

Rate and Indications of Caesarean section in the Apollo Institute of Medical Sciences and Research, Chittoor: A retrospective study

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Aim: To determine the rate and indications of caesarean section. **Method:** A retrospective study was conducted at The Apollo Institute Of Medical Sciences And Research, Chittoor, for one year. The data was retrieved from the medical record of the operation theatre. **Results:** During the study period, 34.85% (1,432 out of 4109) of women underwent caesarean section. The majority of the women (80.02%) belonged to 20-30 years, and 69.13% had studied up to metric. The majority of women, 78.35 %, were from a rural area, and 87.70 % belonged to middle socioeconomic status. Booked cases were 94.55%, and multigravida (54.53%) were the majority to undergo a caesarean section. The four leading indications were previous caesarean section (40.22%), fetal distress (17.94%), non-progress of labour (13.40%) and Oligo-Hydramnious (7.89%). **Conclusions:** The rate of caesarean section is more than the national (India) and global caesarean section rate. Previous caesarean section is the main indication followed by fetal distress.

Keywords: Caesarean section, Fetal distress, Non progress of labour

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Introduction

Childbirth is a profound and powerful human experience. Women's birth accounts often describe feelings of empowerment, elation and achievement, particularly following vaginal birth without medical interventions. The other mode of delivery is by operation, which has become more common in recent years. This operation is termed 'caesarean section', which refers to delivering a baby through incisions made in the mother's abdominal wall and uterus.[1,2].

Caesarean delivery is a life-saving obstetric surgical intervention for mothers and babies. The rate of caesarean delivery has considerably increased globally during the last few decades. India is not an exception. However, during the last decade, the increase in caesarean section deliveries has become a serious concern for public health experts globally. [3].

The Southern Indian states have recorded substantially higher levels of caesarean deliveries in comparison to the other parts of the country. The highest caesarean delivery rate was observed in Telengana (60%), followed by Andhra Pradesh (42%) in India. Studies have indicated that geographical region and socio-demographic factors significantly influence caesarean delivery in India. [4]. However, the national figure for caesarean births in a heterogeneous country such as India does not adequately reflect the diversity of the public health situations and challenges. The present study investigates the rate of caesarean section, socio-demographic factors influencing caesarean section and indications contributing to caesarean section.

Material and Methods

Duration and type of study: Present study is a retrospective study for one year from 1st January 2020 to 31st December 2020.

Setting: hospital setting in the Department of Obstetrics and Gynecology, The Apollo Institute of Medical Sciences and Govt District Hospital, Chittoor, a large tertiary care hospital in southern Andhra Pradesh of India.

Sampling methods: Women who underwent caesarean section and their details documented in the caesarean section register kept in the operation theatre.

Inclusion criteria: All the patients delivered by caesarean section during the study period were included in the study.

Exclusion criteria: women who underwent vaginal delivery.

Data collection procedure: Data of the caesarean section as per the operation theatre list were collected in a retrospective manner from the caesarean section register. Data were collected on a predesigned proforma, which included socio-demographic characters & indications for caesarean section.

Ethical consideration & permission: Not required as it is a retrospective study.

Statistical Analysis: Caesarean section rate is calculated and is defined as the percentage of births achieved by Caesarean section among a total number of live births in the study period. Frequencies and percentages were calculated for Age, Education, Residence, Socioeconomic status, Gravida, Booked or unbooked, and Indications of Caesarean Section.

Results

Table 1 shows that among 4109 total live births, 2677 women underwent vaginal delivery, and 1432 underwent caesarean section. The caesarean delivery rate was 34.85%. Table 4 provides the socio-demographic and obstetric characteristics of the study participants. Age distribution showed that the majority of the women who underwent caesarean section was in the age group of 20–30 years. Elderly women were 11.31%, and teenage pregnancy was 8.65%. Patients' educational status shows that 69.13% had studied up to metric were as 29.88% had graduation and 0.97% didn't have any formal education. Women from the rural area were 78.35% and from the urban area was 21.64%. Socioeconomic status of patients shows that women of Middle socioeconomic status were 87.70%, were as women of lower and upper socioeconomic status were 9.77% and 2.51%, respectively. Multigravidas were 54.53% and Primigravida were 45.46%. Booked patients were 94.55%, and Unbooked patients were 5.44%. Table 5 presents that four leading indications were: previous caesarean section (40.22%), fetal distress (17.94%), non-progress of labour (13.40%) and Oligo-Hydramnious (7.89%).

