

## Rate and Indications of Emergency Caesarean Section: A Retrospective Study

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**Background:** In obstetrics, a Caesarean section is the most commonly performed surgery. The emergency caesarean rate is a major contributor to increased total caesarean section rates in recent times. This study was undertaken to know the emergency caesarean section rate in a district hospital and the indications contributing to it. **Method:** Sociodemographic data for the emergency caesarean section deliveries and indications of emergency caesarean sections performed during one year from January 2020 to December 2020 at The Apollo Medical College and Government district hospital, Chittoor, were collected retrospectively. **Results:** Among a total of 1432 women delivered by caesarean section during the study period, 804 (56.14%) were delivered by emergency caesarean section. Booked (742, 92.28%) Primigravida (480, 59.70%) Women 20 to 30 years old (664, 82.58%), studied up to metric (510, 63.43%), residing in rural area (713, 88.68%), belong to middle socioeconomic status (676, 84.07%) were the majority to undergo emergency CS. Fetal distress (31.96%) made the greatest contribution to the emergency C.S. rate followed by Non-Progress of labour (23.88%), Previous caesarean in labour (21.51%), Oligo-Hydramnious (8.33%), chronic health conditions (4.97%) and Breech presentation in labour (4.85%). **Conclusions:** As fetal distress and non-progress of labour are the most common indications of emergency caesarean section, and there is a need to address these indications to bring down the emergency caesarean section rate.

**Keywords:** Emergency caesarean section, Fetal distress, Non-progress of labour

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## Introduction

Caesarean section is one of the most commonly performed surgeries in obstetric practice for saving the lives of women and their newborns from pregnancy- and childbirth-related complications. Its prevalence has increased alarmingly in the last few years. [1]. When the caesarean section is performed due to unforeseen or acute obstetric emergencies, the term "emergency caesarean section" is used. It is seen that morbidity and mortality are associated more with emergency procedures than with elective procedures. [2].

A caesarean section is medically indicated when a significant risk of adverse outcome for mother or baby is present if the operation is not performed at a given time. [3]. But C.S. may be associated with short term, and long term risks to the mother and the newborn may face problems like neonatal respiratory distress, including transient tachypnea and persistent pulmonary hypertension. [4,5]. In spite of knowing these risks, the causes of the rise in the C.S. rate are not fully understood but emerge as a complex multifactorial labyrinth involving health systems, health care providers, women, societies, and even fashion and media. [6].

This research is carried to identify the indications and determinants influencing emergency caesarean section delivery in the Apollo Institute Of Medical Sciences And Research, Chittoor, as it was considered more and more necessary to revisit the C.S. rate and indication for emergency C.S. because of the significant improvements in clinical obstetric care and the methodology to assess evidence and issue recommendations. This study aimed to determine the rate, sociodemographic characteristics and indications of Emergency C.S.

## Material and Methods

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

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

**Sampling methods:** women who underwent emergency caesarean section and

Their details documented in the caesarean section register kept in the operation theatre. Emergency caesareans were defined as those in whom the decision for C.S. was made as per RCOG guidelines [7] as follows

Category I (immediately life-threatening to mother or fetus),

Category II (no immediate threat to mother or fetus) or

Category III (requiring early delivery)

**Inclusion criteria:** All the patients delivered by Emergency C.S. during the study period were included.

**Exclusion criteria:** The patients who underwent Elective C.S. during the study period were excluded from the study.

**Data collection procedure:** Data of emergency caesarean section as per the emergency operation theatre list were collected retrospectively from the caesarean section register. Data were collected on a predesigned proforma, which included sociodemographic characters & indications for caesarean section.

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

**Statistical Analysis:** Emergency caesarean section rate is calculated and is defined as the percentage of births achieved by Emergency caesarean section among total caesarean deliveries in the study period. Frequencies and percentages were calculated for Age, Education, Residence, Socioeconomic status, Gravida, Booked or unbooked, and Indications of elective C.S.

## Results

Table 1 shows that a total of 1432 women underwent caesarean section. Among this, 804 (56.14%) women had emergency C.S.

