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Factors that Contribute to the Increasing Incidence of Primary Caesarean Section Deliveries-Retrospective Study

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ABSTRACT
The escalating rate of caesarean sections (CS) worldwide, including South Asia, has become a pressing public health concern. This retrospective record based study study aimed to investigate the factors contributing to the rising rates of CS in Central India. A total of 320 antenatal patients admitted to the Obstetrics and Gynecology Department of a tertiary care hospital were included. Demographic characteristics, nutritional status, indications for CS and maternal and fetal outcomes were analyzed. The study revealed a CS rate of 36.35%, exceeding the WHO's recommended threshold of 15% for underdeveloped nations. Common indications for CS included cephalopelvic disproportion (CPD), eclampsia and fetal distress. Maternal complications occurred in 18.09% of cases, with post-operative fever and surgical site infection being the most frequent. Fetal outcomes were generally favorable, with term births and healthy birth weights predominating. Strategies to reduce CS rates should focus on personalized indication criteria, standardized protocols and promoting vaginal birth after cesarean (VBAC) to minimize maternal and neonatal morbidity and mortality.

INTRODUCTION

The increasing prevalence of caesarean section (CS) is a worldwide issue of public health significance. The World Health Organisation (WHO) has advised that the ideal caesarean section (CS) rates should range between 10% and 15%[1]. A caesarean section rate exceeding 10% at the population level does not result in a decrease in maternal and newborn mortality rates[2]. The caesarean section (CS) rate increased by almost twofold worldwide from 12.1% in 2000 to 21.1% in 2015[3]. Given this, there is a focus on maximising the utilisation of caesarean sections for medically necessary purposes in order to prevent unnecessary interventions in pregnancies with low risk[4,5]. However, it is evident that caesarean section (CS) is frequently carried out without medical necessity and this is linked to a higher likelihood of serious complications for the mother[6]. Caesarean section (CS) is linked to a multitude of maternal and infant health issues, both immediate and long-lasting and can also have negative impacts on future pregnancies[7]. The likelihood of significant maternal complications increases with each subsequent caesarean section[8]. Moreover, superfluous CS procedures incur significant expenses for both households and healthcare systems[9]. Therefore, the performance of CS should be limited to cases where it is medically indicated and where the advantages outweigh the costs and risks involved[10].

In South Asia, the caesarean section (CS) rate increased nearly threefold from 7.2% in 2000 to 18.1% in 2015. Additionally, urban areas have the highest rates of CS[11]. The caesarean section (CS) rates in Bangladesh experienced a more than fivefold increase from 3.5% in 2004 to 23% in 2014[12]. Urban areas exhibited a greater prevalence of CS, with a reported rate of 62.88%[13]. From 2010 to 2016, the estimated overall caesarean section (CS) rate in India was 17.2%[14]. Urban areas had a higher CS rate of 27.20%, while private health facilities had a rate of 29.5%[15]. Moreover, the disparity in the caesarean section (CS) rate between private and public hospitals has progressively grown in India[16]. The caesarean section (CS) rate in Nepal is currently 12.21%,13 with a noticeable increase in urban areas[17]. The caesarean section (CS) rates in private hospitals experienced a three-fold increase from 8.9% in 1996 to 26.3% in 2016[18]. In Pakistan, the caesarean section (CS) rate experienced a significant increase, rising from 2.7% in 1991-1992 to 15.8% in 2012-2013, which is approximately five times higher. Additionally, the CS rate was even higher in urban areas, reaching 27.79%[19]. A study conducted in Sri Lanka found that the caesarean section (CS) rates increased from 29.6% in 2008 to 33.6% in 2010[20]. Similarly, urban areas in the Maldives have reported a high caesarean section (CS) rate of 30.18%.In Afghanistan, the adoption of caesarean section (CS) remains limited, with a utilisation rate of only 3.4%[21]. A study conducted in a hospital setting revealed that the caesarean section (CS) rate in Bhutan was 18.7%[22]. The increasing prevalence of caesarean sections (CS) in South Asia prompts inquiries regarding the performance of CS for nonessential purposes. A study conducted in Nepal found that caesarean sections (CSs) are often performed for inappropriate reasons, specifically in cases of foetal distress and prolonged labour. This is due to the inadequate accuracy of foetal heart rate monitoring in diagnosing foetal distress, as well as the insufficient use of partographs to diagnose prolonged labour before deciding to perform an emergency CS[23]. Therefore, it is necessary to investigate the primary indications and factors that contribute to the increasing rates of caesarean sections, not only to address the actual rate of CS but also to prevent excessive medical intervention during childbirth in South Asia. This study aims to address the question of what factors are contributing to the increasing rates of caesarean sections (CS) in Central India.

