

Original Research Article

Caesarean Audit in Maternity Hospital of SKIMS, A Tertiary Care Institute of North India

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ABSTRACT

Introduction: Maternal health refers to the health of women during pregnancy, childbirth and the postnatal period. The international healthcare community has considered the ideal rate for caesarean sections to be between 10% and 15%. There is a need to understand the possible factors of the high C-section rates in India.

Methodology: A prospective study was carried out in maternity hospital for 6 months. Out of total caesarean sections, 500 subjects were studied after resorting to random sampling. A predesigned audit Proforma was used to study the caesarean delivery.

Results: Majority (54%) were in the age group 30-40 yrs, 76% were subjected to partograph, 96% trial of labor. 100% subjects delivered live births with 96% babies stable. Majority (24%) had previous C-sections as a sole reason for LSCS and were belonging to Group eight (8).

Conclusion: In conclusion the findings of our study established that high rate of caesarean section was observed in comparison to available literature on the subject. High rates of caesarean section were complimented with approximately 100 percent positive fetal outcome and negligible maternal mortality

Keywords: Caesarean section (CS), Caesarean rate (CR)

INTRODUCTION

Maternal health refers to the health of women during pregnancy, childbirth and the postnatal period. Each stage should be a positive experience, ensuring women and their babies reach their full potential for health and well-being. Although important progress has been made in the last two decades, about 295,000 women died during and following pregnancy and childbirth in 2017. This number is unacceptably high. The most common direct causes of maternal injury and death are excessive blood loss, infection, high blood pressure, unsafe abortion, and obstructed labor, as well as indirect causes such as anemia, malaria, and heart disease. Most maternal deaths are preventable with timely management by a skilled health professional working in a supportive environment. Ending preventable maternal death must remain at the top of the global agenda. At the same time, simply surviving pregnancy and childbirth can never be the marker of successful maternal health care. It is critical to expand efforts reducing maternal injury and disability to promote health and well-being.⁽¹⁾

Caesarean delivery (C-section) delivers a baby via surgery through a laceration in the mother's abdomen and uterus. According to the World Health Organization (WHO), a caesarean section is a surgical procedure that can save the life of a woman and her baby when undertaken for medical reasons. Thus, the procedure should only be used in complicated pregnancies.⁽²⁾ Since 1985, the international healthcare community has considered the ideal rate for caesarean sections to be between **10% and 15%**. Since then, caesarean sections have become

increasingly common in both developed and developing countries. When medically justified, a caesarean section can effectively prevent maternal and perinatal mortality and morbidity. However, there is no evidence showing the benefits of caesarean delivery for women or infants who do not require the procedure. As with any surgery, caesarean sections are associated with short- and long-term risk which can extend many years beyond the current delivery and affect the health of the woman, her child, and future pregnancies. These risks are higher in women with limited access to comprehensive obstetric care. In recent years, governments and clinicians have expressed concern about the rise in the numbers of caesarean section births and the potential negative consequences for maternal and infant health.

A considerable number of studies have shown that there is an inverse relationship between the rates of C-section and maternal and child mortality in low-income countries where large sectors of the population lack access to basic obstetric care^(3,4,5) However, the C-section rates above a central limit have not shown additional benefit for the mother or child, and some studies have shown that the high rates of the C-section could be linked to negative repercussions in maternal and child health.

In terms of the global scenario, the previous studies show that in both the developed and developing countries, there is a large increment in the rate of C-section as country shifts from lower to higher Human Development Index (HDI). However, it can be seen that the rates are consistently rising even within the HDI categories. The latest edition of the National Family Health Survey (NFHS) revealed that India steadily moved towards population stabilization. The report also revealed that while, on the one hand, there are fewer births that are taking place, the trend of C-Section deliveries is becoming common amongst new mothers. The most common major operating room procedure performed is a caesarean birth or C-section. Research by the World Health Organization (WHO) substantiated that the estimated C-Section births would be 30 percent of the total births by 2030. The growing disparity of C-section births in government and private hospitals is problematic. In NFHS-4, which was released in 2015-2016, about 40.9 per cent of caesarean deliveries were performed in private hospitals, compared to 11.9 per cent in the government sector. Fast-forwarding to NFHS 5, 47.4 percent of babies born in the private sector are being delivered by surgical methods compared to just 14.3 percent in the government sector.