Table 3 shows the sociodemographic characteristics of the study participants. Age distribution of women undergoing emergency C.S. showed that most women were in the age group of 20–30 years, i.e. 664 (82.58%). Further 104 (12.93%) women had teenage pregnancies, and the remaining 36 (4.47%) women were elderly pregnant women. The majority of women had studied up to metric

(510 women making 63.43%), the remaining 248 women (35.32 %) had completed graduation, and only ten women (1.12%) were illiterate. The majority of the women, i.e., 713 (88.68%), belonged to a rural area, whereas 91 (11.31%) were from urban areas. The majority of women belong to middle socioeconomic status, i.e. 676 (84.07%), whereas 108 (13.43%) women belong to lower socioeconomic status, remaining 20 (2.48%) women belong to higher socioeconomic status. The percentage of primigravida women undergoing emergency C.S. was more elevated, i.e. 59.70% (480 cases), whereas the rate of multigravida women was lower, i.e. 40.29% (324 cases). The majority of women undergoing emergency C.S. were booked 742 (92.28%), only 7.71% (62) were unbooked

Table 4 shows emergency C.S. births classified by their indications. Fetal distress (31.96%) made the most significant contribution to the emergency C.S. rate. Non-Progress of labour (23.88%) had the second-highest contribution to the emergency C.S. rate and the history of the previous caesarean in labour (21.51%). Consequently, Oligo-Hydramniotic in labour made up 8.33% (67) and Chronic health conditions made up another 4.97% and Breech presentation in labour made up to 4.85% of the overall emergency C.S. Further small contribution to overall emergency C.S. was made by Obstructed labour 1.11%, Multiple pregnancies in labour 0.87%, Short stature in labour 0.87%, Transverse Lie in labour 0.49%, Cord prolapse 0.37%, Placental disorders in labour 0.24%, Occipito-Posterior Position 0.24%, Precious pregnancy in labour 0.12%, Footling presentation 0.12%.

**Table 1: Emergency C.S. rate.**

	Number	Percentage
Emergency CS	804	56.14%
Total	1432	100 %

**Table 2: Emergency C.S. rate in India and other countries.**

Sl no	Rate of emergency CS	Period	Study	Country
1	78.37	2013-2014	Thakur V et al [8]	INDIA
2	75.85%	2014	Benzouina S et al [9]	MOROCCO
3	74.4%	2018	Darnal N et al [10]	NEPAL
4	61.22%	2016-2017	Jain SM et al [11]	INDIA
5	59.68%	2017-2018	Reddy KM et al [12]	INDIA
6	58%	2000-2015	Radha K et al [13]	INDIA
7	56.14%	2020	Present Study	INDIA
8	44.18%	2015-16	NFHS-414	INDIA

**Table 3: Sociodemographic Characteristic**

Sl no	Demographic character	number	percentage
1	Age	Tenage	104 12.93 %
		20 to 30 years	664 82.58 %
		Elderly(above 30yrs)	36 4.47 %
2	Education	No literacy	10 1.12 %
		Matric	510 63.43 %
		Graduate	284 35.32 %
3	Residence	Rural	713 88.68 %
		Urban	91 11.31 %
4	Socioeconomic status	Lower	108 13.43 %
		Middle	676 84.07 %
		Upper	20 2.48 %
5	Gravida	Primigravida	480 59.70 %
		Multigravida	324 40.29 %
6	Booking status	Unbooked	62 7.71 %
		Booked	742 92.28 %

**Table 4: Indications Of Emergency C.S.**

Sl no	Indications	number	%
1	Fetal distress	257	31.96 %
2	Non-Progress of labour	192	23.88 %
3	Previous caesarean in labour	173	21.51 %
4	Oligo-Hydramniotic in labour	67	8.33 %
5	Chronic health conditions	40	4.97 %
6	Breech presentation in labour	39	4.85 %
7	Other indications	36	4.50%
	Obstructed labour	9	1.11%
	Multiple pregnancies in labour	7	0.87 %
	Short stature in labour	7	0.87 %
	Transverse Lie in labour	4	0.49 %
	Cord prolapse	3	0.37 %
	Placental disorders in labour	2	0.24 %
	Occipito-Posterior Position	2	0.24 %
	Precious pregnancy in labour	1	0.12 %
	Footling presentation	1	0.12 %
	<b>Total</b>		<b>804</b>

