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Original Research Article

Interventions to reduce caesarean section rates at government medical college and hospital Aurangabad, India

Shrinivas Gadappa, Honey Gemavat*, Sonali Deshpande, Ankita Shah

Department of Obstetrics and Gynecology, GMCH, Aurangabad, Maharashtra, India

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***Correspondence:**
Dr. Honey Gemavat,
E-mail: honey_g29@ymail.com

ABSTRACT

Background: Caesarean sections are effective in saving maternal and infant lives, but only when they are performed for medically indicated reasons, The Objective of this study was to reduce caesarean Section rate at GMCH, Aurangabad and to improve overall birthing experience with respectful maternity care.
Methods: The caesarean sections done at GMCH Aurangabad were audited using Robson`s Ten Group classification system to identify the major contributors to the overall CS rate. The following clinical and non-clinical interventions were applied dynamically to control the caesarean section rates. Clinical Interventions were changes in protocols regarding induction of labour, Intermittent auscultation as opposed to continuous electronic foetal monitoring in low risk cases, use of a partogram, encouragement of different birthing positions, promoting TOLAC to reduce the secondary CS rate. Nonclinical interventions include encouragement of DOULA (birth companion), ante-natal counselling of the expectant mothers, training of healthcare staff for respectful maternity care and use of evidence based clinical practice guidelines with mandatory second opinion for every non recurrent indication of CS. Auditing of caesarean section using Robson classification.
Results: In this study there has been steady decline in LSCS rates from 33% to 26.9%. On analysis with Robson classification, group 5 (previous LSCS) made largest contribution of 36.9% followed by Group 1, 2, 10 each contributed 18.01%,13.2% and 11.2% respectively. Group 6 to 10 account for 23%. Various birthing positions lowered use of oxytocics from 33 % to 19% as well lowered episiotomy rates with greater success in vaginal delivery.
Conclusions: Modification of induction protocols have reduced the primary LSCS rates and successful VBAC using FLAMM score was helpful in reducing the repeat caesarean Sections. Various birthing positions, DOULA gave greater success in vaginal delivery. LSCS rates in mothers with breech, multiple or oblique/transverse lies were largely unmodifiable. Limiting the CS rate in low-risk pregnancies by individualizing every labour and not to set a time limit as long as mother and baby are closely monitored.

Keywords: Birthing position, Caesarean rates, Clinical interventions, Doula, Non-clinical interventions, Respectful maternity care, Robson classification

INTRODUCTION

Caesarean sections are effective in saving maternal and infant lives, but only when they are performed for medically indicated reasons. Every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate.[1]

However, the caesarean section (CS) delivery rate in the India has steadily increased over last 20 years, high

caesarean birth rates are an issue of international public health concern. Caesarean section without medical indication increases risk of short-term adverse outcomes for mothers. (2004-2008 WHO global survey). Caesarean sections can cause significant and sometimes permanent complications, disability or death particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications.

According to an Indian Council of Medical Research (ICMR) task force study, the CS rate has increased to 28.1% in 2015-16, that was 21.8% in 1993-94. The rates are even higher in private sector up to 40%.

Many theories have been offered to explain the rising rates of caesarean sections, these include a decrease in vaginal births after caesarean (VBAC), an increase in caesarean sections performed for maternal request, increased number of high-risk expectant mothers, the obstetrical medicolegal environment, and changes in provider practice patterns.[2]

A study compared caesarean section rates in health-care facilities in 21 countries using the Robson classification system and found that caesarean section rates increased over time between the two WHO surveys in all countries except Japan. This overall pattern suggests that the threshold for caesarean section has become lower over time, or the use of elective caesarean section surgery has risen, or both.[3]

World Health Organization has recommended that caesarean section (CS) rates should not be more than 15%, as CS rates above this are not associated with additional reduction in maternal and neonatal mortality and morbidity.