There is a need to understand the possible factors of the high C-section rates in India. India, being a diverse country, there have been quite wide differences across the geographies, religions, castes and other socioeconomic characteristics which eventually are correlated with women's education, literacy, livelihood and health. Education, awareness on caesarean deliveries and importance of institutional deliveries and increased healthcare access plays a significant role in the higher C-section deliveries. A few global studies have mentioned the physician factor contributing to the rise in C-section rates in terms of preferring a C-section because of the doctors' ability to schedule C-section at their convenience, the shorter duration of the delivery by C-section compared to vaginal delivery, inadequate training of the physicians in vaginal delivery and financial incentives^(6,7) Not many studies have been done to understand how C-section deliveries have become a public health concern in today's time and what to do to reduce the unnecessary C-sections. Keeping in view the above facts this study tries to understand the relationship between the various factors affecting the increase in caesarean deliveries in health facilities and their co-relation.

METHODOLOGY

The study was conducted in Maternity Hospital of SKIMS, a tertiary care Hospital of North India. Maternity Hospital is 129 bedded with facilities which provide obstetrical and Gynecological care to patients with appropriate diagnostic and Intensive care back up.

Study period – 1st- Jan- 22 to 31st-June 22- (6 months)

Study design -Prospective study

Study tool - A predesigned audit Proforma was used to study the caesarean delivery. The Proforma included demographic details regarding pregnant female like age etc. as well as clinical details like parity, time of caesarean section, referral with reasons, indications for caesarean and outcome both maternal and neonatal

Sampling - The total caesarean sections performed during the study months were 1479 out of which 500 patients were studied (33% sample size) by resorting to simple random sampling. The studied patients were

subjected to predesigned caesarean section audit proforma after taking proper consent from them. The Study was conducted for a period of 06 months during which the researchers visited the wards, Labor Room and operation theatre on daily basis and recorded the observation regarding both caesarian and normal deliveries. The caesarian rate was calculated by following formula.

$$\text{Caesarian rate} = \frac{\text{Total No. of caesarian deliveries during the said period}}{\text{Total number of deliveries (both Caesarean and normal during the period)}} \times 100$$

The observations regarding caesarian audit were entered on the predesigned Proforma. A total of 500 caesarian sections were observed during the study period. The demographic data pertaining to patients was obtained from inpatient records of patients while the clinical aspects pertaining to caesarian section like Time of Caesarean section, Parity, reasons for Caesarean section and both maternal and fetal outcome were obtained from operating surgeons.

Observations

	January	February	March	April	May	June
Normal Deliveries	44	52	78	62	68	68
Caesarean Section	181	237	235	277	265	284
Total Deliveries	225	289	313	339	333	352
Caesarean Rate	80.4%	82%	75%	81.7%	79.5%	80.6%

It was observed that during the period of study maximum number (n-284) of caesarean sections were observed in the month of June while minimum (n-181) in January. Highest number of normal deliveries were noted in the month of March (n-78) while minimum (n-44) were observed in the January month. The highest caesarean rate i.e. 82% was observed in the month of February followed by April 81.7% and June 80.6%. Lowest caesarean rate i.e, 75% was observed in the month of March. Mean Caesarean rate was calculated to be 79.86% (Refer to table 1)

PARITY	G	P	L	A
	1	210	100	100
2	150	100	100	10
3	120	30	30	10
4	20	0	0	10

Studying the parity of obstetrical patients shows that maximum Caesarean deliveries i.e n-210 were Gravida first while only n-20 were Gravida four. Maximum patients n-100 with G1 P1 L1 (Refer to Table 2)

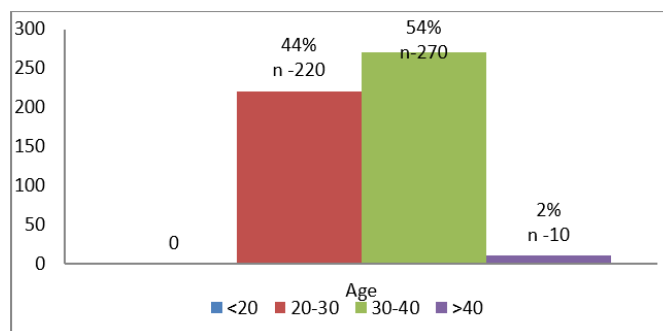


Fig 1: Age of caesarean section patients

Observation for age of Caesarean deliveries reveals that maximum 54% (n-270) were in the age group 30 – 40 years followed by age group 20 – 30 years which contributed to 44% of Caesarean load. Only 2 % of C-section patients were in the age group 40 years and above. (Refer to Fig 1)

