

# A Retrospective Study on Indications of Caesarean Section in a Tertiary Care Urban Setup

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## Abstract

**Background:** A Caesarean Section (CS) is a life saving procedure. It has a beneficial effect on maternal and child health as an alternative to difficult vaginal delivery. Adverse outcomes are postpartum hemorrhage (PPH), surgical site infection, puerperal sepsis, and maternal mortality, and fetal complications like neonatal sepsis, neonatal death, stillbirth, neonatal respiratory distress, a low Apgar score, and preterm birth. In past few decades a remarkable increase has been observed in delivery by caesarean section. This study aimed to find the indications of caesarean section in a private hospital.

**Method:** A retrospective study was carried out for a period of six months at AMRI Hospital, Mukundapur, Kolkata. This includes 359 pregnant women, who underwent caesarean sections, both elective and emergency.

**Conclusion:** Out of 359 pregnant women, 91% (328) were elective caesareans and 9% (31) were emergency caesarean sections. Previous caesarean section 16.15% (58) was found to be the most common indication of caesarean sections. A reduction of primary CS should be given priority. Following labor care guidelines, use of cardiotocography, partography, and patient education will contribute to the reduction of caesarean sections and related complications.

**Key words:** Caesarean section, indications, tertiary care

## Introduction

There is a noticeable increase in caesarean sections in both developed and developing countries. The reported increase in developed countries in the past decades from about 5% in the early 1970s to more than 40% in some regions of the world till 2018s<sup>1-2</sup>.

The reasons for this alarming increase are not completely understood. Some probable reasons are late pregnancy, malpresentation, malposition, especially breech, diminished normal or assisted vaginal delivery, fear of birth trauma to newborn and decreased vaginal birth after Caesarean section.

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In India, rate of C-section deliveries doubled from 7.1% in 2006 to 17.2% in 2016 and increased to 21.5% in 2021<sup>3, 4, 5</sup>. The World Health Organization (WHO) experts opined on the desirable rate of Caesarean section should be between 10 and 15%<sup>6</sup>.

It is a life-saving obstetric intervention with a goal to minimize adverse maternal and fetal outcomes, and maximize favorable effects. It can be achieved by reducing the risk of maternal PPH, surgical site infection, postpartum fever, puerperal sepsis, and maternal mortality, psychological trauma and controlling stillbirth, preterm birth, neonatal sepsis, early neonatal death, neonatal respiratory distress, and a low Apgar score of the neonates<sup>7, 8</sup>.

Caesarean delivery also carries long-term risks to mothers, and to her future pregnancies. A scar on the uterus may result in subsequent delivery by CS. The risk of placenta accreta is 0.3% in a woman delivered by CS, and it increases to 6.74% with five or more Caesarean deliveries<sup>9</sup>.

Caesarean delivery on maternal request (CDMR) refers to a primary Caesarean Section performed on maternal requests in the absence of definite medical or obstetric indications of CS. Possible reasons are anxiety and fear of the labor pain, trauma to the pelvic floor, poor labor experience from previous deliveries; wrong belief about fetal trauma or death from vaginal deliveries; convenience of scheduled birth; short delivery time without labor pain<sup>10, 11, 12, 13</sup>. There were globally 6.2 million reported cases of unnecessary Caesarean sections performed annually<sup>14</sup>. Researchers explored in their studies that the CS rate was about 19% in some countries, and it's association with a high maternal and neonatal mortality rate<sup>15, 16</sup>.

This study aimed to identify the factors associated with Caesarean section and its indications in the present day.

### Materials and Methods

It is a retrospective study conducted with pregnant women who were admitted for delivery at inpatient department of gynecology and obstetrics of this hospital from September 2023 to February 2024.

Pregnant women who underwent Caesarean sections, both elective and emergency included in

this study and who delivered by other mode such as normal delivery, or instrumental vaginal delivery were excluded.

The patient files of all women CS delivery in this study period were identified from the hospital medical record department. Collected data were entered in pre-structured proforma. An elective Caesarean section is a planned intervention performed to avoid risky vaginal deliveries and the decision was made before the onset of labor. Emergency Caesareans were defined as those performed for maternal or fetal complications arising before or during labor.

Demographic characteristics such as age, gravidity, and parity were collected from patient files. Obstetric characteristics were also recorded, such as the period of gestation during delivery, history of assisted reproduction, fetal number, previous history of fetal loss, and indication for undergoing a Caesarean section.

Outcome data was collected on newborns transferred to a nursery or neonatal intensive care unit (NICU), history of postpartum hemorrhage, and readmission following CS.