MATERIALS AND METHODS

This study is a retrospective record based study conducted on all antenatal patients admitted to the OBGY Department of a tertiary care hospital. Only patients who meet the inclusion criteria were included in the study. A total of 320 patients were enrolled in this study. Written consent was obtained after providing the necessary information. The baseline data was collected using a prestructured proforma. This included information on whether the patients were booked, unbooked, or referred and whether they were admitted through the outpatient department (OPD) or emergency department. The data specifically focused on patients who underwent a caesarean section at our institute. An analysis of descriptive statistics will be conducted to ascertain the attributes and qualities of the gathered data. The data will be represented using the mean and percentage. Statistical tests are used as necessary to determine the relationship between variables. A P value less than 0.05 is considered to be statistically significant.

RESULTS

Table 1 displayed the demographic traits of the participants, with the majority falling within the age range of 20-24 years, followed by 25-29 years. 83.75% of the population followed the Hindu religion, while 51.25% lived in rural areas and 49.75% lived in urban areas. 96% of the individuals were classified as housewives, while 35% were categorised as illiterate. Additionally, 20% had completed their education up to the middle school level.

Table 1: Demographic Characteristics of Participants

Particulars	Frequency	Percentage
Age group		
15-19	8	2.5
20-24	176	55
25-29	112	35
30-34	20	6.25
35-39	4	1.25
Religion		
Hindu	268	83.75
Muslim	52	16.25
Others	0	0
Residence		
Urban	156	48.75
Rural	164	51.25
Occupation		
Housewife	304	96
Labourer	8	2.5
Others	8	2.5
Education		
Illiterate	112	35
Primary school	20	6.25
Middle school	64	20
High school	44	13.75
Intermediate	52	16.25
Graduate or above	28	8.75
SES		
Upper	0	0
Upper middle	136	42.5
Lower middle	92	28.75
Upper lower	72	22.50
Lower	20	6.25

Table 2: Nutritional status of study subjects

Parameters	No. of patients	Percentage
Anemia		
Normal HB	108	33.68
Mild	177	55.70
Moderate	26	8.03
Severe	7	2.07
Very severe	2	0.52
BMI		
Underweight	61	19.17
Normal	235	73.57
Overweight	22	6.74
Obesity	2	0.52

Table 2 shows the nutritional status of the study subjects, focusing on two parameters: anemia and body mass index (BMI). Regarding anemia, the majority of patients exhibit mild levels, constituting 55.70% of the sample, followed by those with normal hemoglobin levels at 33.68%. Moderate, severe and very severe cases are comparatively lower, with percentages ranging from 0.52% to 8.03%. In terms of BMI, the majority fall within the normal range, comprising 73.57% of the subjects, while underweight individuals account for 19.17%. Overweight and obese categories represent smaller percentages, at 6.74% and 0.52%, respectively.

Table 3 outlines the indications for Lower Segment Cesarean Section (LSCS) among the subjects. The most common indication is cephalopelvic disproportion (CPD), accounting for 18.75% of cases, followed closely by eclampsia at the same percentage. Other significant indications include breech/malpresentation, obstructed labor and previous cesarean section, each constituting 9.375% of the cases. Antepartum hemorrhage (APH), multiple scarred uterus (MSL) and severe oligohydramnios each represent 6.25% of the indications, while fetal distress accounts for another 9.375%. Overall, the distribution of indications showcases a variety of obstetric complications necessitating LSCS, with CPD and eclampsia being the most prevalent.

Table 3: Indication for LSCS

Type	Frequency	Percentage
APH	20	6.25
CPD	60	18.75
MSL	40	12.5
NPOL/SPOL	20	6.25
Previous CS	30	9.375
Fetal Distress	30	9.375
Eclampsia	60	18.75
Breech/Malpresentation	30	9.375
Obstructed labor	30	9.375
Severe Oligohydramnios	20	6.25

Table 4: Maternal outcome

Maternal outcome	No. of patients	Percentage
Healthy	245	76.42
Postoperative morbidity	75	23.57
Abdominal distention	5	1.55
Pyrexia	33	10.36
URTI	27	8.29
Wound infection	9	2.85
PPH	2	0.52
Total	320	100

Table 4 presents the maternal outcomes following Lower Segment Cesarean Section (LSCS). The majority of patients, accounting for 76.42%, exhibit a healthy postoperative status. However, 23.57% of the subjects experience postoperative morbidity, with various complications. Among these, pyrexia is the most common, affecting 10.36% of patients, followed by upper respiratory tract infections (URTI) at 8.29%. Abdominal distention, wound infection and postpartum hemorrhage (PPH) are less frequent, with percentages ranging from 0.52% to 2.85%. Overall, the data illustrate a significant proportion of patients experiencing postoperative complications following LSCS, albeit with the majority achieving a healthy recovery.