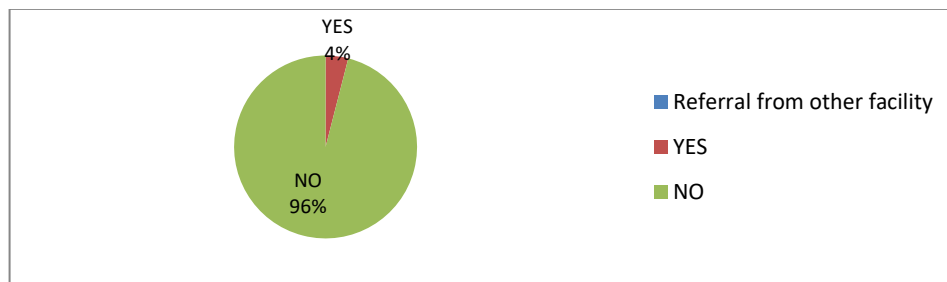


Fig 2: Showing Referral of caesarean section patient.

According to various aspects of Caesarean section performed during the study period, it was observed that out of total 500 P-section studies only 4% i.e 20 had been referred to Maternity Hospital while 96%(n-480) were booked / registered patients. (Refer to Fig 2)

Reason for Referral	Table 3: Reasons for Referral of C-Section Patients			
	High Risk	Obstructed labor	Neonatal Risk	Any other Risk
	50% (N – 10)	Nil	50% (N – 10)	Nil

It was observed that out of 500 studied C-Sections, 20 patients (4%) were referred from outside. Studying the reasons for referral of patients who were referred and underwent Caesarean section during the study period revealed that 50% (n-10) were grouped as high-risk pregnancies while 50% were referred for neonatal risk. (Refer to Table 3)

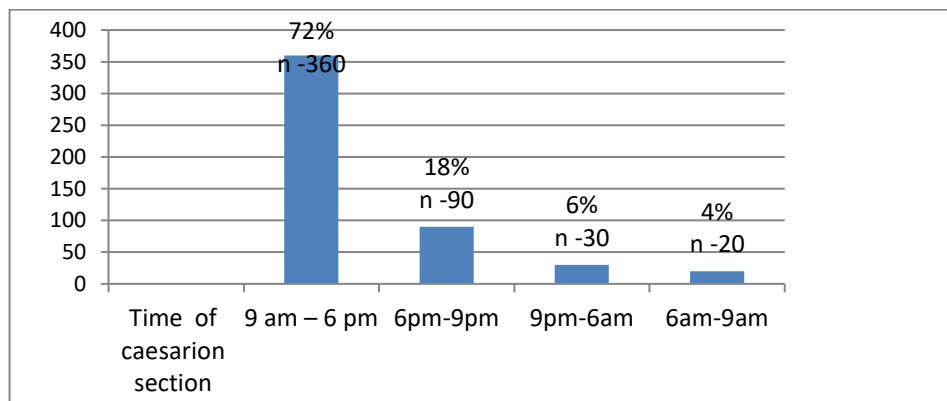


Fig 3: Timing of Caesarean section

Regarding timing of caesarean delivery, it was observed that maximum caesarean section i.e., 72% (n 360) were performed during morning shift i.e., 9am – 6 pm, followed by evening shift i.e., 6pm – 9 pm during which 18% (n-90) caesarean sections were done. Less number of caesarean sections were done during late evening and night however i.e., 6% (n-30) 4 % (n-20) respectively. (Refer to Fig 3)

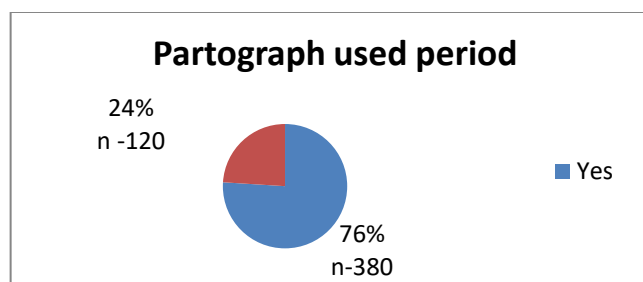


Fig 4: Use of partograph for assessment of labor

Use of partograph is an important parameter for taking a decision regarding conduct of caesarean section. The study records that in 76% (n-380) cases partograph was used for assessment of progression of labor and after

proper assessment of partograph, decision for Caesarean was taken. (Refer to fig 4)