It has been reported that if the CS rate were reduced to 15%, there would be worldwide cost savings of around USD2.32 billion.[4]

Objectives of this study were to audit caesarean sections at the institute using Robson's classification and identify groups with highest caesarean rates. To introduce clinical and non-clinical interventions to optimise caesarean Section rates based on the above study. To analyse the outcomes of said interventions in reducing caesarean rates.

METHODS

Government Medical College and Hospital, Aurangabad is teaching institute with a busy obstetric unit having approximately 18000 deliveries annually. The study hospital acts as referring centre of high-risk patients in surrounding areas. The caesarean rate at the institute was 33% in 2016.

Understanding that reducing caesarean section would require a multi-pronged approach, auditing of LSCS was started using Robson's Classification to analyse and identify the common causes of rising LSCS at the institute.

Descriptive statistics were recorded daily on Microsoft excel sheets, data included number of normal deliveries, LSCS, instrumental deliveries, VBAC, Robson's group of LSCS, maternal medical conditions, live births, still births, NICU admissions, birthing positions adopted were also recorded. Relative size of each Robson group and relative contribution of each group to the overall CS rate was calculated. Monthly analysis of data was done to formulate strategies to reduce LSCS rates.

Clinical and non-clinical interventions in the form of standard operating procedures were introduced in 2017 and are strictly followed in labour room, OT, wards and OPD and monthly audits of LSCS was done using Robson's Classification.

This process of recording, auditing and analysis of caesarean Section on the basis of Robson`s Ten Group has become a dynamic process which is reviewed monthly and the process is ongoing.

Inclusion criteria

- Willing to participate in study
- All patients admitted in labour room in the hospital.

Exclusion criteria

- Not willing to participate in study
- Patient who were delivered at peripheral centres and referred to the institute.

Clinical interventions

Various clinical interventions have been introduced in the form of the policy and protocols to reduce both primary and repeat caesarean section rates. In implementing the following protocols, the main aim was to reduce the primary Caesarean Section rates as these were also the reasons for the repeat sections.

Changes were made in protocols regarding induction of labour including induction after 41 weeks. Before 41 weeks induction of labour was performed only if there were maternal and foetal indications. Pre-Induction with cervical ripening agents was done when labour was introduced in woman with unfavourable cervix. The policy regarding the failure of induction or failure to progress was changed, if the maternal and foetal status allowed, caesarean deliveries for failed induction of labour in the latent phase were avoided by allowing longer durations of the latent phase (up to 24 hours or longer).

Intermittent auscultation as opposed to continuous electronic foetal monitoring in low risk cases with

electronic foetal doppler. The most common indication for primary caesarean was an abnormal or indeterminate foetal heart rate tracing. Given the known variation in interpretation and management of foetal heart rate tracings, a standardized approach was a logical potential goal for interventions to safely reduce the caesarean delivery rate.

Use of a partograph with a four-hour action line for women in spontaneous labour with an uncomplicated singleton pregnancy at term. To revisit the definition of labour dystocia because recent data show that contemporary labour progresses at a rate substantially slower than what was historically taught.[5] Most women with a prolonged latent phase ultimately entered the active phase with expectant management. With few exceptions, the remainder would either with amniotomy or oxytocin (or both), achieve the active phase. Thus, a prolonged latent phase (e.g., greater than 20 hours in nullipara women and greater than 14 hours in multipara woman) should not be an indication of caesarean section. Instead use of a partograph with a four-hour action line for women in spontaneous labour with an uncomplicated singleton pregnancy at term, helped in accurately diagnosing those in prolonged labour requiring intervention.

Birthing position; traditionally lithotomy and supine positions were the most commonly adopted positions during delivery. However, many women reported discomfort during delivery in this position and preferred alternative natural birthing positions like squatting, standing, semi sitting, reclining, all fours position etc. Natural birthing positions have advantage of improved alignment of baby with birth canal with increased width of pelvic outlet along with assistance of gravity.[6] This gave greater success in vaginal birth, shortened the duration of labour, lowered episiotomy rates and LSCS rates.