This study was approved by the institutional ethics committee of this hospital on 24 January 2024 (Reference no- AMRI-MKP/EC/ AP 10/23-24).

### Results and Discussion

A total of 359 women with Caesarean sections were enrolled in the study. Out of them, 91% were elective cesareans and 9% were emergency Caesarean sections. The maternal age for underwent Caesarean section ranges from 22 years to 50 years with an average of 32 years. Figure 1 shows 76% of women belong to the age group 30 to 39 and, 26% are age between 20 to 29, and 3% are age between 40 to 49, and one patient in the age group 50 and above. 93% (Table 1) of mothers have singleton pregnancy and 7% delivered twin baby.

Figure 1, Age distribution, n=359

Primigravida (Table 1), was 56%, second gravida 28%, and the remaining were between 3<sup>rd</sup> and 6<sup>th</sup> gravida. Table 1 shows that the majority of women who underwent Caesarean sections electively were primigravida 57% whereas a greater number

of multigravida 61% had undergone emergency Caesarean sections. Quin et al. found a higher incidence of cesarean section among primigravida because of presence of risk factors<sup>17</sup>. Haidar et al. and Shams had et al. observed that the rate of emergency CS is higher in multigravida<sup>18,19</sup>.

**Table 1: Distribution of patients according to different parameters**

	Variables	n=	Percentage
Type of Caesarean sections			
1	Elective	328	91%
2	Emergency	31	9%
Gravidity			
1	Primi	202	56%
2	Second	101	28%
3	Third	39	11%
4	4-6	17	5%
CS & Gravidity- Elective			
1	Primi	188	57%
2	Multi	140	43%
CS & Gravidity- Emergency			
1	Primigravida	11	39%
2	Multigravida	17	61%
Fetal Number			
1	Singleton	333	93%
2	Twin	26	7%
Period of gestation			
1	Preterm	164	46%
2	Term	195	54%
Assisted reproduction			
1	IVF	44	12%
2	Normal pregnancy	315	88%
Admission to NICU			
1	Admitted to NICU	36	10%
2	Transfer to nursery	323	90%

Reasons for emergency Caesarean delivery classified as premature rupture of membranes (PROM) 32.2%, pre-eclampsia 32.2%, fetal distress 25.8%, early labor 6.45%. One case of acute pancreatitis in pregnancy was delivered at 35 weeks by emergency CS.

Figure 2, Emergency CS, n=31

Figure 3 shows the various indications for Caesarean sections. The most frequent indications of Caesarean delivery were previous Caesarean section 16.15% maternal disorder related to pregnancy 12.00% hypertensive disorder of pregnancy 11.70% prolonged and obstructed labor 10.86% uterine factor 10.60% and general disease complicating pregnancy 9.75% The next common causes are malposition 5.84% PROM 5.29% intrauterine growth retardation (IUGR) 5.01% and fetal distress 3.9% . Information on indications of CS was missing in 15 cases. There were 6 cases of oligohydramnios, 4 cases of antipartum hemorrhage, and 3 cases with previous history of fetal loss.

Figure 3, Indications of CS, n= 359

Fibroid uterus, adenoma uterus, unfavorable cervix, unicornuate or bicornuate uterus, women with bad obstetric history, and bilateral tubal clipping were grouped under the uterine factor. Prolonged or obstructed labor includes high floating head, failed induction, cephalopelvic disproportion, and large for a date baby. Maternal disorders consisted of Rh -ve pregnancy, obstetric cholestasis, gestational diabetes mellitus (GDM), and gestational thrombocytopenia. Pregnant women with type 2 diabetes mellitus (T2DM), systemic HTN, beta thalassemia trait, Glanzmann thrombasthenia, hypothyroidism, and bronchial asthma are categorized under general diseases complicating pregnancy. Women recovered from leptospirosis and scrub typhus, delivered by elective CS, came under the same title. Hypertensive disorders of pregnancy cover gestational hypertension, preeclampsia, and eclampsia.

Studies have reported an upward curve in CS deliveries globally and in India<sup>20, 21</sup>. As shown in this study, Mishra et al and Mascarello et al reported increased incidences of CS among women previously underwent Caesarean delivery<sup>22, 23</sup>.

National Institute for Health and Clinical Excellence<sup>24</sup> and the American College of Obstetricians and Gynecologists<sup>24</sup> have stated that previous CS should not be considered as an indication in the absence of maternal and fetal emergencies. There is reported success rate of (80%) in vaginal birth after Caesarean section (VBAC) and lower morbidity rate

than those who delivered previously by CS<sup>23, 25</sup>. So, focus on reducing post CS deliveries can be achieved by reducing the rate of primary CS.