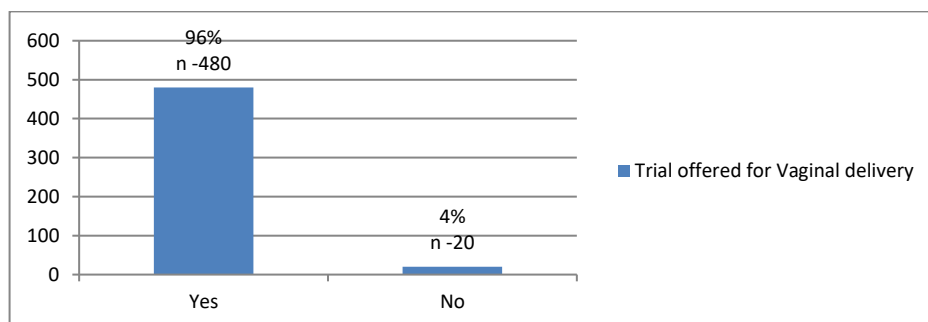


Fig 5: Trial offered for vaginal delivery

Auditing the caesarean section studied, it was observed that 96% (n-480) patients were offered trial of labor and due to non progression had to undergo caesarean section finally. Only in 4% (n-20) of caesarean section trail of labor was not given prior to surgery. (Refer to Fig 5)

Delivery Outcome	Table 4: outcome of caesarean delivery	
	Live Birth	Still Birth
	100 % (n= 500)	Nil

Studying the outcome of deliveries viz a viz live and still birth reveals that out of 500 caesarean sections observed during the study period, 100% n-500 were live births. (Refer to Table 4)

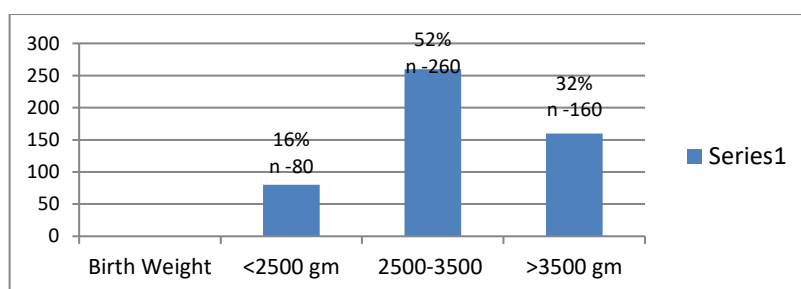


Fig 6: Birth weight of Caesarean delivery

Out of total 500 deliveries by caesarean section maximum 52 % (n-260) had birth / weight 2500-3500 gm while 32% (n-160) had birth weight of more than 3500 gm. Only 16% (n -80) had a birth weight less than 2500 gm. (Refer to Fig 6)

Maternal Outcome	Table 5: Maternal outcome viz. a viz. caesarean delivery.			
	Stable	Shifted to HDU/ICU	Maternal near miss	Maternal Death
	96% (N – 480)	4% (N – 20)	x	x

Out of 500 caesarean section studied maximum patients 96% (n-480) were stable post operatively and were shifted to post operative ward for monitoring while only 4% (n-20) mothers who underwent caesarean section required to be shifted to ICU / HDU for monitoring. (Refer to Table 5)

Newborn Outcome	Table 6: Neonatal outcome viz a viz caesarean section delivery		
	Stable satisfactory	Admitted in NICCU/SICCU	Born alive and died
	90% (N – 450)	10% (N – 50)	Nil

As far as newborn outcome is concerned 90% (n-450) births delivered by caesarean section were stable while only 10 % (n-50) new born were admitted in NICU or SICCU for further management. (Refer to Table 6)