Reduction in secondary caesarean rate by promoting trial of labour after caesarean (TOLAC) justifiably to reduce the secondary caesarean section rate. TOLAC should be considered as protocol and not left to the discretion of individual obstetrician. Careful selection of patient for TOLAC is important. Study have used the FLAMM score to help us predict the successful outcome of TOLAC. Appropriate monitoring of both mother and foetus was done to reduce the rate of proceeding in to caesarean section.

Non-clinical interventions

Continuous labour and delivery support personnel - DOULA. Published data indicate that one of the most effective tools to improve labour and delivery outcomes is the continuous presence of support personnel, such as a DOULA. A Cochrane meta-analysis demonstrated that the presence of continuous one-on-one support during labour and delivery was associated with improved patient satisfaction and a statistically significant reduction in the rate of caesarean delivery. Given that there are no associated measurable harms, this resource is underutilized. In this study one birth companion is allowed with the mother in the labor room, she was educated about birthing positions, various warning signs and symptoms to look out for as well as care about mobilization and hydration of mother and most importantly provide psychological support.

Counselling of the expectant mothers and their families regarding various aspects of childbirth in the ante-natal clinic and the ante-natal ward. Women think that learning new information about birth can be empowering. The content of educational material helped reduce anxiety and provided the basis for more informed dialogue between doctor and patient. Various audio-visual and print materials were also provided to help reduce anxiety related to the childbirth. This exceptionally worked well with the first-time mothers. Women were encouraged to actively participate in labour process by making them aware of the various birthing positions that can be adopted during labour and their advantages. Women were also given emotional support alongside the communication of facts and figures about birth, this was provided during labour with the help of doula.

Training of resident doctors and staff nurse was done regarding respectful maternity care and psychosocial support to mother during labour. In modern era, despite overall advances in maternal health care ensuring that woman gets skilled and respectful care during delivery remains a challenge. This study has implemented the core components of respectful maternity care so that all woman is benefitted by the process of humanizing labour thereby reducing maternal and perinatal mortality and morbidity.

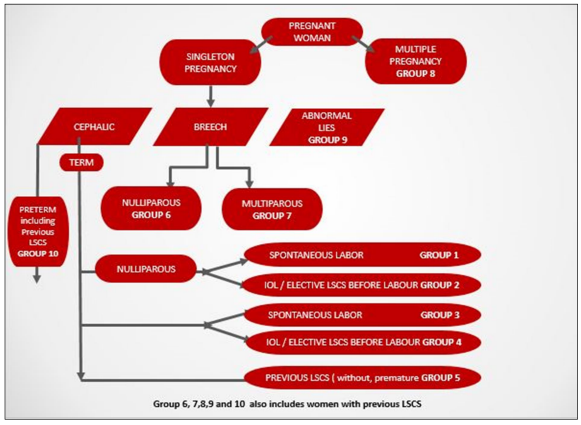

Figure 1: Robson Ten group classification.

Implementation of evidence-based clinical practice guidelines was done combined with structured, mandatory second opinion of senior obstetrician for every non-recurrent indication caesarean section to reduce

unnecessary CS rates. Caesarean sections were categorised as per the Robson`s classification as shown in Figure 1, and monthly feedback to health-care professionals to reduce unnecessary caesarean.

Statistical analysis

All the data retrieved was entered in Microsoft excel and statistically analyzed for its effectiveness.

RESULTS

The study was formulated with the aim of reducing CS rates at GMCH, Aurangabad and morbidity associated with it. The study has been implemented at GMCH, Aurangabad since June 2017, has shown steady decline in LSCS rates. From earlier rates of 33%. CS rates have declined to 26.9% this year as shown in Figure 2 given below.