## Discussion

The total number of C.S. (combined Elective C.S. & Emergency C.S.) during the study period was 1432. The rate of emergency caesarean delivery (56.14%) is significantly higher when compared to elective C.S. (43.85%). Similar results were seen in studies conducted by Thakur V et al. [8], Benzouina S et al. [9], Darnal N et al. [10], Jain SM et al. [11], Reddy KM et al. [12] and Radha K et al. [13] except NFHS-4[14] survey which shows lesser emergency C.S. rate. In the present study percentage

Of emergency C.S. is lowest when compared to the rate of emergency C.S. of other studies. The percentage of emergency C.S. is marginally less when compared to Jain SM et al. [11] and Reddy KM et al. [12] but substantially less when compared to Thakur V et al. [8], Benzouina S et al. [9] and Darnal N et al [10]. Also, Aminu M et al. found in their study that most hospitals performed more emergency C.S. compared to elective C.S. [15]. In contrary to the finding of the present study, analysis of the dataset of the fourth round of NFHS-4 India, conducted in 2015-16 by Kathuria B et al. stated in India, 7.6% of births were delivered by emergency C-section, which is 44% of total C-section births [17]. Emergency caesarean section is performed due to unforeseen or acute obstetric emergencies. Hence even though the Emergency C.S. rate is lowest in the present study area, the rate needs to be brought down to a still lower extent as it is seen that morbidity and mortality are associated more with emergency procedures than with elective procedures.

The mother's age at childbirth is one of the most important sociodemographic factors in caesarean delivery. In the present study, the chance of having emergency caesarean birth is significantly less for women with age less than 20 or more than 30. Emergency C.S. rate is high in the 20 to 30 years age group as most women marry at a younger age and become pregnant within this age. However, Benzouina S et al. stated in their study that high incidence of emergency C.S. in younger mothers might indicate the tendency of the attending obstetrician to allow vaginal deliveries in these mothers as long as this is feasible with a view to preserving their future reproductive performances and only resorting to C.S. delivery when there is a threat to either the mother or the fetus [9]. The present study finding was contrary to Bayrampour H et al., which showed women's advanced maternal age are more likely to suffer from increasing C-section delivery rate[16]. Present study findings were nearly similar to a dataset of NFHS-4 India, conducted in 2015-16, which states that the percentage of C-section rate is higher among women in the age group of 25-34 years as compared to those women who are either younger or older from this age group (<25 years or 35+ years)[14].

Analysis by Kathuria B et al. indicates that the likelihood of C-section is more than two times

Higher among highly educated mothers than uneducated mothers [17]. A similar finding was seen in the present study where among women who underwent emergency C.S. majority (98.88%) had studied up to metric and above. The Study by Choudhury CR stated that as the education level of the women increases, the knowledge about the pregnancy also increases, so it is expected that educational level will have a significant effect on the outcome of pregnancy. It is observed from the logistic analysis that as the higher educational level of a woman increases, she becomes more likely to have a caesarean section [18]. Even though the percentage of caesarean deliveries is high in urban areas, as stated in the Study of Singh P et al. [19], most women coming to the urban hospital are from rural areas in the present study. This is due to several factors like lack of availability and accessibility of advanced health facilities and significantly less or no private-sector health care facility in rural areas. Even though few private-sector health care facilities are available in some rural areas, women of low and middle socioeconomic status cannot pay for the surgery and extra costs associated with C-sections. On the other side, the availability of medical facilities in the urban areas is one of the reasons for the higher caesarean rate. The people from the neighbouring rural areas are highly dependent on the urban medical facilities, making the urban areas more prevalent for caesarean births. Kang L et al. stated in their Study that Caesarean section rates have increased in rural areas, and the disparity in rural-urban areas has increased substantially over the years [20]. Singh N et al., in their study, found that the majority of women belong to a rural area in the emergency C.S. group [2].