Table 1: Caesarean Section rate.

	Vaginal deliveries	Caesarean Section	Total deliveries
Number	2677	1432	4109
Percentage	65.15%	34.85%	100%

Table 2: Caesarean Section rate worldwide and in different regions [6].

S. no	Regions	CS rate	CS rate world wide
1	Africa	9.2	21.1%
2	Oceania	21.4%	
3	Asia	23.1	
4	Europe	25.7%	
5	America	39.3%	

Table 3: Caesarean Section rate in India and other five countries with highest and lowest CS rate [6].

The top five countries with the highest CS rate worldwide		
S.no	Country	CS rate
1	Brazil	55.7%
2	Cyprus	55.3%
3	Egypt	51.8%
4	Turkey	50.8%
5	Romania	46.9%
6	INDIA	17.2%
The top five countries with the lowest CS rate worldwide		
S. no	Country	CS rate
1	Cameroon	2.4%
2	Madagascar	2%
3	Ethiopia	1.9%
4	Niger	1.4%
5	Chad	1.4%

Table 4: Socio-demographic Factors

S. no	Socio-Demographic character	Total CS		
		number	percentage	
1	Age	Tenage	124	8.65 %
		20 to 30 years	1146	80.02 %
		Elderly (above 30yrs)	162	11.31 %
2	Education	No literacy	14	0.97 %
		Matric	990	69.13 %
		Graduate	428	29.88 %
3	Residence	Rural	1122	78.35 %
		Urban	310	21.64 %
4	Socioeconomic status	Lower	140	9.77 %
		Middle	1256	87.70 %
		Upper	36	2.51 %
5	Gravida	Primigravida	651	45.46 %
		Multigravida	781	54.53 %
6	Booking status	Unbooked	78	5.44 %
		Booked	1354	94.55 %

The less common indication was Cephalo-pelvic disproportion (6.21%), Malpresentation (5.79%), chronic health conditions (3.91%) and Failed Induction (1.88%). Other least common indications were Placental disorders (0.69%), Obstructed labour (0.62%), multiple pregnancy (0.48%), Short stature in labour (0.48%) and Precious pregnancy (0.4%).

Table 5: Indication for Caesarean Section

S. no	Indications For CS	Total CS	
		number	%
1	Previous caesarean	576	40.22 %
2	Fetal distress	257	17.94 %
3	Non-Progress of labour	192	13.40 %
4	Oligo-Hydramnious	113	7.89 %
5	Cephalo-pelvic disproportion	89	6.21 %
6	Malpresentation	83	5.79 %
7	Chronic health conditions	56	3.91 %
8	Failed Induction	27	1.88 %
9	Placental disorders	10	0.69 %
10	Obstructed labour	9	0.62 %
11	Multiple pregnancies	7	0.48 %
12	Short stature in labour	7	0.48 %
13	Precious pregnancy	6	0.41%
TOTAL		1432	100%

Discussion

The caesarean delivery rate and the indications of caesarean delivery were examined during the study period. A total of 4109 live births occurred in the hospital in 2020. The caesarean delivery rate was 34.85% in the present study. In India, Telangana state has the highest C-section rate of 57.7%, followed by Andhra Pradesh state with 40.1%. Caesarean Section rate in India is 17.2% (NFHS-IV) during 2015-16.[4]. Caesarean section rate in the present study (34.85%) is lower than the state (Andhra Pradesh with 40.1%) statistics but higher than the national (India with 17.2%) statistics. CS rate in the present study was almost similar (34.1%) to the study of Banerjee A et al. conducted on a population of Silchar in Assam.[5].