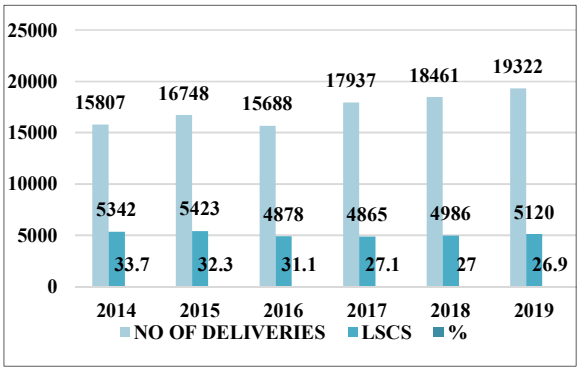

Figure 2: Rate of caesarean section at GMCH, Aurangabad.

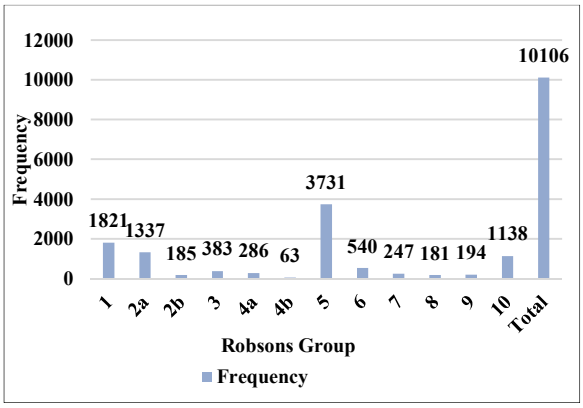

Figure 3: Frequency distribution of caesarean sections at GMCH, Aurangabad classified according to Robson classification (2017-2019).

While this study gave the rate of 26.9%, which is quite low compared to other reports but still above the WHO criteria. In comparison with other international studies, the current study results were quite reassuring.

On analysis of CS according to Robson's classification, different rate of each group was observed separately. Group 5 (previous CS group) made the greatest contribution to the total CS rate accounting for 36.9% of total LSCS rate alone as shown in Figure 3 and 4. Group 1, Group 2a and Group 10 were other significant contributors to the caesarean section rates with each contributing to about 18.01%, 13.2% and 11.2% respectively. Group 6 to 10 account for 23% of total LSCS. These indications are largely unmodifiable, so the focus of study was mainly on the first 5 groups. Increased use of caesarean sections occurred in women undergoing a prelabour caesarean section and a rise in the proportion of women with a previous caesarean section. The nulliparous population was the largest contributor to the overall caesarean section rate, and therefore increasing use of obstetric interventions in this group drove rates higher. Total number of CS in Group 5 is 3731. In this study out of total 4983 patients with previous CS across the groups 2170 patients were subjected to TOLAC after assessment of success rate using FLAMM score and counselling them about the risks and benefits of the VBAC. Of these 1328 successfully delivered vaginally. Total 26.6% of the previous caesarean section patients delivered vaginally.

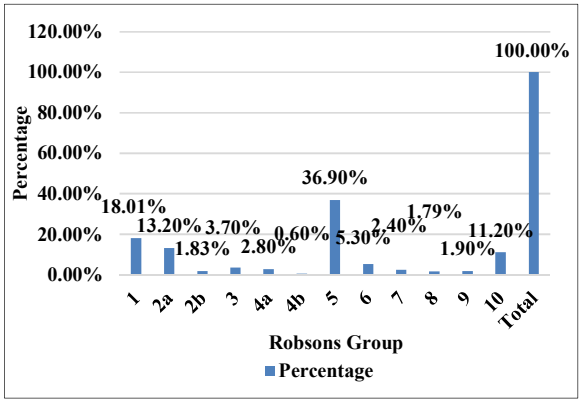

Figure 4: Percentage distribution of caesarean sections at GMCH, Aurangabad classified according to Robson classification (2017-2019).