Table 5 provides an overview of the fetal outcomes following Lower Segment Cesarean Section (LSCS), detailing aspects such as period of gestation, fetal outcome, gender distribution, birth weight and neonatal intensive care unit (NICU) admission. The majority of births occur at term gestation, constituting 71.25% of cases, while preterm and post-term births account for 21.25% and 7.5%, respectively. All infants are born alive, with no reported fetal mortality. Regarding gender, males slightly outnumber females, comprising 61.25% and 38.75% of births, respectively. Birth weight distribution shows that the majority fall within the range of 2.5-3.9 kg, representing 95% of infants, while a small proportion weigh between 1.6-2.4 kg (5%). None of the infants weigh below 1.5 kg or above 4 kg. Additionally, 11.25% of newborns require NICU admission, while the vast majority

Table 5: Fetal outcome

Particulars	Frequency	Percentage
Period of gestation		
Pre term	68	21.25
Term	228	71.25
Post term	24	7.5
Fetal outcome		
Alive	320	100
Dead	0	0
Gender		
Male	196	61.25
Female	124	38.75
Birth weight		
<1.5 kg	0	0
1.6-2.4 kg	16	5
2.5-3.9 kg	304	95
>4 kg	0	0
NICU admission		
Yes	36	11.25
No	284	88.75

(88.75%) do not necessitate such intensive care. Overall, the data indicate favorable fetal outcomes with predominantly term births and healthy birth weights, although a minority require NICU support.

DISCUSSION

Both industrialized and developing nations are concerned about the rising rate of CS[24,25]. Primary and repeat caesarean deliveries have increased in frequency[26].

In the current study, the age range of 20 to 29 years (55%), which is thought to be the one with the highest fertility, is made up of the majority of patients. The findings concur with those of Gupta *et al*.[27] and other Indian studies[28,29].

The study reveals Cesarian Section rate was 36.35%, which is higher than the established upper WHO limit of 15%. This can be because patients are being sent to our hospital from neighbouring and far-off PHCs, CHCs and private hospitals because it serves as the referral centre. In comparison to the rates from the current study, even lower or equal rates-28.93% from Mumbai and 29% from Kolkata-were reported by Sibha *et al*. and Saha *et al*. According to Singh *et al*.[30] from Haryana (31% in 2007 and 51.1% in 2012), Subhashini *et al*.[31] from Andhra Pradesh (20.33 in 2009 and 25.66% in 2014), Yadav *et al*.[32] from Gujarat (23.48% in 2004 and 28.87% in 2013) and Manjulatha *et al*.[33] from Gujarat, CS rates are continuously rising in India (16.60% in 2002 and 22.40% in 2012) were from Andhra Pradesh. There are many factors contributing to the rise in caesarean deliveries, including an increase in institutional deliveries, a decrease in difficult manipulative or instrumental vaginal deliveries, the use of continuous electronic foetal monitoring to detect foetal distress and the liberal use of caesarean in high-risk situations like breech presentation, a previous caesarean delivery, a growth-retarded foetus, multiple pregnancies and preterm birth[27].

Out of total 320 patients, 55.70% of patients had mild anemia, 8.03% of patients had moderate anemia and 2.07% and 0.52% of patients had severe and very severe. The incidence of Anemia in antenatal patients in India is reported in >80% patients.

Second and third most common indication in present study was CPD and non- progress of labor respectively. In agreement to present study Gupta *et al*.[27] also reported arrest of labour (13.65%) as the second most common cause of CS[24]. The increase in labour arrest disorders is possibly because of decrease in the difficult instrumental deliveries over a period of time in our institute. Other important indication in present study for CS were failed induction (7.42), pregnancy induced hypertension (5.07), fetal distress (7.03%), breech (5.98%), severe oligohydroamnious (5.46%) and post datism (3.25) which are similar to the reports of Singh *et al.*[30], Jawa *et al.*[28], Chavda *et al.*[34], Nikhil *et al.*[35], Bade *et al.*[36] and Balci *et al.*[37].

The CS has higher risk of maternal complications compared to vaginal deliveries[38]. Incidence of Maternal complication in present study was 18.09%. Among them post-operative fever (5.72%), surgical site infection minor (5.59%)] and atonic postpartum hemorrhage (PPH) (1.82%) were the most common. Similar to present study Gupta *et al* also reported surgical site infection (4.40%) and atonic PPH (3.01%) as the most common maternal complications[24].

Fetal distress (26.8%), previous two Caesarean sections (14.8%), breech presentation (6.14%) and unsuccessful induction (5.1%) were the other frequent causes of Caesarean sections in the research area. This was less than what our prior investigations discovered. Impending eclampsia comes next, then[39] and the rest is other.

CONCLUSIONS

The study found that the cesarean section (CS) rates exceeded the World Health Organization's recommended threshold of 15% for underdeveloped nations. Every indication necessitates a unique approach to decrease primary caesarean rates. Implementing personalized indication criteria, comprehensive assessment, standardized protocols, evidence-based obstetric practices and regular institutional assessments can effectively reduce the cesarean section rate. Considering that previous cesarean section (CS) was a significant maternal indication, we suggest a vaginal birth after cesarean (VBAC).Minimize maternal, perinatal, newborn and child mortality and morbidity; in some cases, cesarean section is inevitable.

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