The global CS rate was 21.1%, with an average of 24.2% in the less developed region. Present study CS rate is higher when compared to Africa, Oceania, Asia and European region CS rate as well as the global CS rate, but lesser when compared to American region CS rate. The top five countries with the highest CS rate worldwide

Were: Dominican Republic (58.1%), Brazil (55.7%), Cyprus (55.3%), Egypt (51.8%) and Turkey (50.8%), which also represented the highest CS rate in Americas, Asia, and Africa. In Europe, the highest CS rate was found in Romania (46.9%). The five countries with the lowest CS rate around the world belong to Africa: Chad (1.4%), Niger (1.4%), Ethiopia (1.9%), Madagascar (2%) and Cameroon (2.4%). [6]. Present study CS rate and Indian CS rate is relatively higher when compared to Cameroon, which has the highest CS among the top five countries with the lowest CS rate around the world, and considerably lower when compared to Romania, which has the lowest CS among top five countries with the highest CS rate around the world

In the present study, it is observed that younger (30 years and below) women (80.02%) were more likely to have a CS birth. Similar results were seen in Banerjee A et al. [5] and Kaur J et al. [7], while studies by Begum T et al. [8] and Rebelo F et al. [9] observed a higher likelihood for CS delivery among older women. Educational attainment of women was found to be positively associated with C-section delivery in which women with metric (69.13%) or higher education (29.88%) were more likely to have caesarean delivery compared with uneducated women. Similar results were seen in Kathuria B et al. [4], which states that in India, the percentage of C-section rate is very high among women having secondary and higher education. In contrary to present study, Apanga PA et al [10]. in their study, with a smaller sample size at northern Ghana reported a lower risk of CS delivery among women with secondary or higher education

The majority of women (78.35%) in the present study were from rural areas. Similar results were seen in Banerjee A et al. [5] but are contrary to the present study, bi-variate analysis by Kathuria B et al. [4] reveals that the rate of C-section in urban areas is more than double than in rural areas in India. Even though this disparity between rural and urban areas in India is minimum in the Southern region, the C-section rate even in rural areas (33.6%) is more than doubled than the recommended rate of 15% by WHO. Middle socioeconomic status women (87.70%) were the majority to undergo a caesarean section. A similar result was seen in the study of Divyamol N et al. [11]. The present study's finding of the higher likelihood of CS delivery among middle and lower socioeconomic status women could be

The result of the costs associated with CS birth, and the Institute in which the present study was conducted is a government health care facility where caesarean/vaginal delivery is covered under free maternal health services policy.

Contrary to the present study, Kathuria B et al. [4] states that in India percentage of C-section rate are very high among women belonging to the rich wealth quintile. Similar results were seen in the study of Ahmmed F et al. [12]. In Bangladesh, where the rich mothers showed the highest rate of CS delivery (41%), followed by middle (19.90%) and poor mothers (8.70%). Even though a study by Kathuria B et al. [4] and Ahmmed F et al. [12] states that CS is common in the rich wealth quintile, the high socioeconomic status women were significantly less in the present study because the majority of them choose private health facility and only a few of them who are in emergency land up in public health care facility.

The percentage of multigravida (54.53%) women was higher to undergo a caesarean section. Similar results were seen in the study of Reddy KM et al. [13], in which these results were explained due to the domino effect of the caesarean section. As the rates of caesarean section increase, more women will be multigravida and need repeat caesarean section. Contrary to the present study, Dankwah E et al. [14] states that the CS rate decreases as the birth order increases. In the present study, booked patients were 94.55%. A similar result was seen in the study of Shrestha DB et al. [15]. In which 94.2% were booked. In the analysis of NFHS-4 conducted by Kathuria B et al. [4], women who received four or more ANC visits were more likely to have a caesarean birth than women who did not receive ANC service. This is in contrast to the findings of Tebeu PM et al. [16] in Cameroon, who found no association between ANC attendance and CS.

In the present study, the most significant contributor to the rise in Caesarean Section rate is the previous caesarean section (40.22%) followed by fetal distress (17.94%), which is consistent with the findings of the study conducted by Begum T et al. [8] on Bangladesh population, Chavda D et al. [17] in the western part of India and Reddy KM et al. [13] in southern India. But in the studies by Banerjee A et al. [5], Shrestha DB et al. [15] and Yadav S et al. [18], fetal distress was the

Most common indication followed by previous caesarean section. The reason for increased previous caesarean cases in the present study may be because the current study institute is a large tertiary care centre catering for the whole district in which many deliveries are conducted. More referrals from peripheral health centres with less number trained personnel for monitoring labour discourages obstetricians from considering vaginal birth after caesarean. Other reasons are women refusing consent for the trial of labour after caesarean (TOLAC) and details regarding previous CS being not available. The higher rate of fetal distress and a second most common indication for caesarean section in the present study is due to only the cardiotocography-incorporated fetomaternal monitoring in diagnosing fetal distress.