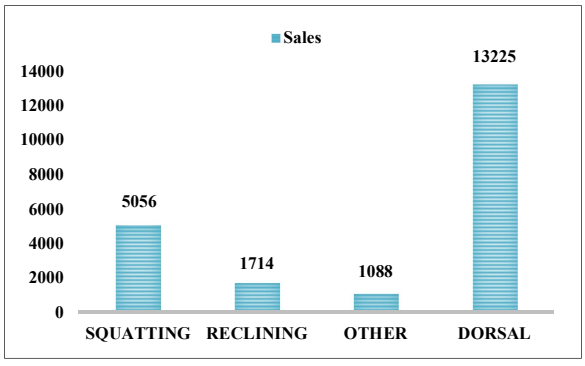

Figure 5: Statistics of various birthing positions adopted at GMCH, Aurangabad.

A total of 21803 birthing positions were statistically recorded. Squatting position was most favoured by patients with around 5356 deliveries conducted in this position, 1414 woman were delivered in reclining position, 1088 woman delivered in other positions like semi sitting, standing kneeling etc. Dorsal position was still most common with 13225 deliveries as shown in Figure 5 and 6.

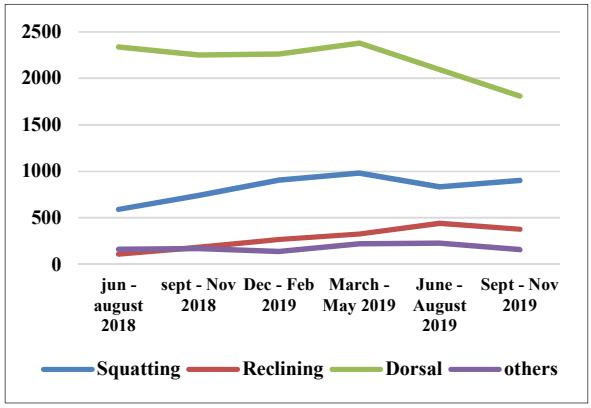

Figure 6: Frequency distribution of birthing positions over time at GMCH, Aurangabad.

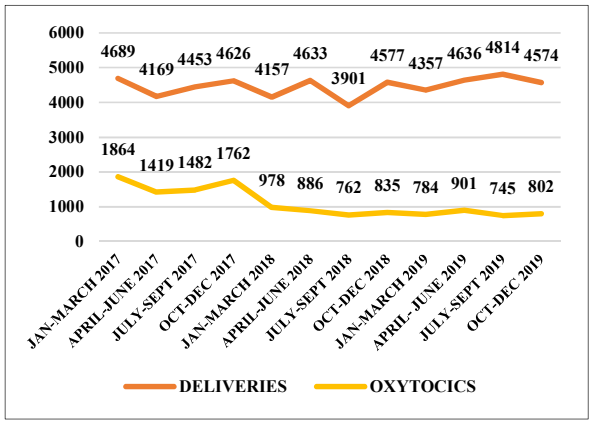

Figure 7: Distribution of use of oxytocics over time GMCH, Aurangabad (2017-2019).

With counselling of mothers from ANC period itself and encouragement of DOULA to help mothers adopt position of choice, there has been gradual increase in deliveries being conducted in different positions over the study period. Total vaginal deliveries conducted during this period were 37783, with 21803 birthing positions recorded statistically.

With encouragement of natural birthing positions and DOULA, need for oxytocic for augmentation of labour has steadily declined from 33% last year to 19% this year as shown in Figure 7. Since the conception of this program the use of Drotaverine and Valethemide Bromide which was widely used earlier has completely been stopped. 22.5% woman needed episiotomy in dorsal lithotomy position whereas 7.2% needed episiotomy in upright position. Also, the duration of first and second stage was lower in upright position as compared to dorsal lithotomy. Duration of 3rd stage was equal in both groups.

Table 1: Statistics of various indications of LSCS at GMCH, Aurangabad.