The present study shows that low and middle socioeconomic statuses have more caesarean sections. A similar result was seen in Singh N et al., which state that lower middle socioeconomic status women were common in the emergency C.S. group [2]. The main reason is that pregnant women with higher socioeconomic status usually choose private health care facilities. In contrast, women of low and middle socioeconomic status cannot afford to pay for the surgery and come to government health care facilities. In contrary to the present Study, Patel RV et al. shows that mothers belonging to higher socioeconomic status have a higher number of caesarean section [21].

Primigravida women were significantly more likely to have emergency C.S. (59.70%) in the present study. This finding was similar in Aminu M et al. [15] and Singh N et al. [2]. The survey by Choudhury CR stated that the risk of caesarean section gets reduced as the women become more and more experienced with the complication factors of pregnancy that leads to the surgical intervention in the delivery [18]. The dataset of the fourth round of National Family Health Survey (NFHS-4) India, conducted in 2015-16, shows that the percentage of C-section rate is much higher among women who had more than 4 ANC visits as compared to those who did not have any ANC visit [14]. Similar findings were seen in the present study. The study conducted by Srivastava S et al. found that Women going for more ANC check-ups might be facing some complications during pregnancy, which will drive women to have institutional delivery, due to which it is more likely to have C-section delivery [22].

In the present study, the most significant contributor to the emergency C.S. rate is fetal distress. Clinical diagnosis is the most commonly used method for diagnosis of foetal distress includes auscultation of fetal heart rate (FHR), detection of meconium-stained liquor and electronic FHR monitoring. By clinical diagnosis of fetal distress, there will be a decrease in the perinatal mortality rate, but the emergency C.S. rate increases. There has been controversy on the clinical diagnosis of fetal distress using only the intermittent counting of the fetal heart rate and passage of meconium-stained liquor. Although cardiotocograph (CTG) is the most widely used tool for antepartum and intrapartum surveillance, suspicious FHR patterns lack specificity. False-positive FHR tracings often result in unnecessary C.S. Gangwar R et al. observed in their study that prediction of foetal hypoxia and acidosis based on non-reassuring fetal heart rate patterns by cardiotocograph (CTG) is sufficiently low to have led to the observation that many caesarean deliveries are retrospectively found to have been unnecessary [23]. Fetal distress has been shown to contribute to the increasing caesarean section rate, which is consistent with the findings of a study conducted by Benzouina S et al. [9] and Desai G et al. [24].

The second highest contributor to emergency C.S. in the present Study is Non-progress of labour. In the study conducted by Abebe FE

Et al. [25], Non-progress of labour was the most common indication. Still, in Mittal S et al. [26], it was the second-highest contributor to emergency C.S. Monitoring labour through plotting a simple graph such as partograph can reduce emergency C.S. rate. Pregnant women coming in labour with a history of the previous caesarean is the third most common indication for emergency C.S. in the present study. In the study done by Thakur V et al. [8] and Aminu M et al. [15], history of the previous caesarean in labour was the most common indication were as in the Study of Benzouina S et al. [9] it was second most frequent indications for repeat C.S. Reason for increase in emergency repeat C.S. in the present study is either labour starts before planned caesarean section or woman come to the hospital after onset of labour. In the current research Oligo-Hydramnios in labour is the fourth common indication contributing to emergency C.S. In the Study of Ethiraj G et al., oligo-hydramnios was associated with a high possibility of emergency C.S. [27].

Chronic health conditions such as uncontrolled hypertension, pre-eclampsia, eclampsia and gestational diabetes mellitus were the fifth major contributor to emergency C.S. In the Study of Reddy KM et al. showed an increase in the caesarean section for maternal indications like uncontrolled hypertension, pre-eclampsia, eclampsia and gestational diabetes mellitus from 1.9% in 2012-2013 to 2.99% in 2017-2018 reflecting the rise in maternal medical complications [12]. In Elvedi-Gasparovic V et al. study, the commonest indication of emergency C.S. was pre-eclampsia and eclampsia [1]. Contrary to the present Study, Ethiraj G et al. found no significant association between hypertensive disorders of pregnancy and emergency C.S. [27].