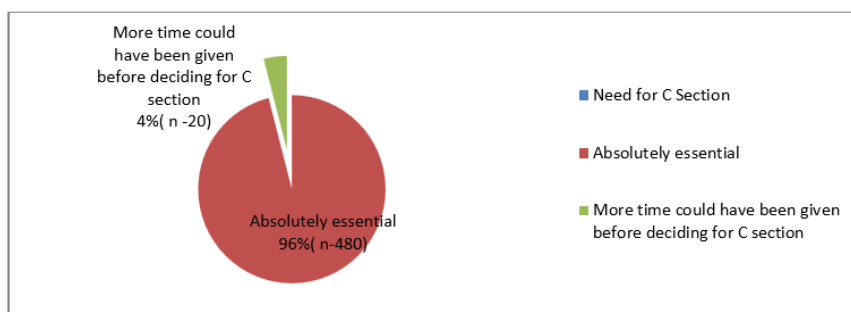


Fig 7: Essentiality of C-section

The study revealed that in majority 96% (n=480) of caesarean section cases the clinicians were of the opinion that the procedure was absolutely essential while in 4% (n=20) the opinion of the operating surgeon was that more time could have been given before deciding for caesarean section. (Refer to Fig 7)

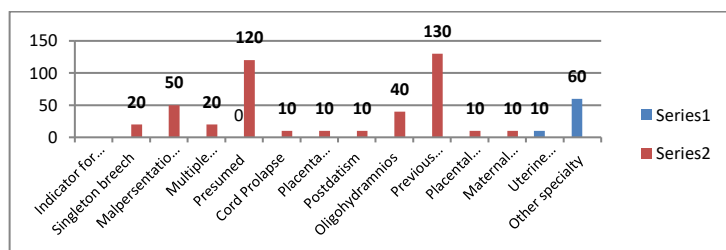
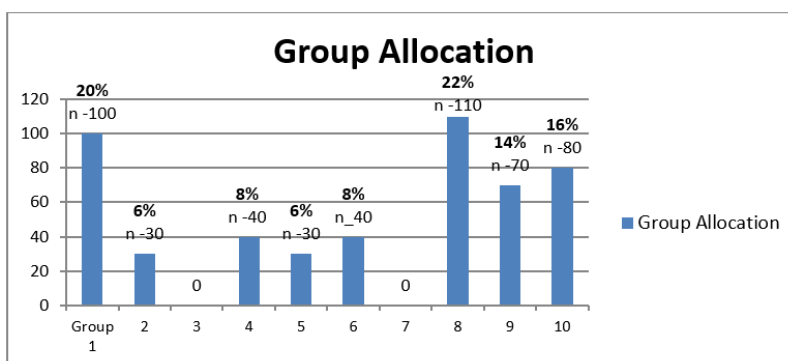


Fig 8: Indications for Caesarean section.

Observations for various indications for caesarean sections reveal that out of total of 500 cases studied maximum 26% (n=130) were having previous caesarean section as an indication for C-section. 24% (n=120) were operated for having Fetal distress as an indication followed by Malpresentation 10% (n=50) and oligohydramnios 8% (n=40) singleton breech and multiple pregnancy also constituted 4% each for C-section load. Other reasons like Cord prolapse, Placenta previa, post-dated pregnancy, placental abruption uterine scar and maternal medical disease constituted 2% of C-section cases operated during the study period. (Refer to Fig 8)



- Group 1: Nulliparous, with a single cephalic pregnancy, 237 weeks gestation in spontaneous labour.
- Group 2: Nulliparous, with a single cephalic pregnancy, 237 weeks gestation who had labour induced or were delivered by CS before labour.
- Group 3: Multiparous, without a previous, 237 weeks gestation in spontaneous labour.
- Group 4: Multiparous, without a previous, 237 weeks gestation who had labour induced or were delivered by CS before labour.
- Group 5: All multiparous, with at least one previous CS, with a single cephalic pregnancy, >237 weeks gestation.
- Group 6: All nulliparous, with a single breech pregnancy.
- Group 7: All multiparous, with a single breech pregnancy including women with previous CS (s)
- Group 8: All women with multiple pregnancies including women with previous CS(s)
- Group 9: All women with a single pregnancy with a transverse or oblique lie, including women with previous CS(s)
- Group 10: All women with a single cephalic pregnancy < 37 weeks gestation, including women with previous CS(s).