FIGO recommends-<sup>26</sup>

- Counseling by healthcare providers at each antenatal visit
- Uniform classification for CS (Robson/WHO classification)
- Equal fees for vaginal delivery and CS
- Publishing annual CS data by hospitals

We observed that maternal disorders related to pregnancy, which include gestational diabetes mellitus (GDM) and intrahepatic cholestasis during pregnancy, are next common causes of caesarean delivery. Other researchers have similar findings in their study<sup>27</sup>.

Prolonged or obstructed labor (10.86%) was one of the first five common causes in this study. Penn Z and Robert CL et al concluded that it also contributed to the rising trend of CS in other population-based studies, with a high prevalence of 30%<sup>23, 28</sup>. Walker R and Heffner L et al in their studies showed active management of the second stage of labor by augmentation was effective in managing prolonged labor<sup>25, 29</sup> without causing severe birth asphyxia<sup>30, 31</sup>. Monitoring labor by using partograph resulted in reduction of CS rate by around 31%, as documented by studies conducted in the United States, the United Kingdom, and South Africa<sup>30</sup>. Some Indian studies drew mixed results on use of partograph for monitoring labor<sup>32-34</sup>.

Table 1 shows that 54% of the women delivered at gestation period >37 weeks and 45% of the women with gestation period <37 weeks had delivered by Caesarean section. It was observed that 12.25% of total Caesarean section cases had a history of assisted reproductive technology (ART), out of which 95.45% were delivered by elective CS. Fear of women and obstetricians about the safe outcome of an IVF pregnancy<sup>35, 36</sup> may be the probable reason.

All women delivered by CS at this hospital have an uneventful postpartum period, except two cases of PPH. One death documented and two received blood transfusions.

In this study, there were two cases of caesarean delivery on maternal request (CDMR) where both primigravida had undergone elective CS, which may be due to fear of vaginal delivery. This can be overcome by patient counseling reduces fear of labor pain.

As shown in Table 1 babies of 36 mothers were transferred to NICU for O2 support and care 15/11 and one neonatal death of a preterm baby was recorded. Several researchers<sup>37-39</sup> concluded that babies born through CS experienced a higher risk of adverse neonatal outcomes like low birth weight, delayed initiation of respiration.

## Conclusions

In this study previous CS is the commonest indication for caesarean section, reduction of primary CS should be given priority. The consideration of a caesarean section as an easier option than vaginal delivery needs to be changed now. Following updated labor care guidelines, rational use of cardiotocography, partography and patient counseling at antenatal visits will contribute to the reduction of Caesarean deliveries and complications.

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## References

1. Antoine C, Young BK. Caesarean section one hundred years 1920–2020: the Good, the Bad and the Ugly. *Journal of Perinatal Medicine*. 2020 Sep 4;49(1):5–16.
2. Betran AP, Ye J, Moller AB, Souza JP, Zhang J. Trends and projections of caesarean section rates: global and regional estimates. *BMJ Global Health*. 2021 Jun;6(6):e005671.
3. Ministry of Health and Family Welfare Government of India [Internet]. 2015. Available from: <http://rchiips.org/nfhs/NFHS-4Reports/India.pdf>
4. Rodgers J, Lee H, Kim R, Mor N, Subramanian SV. Geographic variation in caesarean delivery in India. *Paediatric and Perinatal Epidemiology*. 2021 Aug 31;36(1):92–103.