Breech presentation in labour was the sixth commonest indication for emergency C.S. Many of these pregnant women are either unbooked, thereby increasing undetected breech presentation at term or come to hospital late despite being booked. Leung WC et al., in their study, stated that although the breech presentation is easy to detect through ultrasound screening, many women go into labour with an undetected breech presentation [28]. Wastlund D et al., in their study, concluded that universal late pregnancy ultrasound in nulliparous women would virtually eliminate undiagnosed breech presentation [29]. In the Study by Sultana

A et al., breech presentation constituted 7.6% of emergency C.S. which is slightly higher than the present study [30]. The percentage of umbilical cord prolapse and subsequent emergency C.S. is less in the present study, which is thought to be secondary to the widespread use of caesarean sections for many of the risk factors of cord prolapse, which is consistent with the Study of Gibbon C et al. [31]. Also, a significant decrease in multigravida women in the present study, which is thought to contribute to the reduced incidence of cord prolapse, is similar to Sayed Ahmed WA et al. [32]. Indications contributing to emergency C.S. by other malpresentation such as Transverse Lie, Occipito-Posterior Position, and Footling presentation were less common. Other less common indications contributing to emergency C.S. rates include multiple pregnancies, short stature in labour, Placental disorders in labour, previous pregnancy in labour. Women undergoing emergency C.S. for placental disorders in the present study was significantly less when compared to 4% and 8% in the Study of Thakur V et al. [8] and Pillai SA et al. [33], respectively.

## Conclusion

Fetal distress is the most significant contributor to the emergency section, followed by Non-progress of labour. To reduce emergency C.S. due to fetal distress, Fetal blood sampling (FBS) is a beneficial tool for diagnosing fetal acidosis and hypoxia but is difficult to do and not widely available. Emergency C.S. due to non-progress of labour can be reduced by increasing the number of skilled human resources and facilities for monitoring during labour or better intrapartum care. Despite advances in intrapartum care with guidelines, skilled manpower and equipment. Still, fetal distress is the major contributor to emergency caesarean section.

### What this study adds to existing knowledge

Despite the advance in Intrapartum care with guidelines, skilled manpower and equipment's, still fetal distress is the major contributor to emergency caesarean section.

**Abbreviations:** CPD: Cephalopelvic Disproportion; C.S.: Caesarean sections.

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### Authors' contributions

Harish K.M. and Shwetha N designed the study, analysed the data and wrote the manuscript. Ch. Kedar Karthik, E.Mallikarjuna Reddy, C.Sreenivasa Reddy and G.M Satish Reddy contributed to data collection and revised the manuscript. All authors read and approved the final manuscript.

**Competing interests:** The authors declare that they have no competing interests.

## Reference

01. Elvedi-Gasparović V, Klepac-Pulanić T, Peter B. Maternal and fetal outcome in elective versus emergency caesarean section in a developing country. *Coll Antropol.* 2006 Mar;30(1):113-8. [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
02. Singh N, Pradeep Y, Jauhari S. Indications and Determinants of Cesarean Section: A Cross-Sectional Study. *Int J Appl Basic Med Res.* 2020 Oct-Dec;10(4):280-285. doi: 10.4103/ijabmr.IJABMR\_3\_20 [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
03. Ali, Muhammad, Mansoor Ahmad, and Rashida Hafeez. Maternal And Fetal Outcome. *The Professional Medical Journal* 12. 01 (2005): 32-39. [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
04. Penna L, Arulkumaran S. Cesarean section for non-medical reasons. *Int J Gynaecol Obstet.* 2003 Sep;82(3):399-409. doi: 10.1016/s0020-7292(03)00217-0 [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
05. Jain, Mahima, and Avani Patel. A cross sectional study of rate, indications and complications of primary caesarean section. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* 5. 6 (2016): 1814-1820. [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
06. Levine EM, Ghai V, Barton JJ, Strom CM. Mode of delivery and risk of respiratory diseases in newborns. *Obstet Gynecol.* 2001 Mar;97(3):439-42. doi: 10.1016/s0029-7844(00)01150-9 [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
07. Royal College of Obstetricians

And Gynaecologists. Classification of urgency of caesarean section: A continuum of risk. From: www.rcog.org.uk/globalassets/documents/guidelines/good

practice11classificationofurgency.pdf Accessed: Sep 2015 [Crossref][PubMed][Google Scholar]