Non-progress of labour (13.40%) was the third most common indication in the present study and the study of Begum T et al. [8]. It was the second most common indication in the study of Divyamol N et al. [11] and the least common indication in Chavda D et al. [17]. Adolescent pregnancies due to immaturity of their pelvis are at increased risk of more prolonged labour, and caesarean delivery is indicated for failure to progress or descent [19]. Teenage pregnancy of 8.65% in the present study may be the main reason for non-progress of labour in the present study. Monitoring labour by plotting a simple graph such as a partograph can reduce the CS rate for non-progress of labour. Oligohydramnios was the fourth most common indication at 7.89%. It is the least common indication in the study of Divyamol N et al. [11]. The survey by Ethiraj G et al. [20] stated a high possibility of emergency CS in the case of oligohydramnios.

Cephalo-pelvic disproportion (6.21%) is the fifth most common indication in the present study and Chavda D et al. [17]. CPD was most common in the study of Gurung RT et al. [21] and the least common indication in the study of Divyamol N et al. [11]. CPD is common in nulliparous women and the most common indication for primary caesarean delivery [22]. Even though the primigravida percentage is 45.46% in the present study, CPD is only 6.21% which is significantly less. Malpresentation (5.79%) was the sixth commonest indication. Malpresentation was seen in 7% of patients who underwent caesarean section in the study of Gurung RT et al. [21], which is slightly more than the present study. Malpresentation

Includes breech presentation, transverse lie and compound presentation. Multigravida patients are the majority in the present study which is a risk factor for breech presentation and transverse lie. Malpresentation was the third most common in the study of Reddy KM et al. [13]. and least common in the study of Gupta M et al. [24]. Chronic health conditions (3.91%) were the seventh common indication for caesarean section. This is slightly more than that reported by Reddy KM et al. [13], which showed an increase in the caesarean section for maternal indications like uncontrolled hypertension, pre-eclampsia, eclampsia and gestational diabetes mellitus to 2.99% in 2017-2018. Failed Induction (1.88%) was the eighth common indication. A similar percentage of failed Induction was seen in the study of Reddy KM et al. [13]. At 1.61% Significantly higher rate was seen in the study of Shrestha DB et al. [15] at 10% when compared to the present study.

The least common indications in the present study are Placental disorders (0.69%), obstructed labour (0.62%). The reported incidence of Placental diseases is as high as 1 per every 533 deliveries, mainly attributed to the increase in caesarean deliveries [25]. The incidence of MAP in the present study is 1 per every 410 deliveries, which is significantly less. Less percentage of obstructed labour (0.62%) is seen in the present study compared to that of Ayenew AA et al. [26]. In which the pooled incidence of obstructed labour in Ethiopia was 12.93%. The possible reason might be the least teenage pregnancy, fewer women with low socioeconomic status, and good ANC follow up in the present study. Other least common indications for caesarean section in the present study are multiple pregnancies (0.48%), Short stature in labour (0.48%) and Precious pregnancy (0.41%).

Conclusion

The rate of caesarean section is more than the national (India) and global caesarean section rate. Women of 20 to 30 years old with education up to metric, residing in a rural area with three or more ANC visits and belong to middle socioeconomic status are the majority to undergo a caesarean section. Previous caesarean section and fetal distress are the two significant indications for caesarean section.

What this study adds to existing knowledge:

Still, previous caesarean sections and fetal distress continue to be the leading indications for caesarean section.

Abbreviations: CS: Caesarean sections. CPD: Cephalopelvic Disproportion. ANC: Antenatal Care.

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Authors' contributions: Harish KM and Shwetha N designed the study, analyzing data and writing the manuscript. MallikarjunaReddy E, KedarKarthik Ch, Pujith Kumar G and SaiChandhan T contributed to data collection and revised the manuscript. All authors read and approved the final manuscript.

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