5. Varshini NM, Shirisha P, Vaidyanathan G, Muraleedharan VR. Variations in the prevalence of caesarean section deliveries in India between 2016 and 2021 – an analysis of Tamil Nadu and Chhattisgarh. *BMC Pregnancy and Childbirth*. 2023 Aug 30;23(1)
6. Söderquist J, Wijma B, Thorbert G, Wijma K. Risk factors in pregnancy for post-traumatic stress and depression after childbirth. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2009 Feb 11;116(5):672–80.
7. Batiha AM, Al Daradakh SA, Khader YS, Basha A, Sabet F, Athamneh TZ and Sheyyab M. Cesarean Section: Incidence, Causes, Associated Factors and Outcomes: A National Prospective Study from Jordan. *Gynecology & Obstetrics Case report*. 2017;03(03).
8. Desai G, Anand A, Modi D, Shah S, Shah K, Shah A, Desai, S., and Shah, P. Rates, indications, and outcomes of caesarean section deliveries: A comparison of tribal and non-tribal women in Gujarat, India. Faragher EB, editor. *Plos one*. 2017 Dec 27;12(12):e0189260.
9. Gibbons L, Belizán JM, Lauer JA, Betrán AP, Merialdi M, Althabe F. The global numbers and costs of additionally needed and unnecessary caesarean sections performed per year: overuse as a barrier to universal coverage. *World Health Report 2010*. 2010 Jan 1; 30.
10. Stützer PP, Berlit S, Lis S, Schmahl C, Sütterlin M, Tuschy B. Elective Caesarean section on maternal request in Germany: factors affecting decision making concerning mode of delivery. *Archives of Gynecology and Obstetrics*. 2017 Mar 21;295(5):1151–6.
11. Størksen HT, Garthus-Niegel S, Vangen S, Eberhard-Gran M. The impact of previous birth experiences on maternal fear of childbirth. *Acta Obstetrica et Gynecologica Scandinavica*. 2013 Feb 22;92(3):318–24.
12. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section – a cross-sectional study at various stages of pregnancy in Sweden. *Acta Obstetrica et Gynecologica Scandinavica*. 2009 Jan;88(7):807–13.
13. Zhang J, Liu Y, Meikle S, Zheng J, Sun W, Li Z. Cesarean Delivery on Maternal Request in Southeast China. *Obstetrics & Gynecology*. 2008 May 1;111(5):1077–82
14. Molina G, Weiser TG, Lipsitz SR, Esquivel MM, Uribe-Leitz T, Azad TD, Shah N, Semrau K., Berry WR, Gawande AA, and Haynes AB. Relationship Between Cesarean Delivery Rate and Maternal and Neonatal Mortality. *JAMA [Internet]*. 2015 Dec 1;314(21):2263. Available from: <https://jamanetwork.com/journals/jama/fullarticle/2473490>
15. Ye J, Zhang J, Mikolajczyk R, Torloni M, Gülmezoglu A, Betran A. Association between rates of caesarean section and maternal and neonatal mortality in the 21st century: a worldwide population-based ecological study with longitudinal data. *BJOG: An International Journal of Obstetrics & Gynaecology [Internet]*. 2015 Aug 24;123(5):745–53. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5014131/>
16. Meara JG, Hagander L, Leather AJM. Surgery and global health: a Lancet Commission. *The Lancet*. 2014 Jan;383(9911):12–3.
17. Qin C, Zhou M, Callaghan WM, Posner SF, Zhang J, Berg CJ, and Zhao, G.. Clinical Indications and Determinants of the Rise of Cesarean Section in Three Hospitals in Rural China. *Maternal and child health journal*. 2011 Dec 13;16(7):1484–90.
18. Haider G, Nishat Z, Aftab AF, Haider A. Frequency and indications of cesarean section in a tertiary care hospital. *Pakistan journal of medical sciences*. 2009 Jan 1;25(5):791–6.
19. Shamshad. Factors Leading To Increased Cesarean Section Rate. *Gomal Journal of Medical Sciences*. 2008, 6(1):1-5
20. Boerma T, Ronsmans C, Melesse DY, Barros AJD, Barros FC, Liang J, Moller A, Say L, Hosseinpoor AR, Mu Y., De Lyra Rabello Neto D, and Temmerman, M. Global epidemiology of use of and disparities in caesarean sections. *The Lancet [Internet]*. 2018 Oct;392(10155):1341–8. Available from: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)31928-7/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)31928-7/fulltext)
21. Mishra VK. Geo-Spatial Analysis of Cesarean Section in India. *Open Access Journal of Gerontology & Geriatric Medicine*. 2019 Oct 22;5(2).
22. Mascarello KC, Matijasevich A, Barros AJD, Santos IS, Zandonade E, Silveira MF. Repeat cesarean section in subsequent gestation of women from a birth cohort in Brazil. *Reproductive Health [Internet]*. 2017 Aug 25;14(1). Available from: <https://reproductive-health-journal.biomedcentral.com/articles/10.1186/s12978-017-0356-8>
23. Penn Z, Ghaem-Maghami S. Indications for caesarean section. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2001 Feb;15(1):1–15.
24. Gholitabar M, Ullman R, James D, Griffiths M. Cesarean section: summary of updated NICE guidance. *BMJ*. 2011 Nov 23;343(nov23 1):d7108–8.
25. Walker R, Turnbull D, Wilkinson C. Strategies to Address Global Cesarean Section Rates: A Review of the Evidence. *Birth*. 2002 Mar;29(1):28–39.