08. Thakur, V. , et al. study of maternal and fetal outcome in elective and emergency caesarean section. *Emergency* 2521 (2015): 78-37. [Crossref][PubMed][Google Scholar]

09. Benzouina S, Boubkraoui Mel-M, Mrabet M, Chahid N, Kharbach A, El-Hassani A, et al. Fetal outcome in emergency versus elective cesarean sections at Souissi Maternity Hospital, Rabat, Morocco. *Pan Afr Med J.* 2016 15th April;23:197. doi: 10.11604/pamj.2016.23.197.7401 [Crossref][PubMed][Google Scholar]

10. . . Pan Afr Med J. 2016 15th April;23:197. doi: 10.11604/pamj.2016.23.197.7401 [Crossref][PubMed][Google Scholar] [Crossref][PubMed][Google Scholar]

11. Darnal N, Dungal G. Maternal and Fetal Outcome in Emergency versus Elective Caesarean Section. *J Nepal Health Res Counc.* 2020 Sep 7;18(2):186-189. doi: 10.33314/jnhrc.v18i2.2093 [Crossref][PubMed][Google Scholar]

12. Jain, Shuchi M. , et al. Study of sociodemographic factors of women undergoing caesarean section in tertiary care centre of rural area of central India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* 8. 12 (2019): 4757-4762 [Crossref][PubMed][Google Scholar]

13. Reddy, Ke Manga, et al. Prevalence and determinants of caesarean section in a rural tertiary teaching hospital: a 6-year retrospective study. *Int J Reproduction, Contraception, Obstet Gynecol* 8. 2 (2019): 560. [Crossref][PubMed][Google Scholar]

14. Radha, K. , Devi, G. P. , Manjula, R. V., & Chandrasekharan, P. A. (2015). *Study on rising trends of caesarean section (c-section): a bio-sociological effect.* *IOSR J Dent Med Sci*, 14(8), 10-13 [Crossref][PubMed][Google Scholar]

15. Iips, I. "National Family Health Survey (NFHS-4), 2015–16. " International Institute for Population Sciences (IIPS), Mumbai, India (2017): 791-846. [Crossref][PubMed][Google Scholar]

16. Aminu M, Utz B, Halim A, van den Broek N. Reasons for performing a caesarean section in public hospitals in rural Bangladesh. *BMC Pregnancy Childbirth.* 2014 5th April;14:130. doi: 10.1186/1471-2393-14-130 [Crossref][PubMed][Google Scholar]

17. Bayrampour H, Heaman M. Advanced maternal age and the risk of cesarean birth: a systematic review. *Birth.* 2010 Sep;37(3):219-26. doi: 10.1111/j.1523-536X.2010.00409.x [Crossref][PubMed][Google Scholar]

18. Kathuria, Bhawna, and Sherin Raj TP. "Regional Disparities and Determinants of Caesarean Deliveries in India. " *Indian Journal of Youth and Adolescent Health (E-ISSN: 2349-2880)* 7. 4 (2020): 15-23. [Crossref][PubMed][Google Scholar]

19. Chayan Roy Choudhury. Caesarean birth : The Indian scenario: research scholar journal 2008,1-28. available from:URL:http://paa 2008. princeton.edu/ download [Crossref][PubMed][Google Scholar]

20. Singh P, Hashmi G, Swain PK. High prevalence of cesarean section births in private sector health facilities- analysis of district level household survey-4 (DLHS-4) of India. *BMC Public Health.* 2018 10th May;18(1):613. doi: 10.1186/s12889-018-5533-3 [Crossref][PubMed][Google Scholar]

21. Kang L, Gu H, Ye S, Xu B, Jing K, Zhang N, et al. Rural-urban disparities in caesarean section rates in minority areas in China: evidence from electronic health records. *J Int Med Res.* 2020 Feb;48(2):300060519877996. doi: 10.1177/0300060519877996 [Crossref][PubMed][Google Scholar]

22. Patel RV, Gosalia EV, Deliwala KJ et al. Indications and trends of caesarean birth delivery in the current practice scenario. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 3(3), 575-581. [Crossref][PubMed][Google Scholar]