Rank	Indication	Frequency	%
1	Foetal distress	2322	22.91%
2	Previous LSCS with impending scar dehiscence	1620	16.03%
3	Failure of induction	786	7.79%
4	CPD in labour	652	6.37%
5	Previous 2 LSCS	616	6.09%
6	Previous LSCS at term with unfavourable cervix	599	5.92%
7	Primigravida breach	554	5.48%
8	Oligohydramnios with unfavourable cervix	392	3.87%
9	Severe preeclampsia / eclampsia with unfavourable cx	390	3.85%
10	Previous LSCS with hypertensive disorder of pregnancy	345	3.41%
11	Placenta previa in bleeding phase	281	2.78%
12	Previous LSCS with PROM	214	2.11%
13	Transverse lie or Oblique lie	209	2.06%
14	Abruptio placenta with unfavourable cx	208	2.05%
15	Multiparous breach with unfavourable cervix	189	1.87%
16	Twins with 1st / 2nd non cephalic presentation	124	1.22%
17	Previous LSCS with short peri-conceptional period	114	1.12%
18	Fetoplacental insufficiency with unfavourable cervix	103	1.01%
19	Failure to progress	94	0.93%
20	Face presentation	73	0.72%
21	Cord prolapse / hand prolapse	72	0.71%
22	Prolonged PROM with unfavourable cervix	41	0.40%
23	Previous 3 LSCS	37	0.36%
24	Previous LSCS with breech	37	0.36%
25	Brow presentation	34	0.33%
	Total	10106	100.00%

The most common cause of the caesarean Section is foetal distress at 23%. Previous caesarean Section with impending scar dehiscence is the second most common cause of caesarean sections at 16% followed by the failure of induction at 7% and CPD in labour at 6% as mentioned in Table 1.

DISCUSSION

Global rates of caesarean section are increasing. It doubled from 2003 to 2018 to reach 21%, and is increasing annually by 4%.[7]

One out three women who gave birth in the US delivered by caesarean in 2011. In 2012, close to 23 million C-sections were carried out globally.[8] More than 50 nations have rates greater than 27%. In the United States about 33% of deliveries are by caesarean-section.[8] In China, the most recent CS rate reported was 41%.[7] In southern Africa it is less than 5%; the rate is almost 60% in some parts of Latin America.[9] In the United Kingdom, in 2008, the rate was 24%.[10] In Ireland the rate was 26.1% in 2009.[11] Australia has a high caesarean section rate, at 30.9% in 2007.[12] According to an Indian Council of Medical Research (ICMR) task force study, the CS rate has increased to 28.1% in 2015-16, that was 21.8% in 1993-94, the rates are even higher in private sector up to 40%.

The study has been conducted at GMCH, Aurangabad since June 2017, has shown steady decline in LSCS rates. From earlier rates of 33%. CS rates have declined to 26.9% this year.

On analysis using Robson group, Group 5 (previous CS group) made the greatest contribution to the total CS rate accounting for 36.9% of total LSCS rate alone. Group 1, Group 2a and Group 10 were other significant contributors to the caesarean section rates with each contributing to 18.01%, 13.2% and 11.2% respectively. Group 6 to 10 account for 23% of total LSCS. These indications are largely unmodifiable.