26. Visser GH, Ayres-de-Campos D, Barnea ER, Bernis L de, Renzo GCD, Vidarte MFE, Lloyd I, Nassar AH, Nicholson WK, Shah PK, Stones W, Sun L, Theron G, and Walani SR. FIGO position paper: how to stop the caesarean section epidemic. *The Lancet* [Internet]. 2018 Oct 13 [cited 2021 Feb 19];392(10155):1286-7. Available from: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)32113-5/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)32113-5/fulltext)
27. Yang J, Chen C, Liu M, Zhang S. Women successfully treated for severe intrahepatic cholestasis of pregnancy do not have increased risks for adverse perinatal outcomes. *Medicine*. 2019 Jul;98(27):e16214.
28. Roberts CL, Algert CS, Ford JB, Todd AL, Morris JM. Pathways to a rising caesarean section rate: a population-based cohort study. *BMJ Open*. 2012;2(5):e001725.
29. Heffner L. Impact of labor induction, gestational age, and maternal age on cesarean delivery rates. *Obstetrics & Gynecology*. 2003 Aug;102(2):287-93.
30. Hartmann KE, Andrews JC, Jerome RN, Lewis RM, Likis FE, McKoy JN, Surawicz TS, and Walker SH. Strategies to Reduce Cesarean Birth in Low-Risk Women [Internet]. PubMed. Rockville (MD): Agency for Healthcare Research and Quality (US); 2012 [cited 2024 Apr 22]. Available from: <http://www.ncbi.nlm.nih.gov/books/nbk114747/>
31. Caughey AB, Cahill AG, Guise JM, Rouse DJ. Safe prevention of the primary cesarean delivery. *American Journal of Obstetrics and Gynecology*. 2014 Mar;210(3):179-93.
32. Chaturvedi S, Upadhyay S, Costa AD, Raven J. Implementation of the partograph in India's JSY cash transfer programme for facility births: a mixed methods study in Madhya Pradesh province. *BMJ Open* [Internet]. 2015 Apr 1;5(4):e006211. Available from: <https://bmjopen.bmj.com/content/5/4/e006211.short>
33. Vogel JP, Pujar Y, Vernekar SS, Armari E, Pingray V, Althabe F, Gibbons L, Berrueta M, Somannavar M, Ciganda Á, Rodriguez R, Bendigeri S, Kumar JA, Patil SB, Karinagannanavar A, Anteen RR, Ramachandrappa PM, Shetty S, Mallesh MH, Kushtagi P, Hofmeyr GJ, Derman R, Goudar S. Effects of the WHO Labour Care Guide on cesarean section in India: a pragmatic, stepped-wedge, cluster-randomized pilot trial.
34. Pandey D, Bharti R, Dabral A, Khanam Z. Impact of WHO Labor Care Guide on reducing cesarean sections at a tertiary center: an open-label randomized controlled trial. *AJOG Global Reports*. 2022 Aug;2(3):100075.
35. Bergholt T, Østberg B, Legarth J, Weber T. Danish obstetricians' personal preference and general attitude to elective cesarean section on maternal request: A nation-wide postal survey. *Acta Obstetrica et Gynecologica Scandinavica*. 2004 Feb 16;83(3):262-6.
36. Cammu H, Martens G, Keirse MJNC. Mothers' Level of Education and Childbirth Interventions: A Population-based Study in Flanders, Northern Belgium. *Birth*. 2011 May 20;38(3):191-9.
37. Khasawneh W, Obeidat N, Yusef D, Alsulaiman JW. The impact of cesarean section on neonatal outcomes at a university-based tertiary hospital in Jordan. *BMC Pregnancy and Childbirth*. 2020 Jun 1;20(1).
38. Chugh A, Lal S, Nijhavan T, Biradar P. Evaluation of primary cesarean section and neonatal outcomes in a tertiary care hospital and impact on current obstetric practice. *European Journal Of Obstetrics & Gynecology And Reproductive Biology: X*. 2023 Sep 1;19:100213-3.
39. Tefera M, Assefa N, Roba KT, Gedefa L. Adverse Neonatal Outcome are More Common among Babies Born by Cesarean Section than Naturally Born Babies at Public Hospitals in Eastern Ethiopia: A Comparative Prospective Follow-Up Study at Eastern Ethiopia. *Global Pediatric Health*. 2021 Jan;8:2333794X2110183.