Fig 9: Group allocation of caesarean patients

Group allocation of pregnant mother's reveals that maximum number of cases 22% (n -110) were in Group 8 (women with multiple pregnancies including women with previous CS(s)) followed by Group 1 20% (n -100) i.e. nulliparous with a single cephalic pregnancy >37 weeks gestation in spontaneous labor. Group 10 and group 9 constituted 16% and 14% respectively, Multiparous, without a previous, 237 weeks gestation who had labor induced or were delivered by CS before labor constituted 8% (Group 4) and nulliparous, with a single breech pregnancy.(Group 6)formed 8% each of caesarean load. (Refer to Fig 9)

DISCUSSION

Globally, there is increasing concern about the rising trends of Caesarean section (CS) rates. General agreement is that, although Caesarean sections have become a much safer procedure over the years, it cannot replace vaginal delivery in terms of low maternal and neonatal morbidity and less expense⁽⁸⁾ In accordance with other reports, almost half (47%) of women who delivered by Caesarean section had at least one previous uterine scar⁽⁹⁾. It is known that repeat CS rates are high in Western countries as well, numbers up to 76% having been reported⁽¹⁰⁾. These findings suggest that primary Caesarean section usually determines the future obstetric course of women and therefore should be avoided if possible. This is probably even more important in the more rural areas with limited access to health care. Findings of our research reveal that out of total of 500 cases studied maximum 26% (n -130) were having previous Caesarean scar as an indication for C-section. Again similar to other reports, our study shows that failure to progress and fetal distress were the leading indications for emergency CS, while two or more previous uterine scars was the most common indication for elective CS⁽¹¹⁾

It has been evidenced from literature that the importance of application of Modified Robson TGCS (Ten Group Classification System) in the efforts to reduce the CS rate. In fact, it is well-known that classification of the data of caesarean sections undertaken in any category of obstetric unit becomes a fundamental step towards these efforts. There is a steep increase in the rates of CS in the last three decades globally. A significant percentage of this rise was due to unnecessary operations attributable to non-evidence-based indications, professional convenience, maternal request, and over-medicalisation of childbirth.¹²

In a study conducted by Pravina et al Robson's group 5 (34.97%) was the major contributor to the overall CS rate, followed by group 2 (26.35%), group 1 (15.51%), and group 10 (7.14%). The incidence of primary CS (61.82%) was more than repeat CS (38.17%). Previous CS, fetal distress, failed induction, arrest of labor, and malpresentation were the main indications for CS. Findings of our study viz a viz Group allocation of pregnant mother's reveals that maximum number of cases 22% (n -110) were in Group 8 (women with multiple pregnancies including women with previous CS(s) followed by Group 1 20% (n -100) ie. nulliparous with a single cephalic pregnancy >37 weeks gestation in spontaneous labour.¹³

In our study maximum females wherein the age group of 30-40 years. Research conducted by Pravina et al 96.7% of females undergoing C-section were in the age group of 20-35 years.¹⁴ The study conducted by Batieha et al revealed that the overall rate of CS was 29.1% (13.2% for emergency CS and 15.9% for planned CS). The CS was significantly higher among women who were older than 35 years and in highly educated women (44.4%, 35.7%, respectively). The rate of CS was significantly lower in women delivering in south of Jordan (23.6%), compared to that in the middle and the north (31.7%, 30.8%, respectively). In our study mean caesarean rate was higher i.e 79.86%¹⁵

Results of the study conducted by Tahmeena et al revealed that most of the new born delivered by caesarean section were live births. (98.9%). Studying the outcome of delivery viz a viz live and still birth finding our research reveals that out of 500 caesarean sections observed during the study period 100% n-500 were live birth.¹⁶

In a study conducted by Azeb et al, the utilization of partograph was 409 (69%) out of 594 study participants¹⁷. In a study conducted by Negash et al obstetric care providers 40.2% utilized partograph during labor . The reasons for not using partograph during labor were using monitoring tools other than partograph, lack of trained human power, shortage of staff, and un-availability of the partograph. This finding is consistent with the studies in Nigeria and South Africa^{18 19 20}

On-job training on partograph had a significant association with partograph utilization. Obstetric care providers who received on the job training on partograph were about 3 times more likely to utilize partograph than those who had not received on- job training. This might be due to the fact that, obstetric care providers who received on-job training had better knowledge about partograph than others that in turn improves their partograph utilization.^{21 22 23}

In conclusion the findings of our study established that high rate of caesarean section was observed in comparison to available literature on the subject. High rates of caesarean section were complimented with approximately 100 percent positive fetal outcome and negligible maternal mortality. Previous caesarean sections emerged as principal cause for subsequent Caesarean delivery thereby establishing the need to focus on first cesarean delivery by using all available means including the use of partograph to promote normal delivery which will prove pivotal to cut down the overall caesarean rate globally.

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