23. Srivastava, Shobhit, et al. Exploring the spatial patterns of cesarean section delivery in India: Evidence from National Family Health Survey-4. *Clinical Epidemiology and Global Health* 8. 2 (2020): 414-422. [Crossref][PubMed][Google Scholar]

24. Gangwar R, Chaudhary S. Caesarean Section for Foetal Distress and Correlation

With Perinatal Outcome. *J Obstet Gynaecol India*. 2016 Oct;66(Suppl 1):177-80. doi: 10.1007/s13224-015-0831-5 [Crossref][PubMed] [Google Scholar]

25. Desai G, Anand A, Modi D, Shah S, Shah K, Shah A, et al. Rates, indications, and outcomes of caesarean section deliveries: A comparison of tribal and non-tribal women in Gujarat, India. *PLoS One*. 2017 Dec 27;12(12):e0189260. doi: 10.1371/journal.pone.0189260 [Crossref][PubMed] [Google Scholar]

26. Abebe FE, Gebeyehu AW, Kidane AN, Eyassu GA. Factors leading to cesarean section delivery at Felegehiwot referral hospital, Northwest Ethiopia: a retrospective record review. *Reprod Health*. 2016 20th January;13:6. doi: 10.1186/s12978-015-0114-8 [Crossref][PubMed][Google Scholar]

27. Mittal S, Pardeshi S, Mayadeo N, Mane J. Trends in cesarean delivery: rate and indications. *J Obstet Gynaecol India*. 2014 Aug;64(4):251-4. doi: 10.1007/s13224-013-0491-2 [Crossref][PubMed] [Google Scholar]

28. Ethiraj, Gomathy, Aditi C. Ramachandra, and Sandhya Rajan. Induction of Labor and Risk for Emergency Cesarean Section in Women at Term Pregnancy. *Journal of Clinical Gynecology and Obstetrics* 8. 1 (2019): 17-20 [Crossref][PubMed] [Google Scholar]

29. Leung WC, Pun TC, Wong WM. Undiagnosed breech revisited. *Br J Obstet Gynaecol*. 1999 Jul;106(7):638-41. doi: 10.1111/j.1471-0528.1999.tb08360.x [Crossref][PubMed][Google Scholar]

30. Wastlund D, Moraitis AA, Dacey A, Sovio U, Wilson ECF, Smith GCS. Screening for breech presentation using universal late-pregnancy ultrasonography: A prospective cohort study and cost effectiveness analysis. *PLoS Med*. 2019 Apr 16;16(4):e1002778. doi: 10.1371/journal.pmed.1002778 [Crossref][PubMed] [Google Scholar]

31. Sultana A, Faisal M, Iqbal R, Javaid K, Khalid MB, Khalid MA. Indications of Emergency vs Elective Cesarean Section: Cross-sectional Study done at Holy Family Hospital, Rawalpindi, Pakistan. *J South Asian Feder Obst Gynae*. 2017;9(1):14-17. DOI: 10.5005/jp-journals-10006-1449 [Crossref] [PubMed][Google Scholar]

32. Gibbons C, O'Herlihy C, Murphy JF. Umbilical cord prolapse--changing patterns and improved outcomes: a retrospective cohort study. *BJOG*. 2014 Dec;121(13):1705-8. doi: 10.1111/1471-0528.12890. Epub 2014 16th June. Erratum in: *BJOG*. 2015 Mar;122(4):599 [Crossref][PubMed] [Google Scholar]

33. Sayed Ahmed WA, Hamdy MA. Optimal management of umbilical cord prolapse. *Int J Womens Health*. 2018 21st August;10:459-465. doi: 10.2147/IJWH.S130879 [Crossref][PubMed] [Google Scholar]

34. Pillai SA, Vaidyanathan G, Al-Shukri M, Al-Dughaisi TR, Tazneem S, Khan D, et al. Decisions to Perform Emergency Cesarean Sections at a University Hospital: Do obstetricians agree? *Sultan Qaboos Univ Med J*. 2016 Feb;16(1):e42-6. doi: 10.18295/squmj.2016.16.01.008 [Crossref][PubMed] [Google Scholar]