The fact that Group 5 women were the major contributors of LSCS. Thus, reducing primary LSCS and successful VBAC will help reduce LSCS in this group. Hence there is a considerable space to reduce the CS rates in Group 5 by considering TOLAC for the patient with previous uterine scar. Total number of CS in Group 5 is 3505. In this study out of total 4983 patient with previous CS across the groups 2170 patients were subjected to TOLAC, 1328 of them successfully delivered by vaginal. Thus, percentage of VBAC being 26.6%. British figures indicate that among women with a prior caesarean section, 33% will successfully achieve vaginal birth in the subsequent pregnancy.[13] TOLAC (Trial of labour after caesarean section) has never being straight forward and tends to be at the discretion of individual obstetrician and risk-taking attitude. And often times counselling of the patient is uni-directed towards this attitude. And in the event of untoward outcome, labour wards residents are so chastised so severely that it kills their initiative and boldness to manage such cases appropriately and so they tend to intervene too soon. TOLAC should be considered as protocol and not left to the discretion of individual Obstetrician. Careful selection of patient for TOLAC with usage of FLAMM score system along with appropriate monitoring of both mother and foetus can reduce the rate of proceeding in to caesarean section. The VBAC risk score for successful vaginal delivery (Flamm Model) is a simple scoring system. It includes cervical assessment which can only be used after admission for labour. The use of such a scoring system enables the obstetricians to predict the chances for success of TOLAC in the individual patient and to evaluate the risks and benefits, thus improving outcome in a trial of labour after previous one lower segment caesarean section

This study showed that foetal distress was one of the most common indications of LSCS. Studies have shown that prediction of foetal hypoxia and acidosis on basis of non-reassuring foetal heart rate patterns on continuous electronic foetal monitoring is low and can lead to unnecessary LSCS.[14]

In low risk pregnancies intermittent auscultation with electronic foetal doppler as opposed to continuous electronic foetal monitoring should be done. Use of modalities like foetal scalp pH or overall assessment of patient's details may help to differentiate between foetuses that require prompt delivery and those not in acute distress.

The fact that Group 5 women were one of the major contributors indicates the importance of preventing primary caesarean if a meaningful reduction in overall CS rate is to be achieved.

A secondary analysis of two WHO global surveys showed that the incidence of labour induction has risen in recent decades. Although the use of labour induction increased in both nulliparous and multiparous women (Groups 2a and 4a), the caesarean section rates in induced multiparous women (Group 4a) were higher than in induced nulliparous women (Group 2a) which exceeded 12%.[3] The modifiable factors for consideration in reducing caesarean section rates would be to improve the number of successful inductions of labour. A critical review of induction protocols was done and modifications adhered to as much as possible.

A total of 21083 birthing positions recorded statistically. Since the inception of this program, there has been steady rise in use of various birthing positions for delivery with training and encouragement of new resident doctors for the same. With encouragement of natural birthing positions and DOULA, need for oxytocic for augmentation of labour has steadily declined from 33% last year to 19% this year Various birthing positions also reduced the need of episiotomy which was more in recumbent group as compared to upright group and the result was significant statistically. 22.5% woman needed episiotomy in dorsal lithotomy position whereas 7.2% needed episiotomy in upright position. Also, the duration of first and second stage was lower in upright position as compared to dorsal lithotomy. Duration of 3rd stage was equal in both groups. This has ultimately contributed to greater success in vaginal delivery and lower LSCS rates.

CONCLUSION

Limiting the CS rate in low-risk pregnancies is key to lowering the trend of increased CS. The important thing is to individualize every labour and so long as monitoring is good and mother and foetus are well, don't set a time limit while patient is in a tertiary centre.

Encouraging doctors, nurses and most importantly patients for VBAC is warranted to decrease secondary caesarean section.

One should not under-estimate the importance of antenatal counselling of the expectant mother helping them to understand the delivery process both physical and physiological and have realistic expectations. The presence of continuous one on one support in form of DOULA helps reduce anxiety and provide emotional support during delivery as well as identify warning signs and symptoms earlier. Various birthing positions that suit the comfort of the patient give greater success in vaginal delivery. Training resident doctors and staff nurse in respectful maternity care bridge the communication gap between doctor and ANC mother, these non-clinical interventions are cost effective ways to help reduce caesarean rates.

Application of these protocols has helped us reduce caesarean sections conducted at the institute. The aim being to help us reach closer to WHO standard of 15%, 1 from the current rate of 26.9%. Ultimately reducing maternal morbidity and operative complications.

However, one should not forget to make every effort to provide Caesarean Sections to women in need, rather than striving to achieve a specific rate.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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