

Original Article

## A STUDY ON THE TREND OF VAGINAL DELIVERY VERSUS CAESAREAN SECTION- AN INSTITUTIONAL RECORD BASED RETROSPECTIVE OBSERVATIONAL STUDY

Rahul Chaudhury, Gairik Bera✉, Ranita Roy Chowdhury, Manidip Pal

### ABSTRACT

**Background:** Even though the caesarean section is an essential component of comprehensive obstetric and new born care for reducing maternal and neonatal mortality. But this increasing trend of Caesarean section has not always resulted to a guaranteed quality improvement in perinatal outcome.

**Objective:** The aim of this study is to estimate and compare rates of delivery modes, indications and outcomes of caesarean section.

**Method:** A retrospective record based observational study of last 7 years (January 2013 to December 2020) in our institute, College of Medicine and JNM Hospital.

**Results:** The caesarean section rate increased 16.74% in last 7 years. Age of the mother, parity, previous caesarean and delayed referral were some of the important determinants of caesarean section rates. The most common indications of caesarean section were previous caesarean section (22.36%), PIH (14.38%), foetal distress (12.75%), breech (8.22%) and prolonged labour (3.0%)

**Conclusion:** Encouraging vaginal delivery improves foetal and maternal health and changes the existing beliefs and attitude towards safe mode of delivery.

**Key words:** fetal health, maternal health, safe delivery

### INTRODUCTION

“The art of surgery has not replaced the older art of obstetrics; it has only softened it, for it is of gentler kind.” Marshall 1955

Caesarean section (CS) is being a part of the standard care in modern obstetrics. During the last 50 years, institutionalization of delivery has

made childbirth a safer event. Goal of Caesarean section is better maternal and neonatal outcome in certain clinical situations where vaginal delivery is not a safe option. The indications for a caesarean section have changed over the time. Today, Caesarean Section is an active part of obstetrical practice with aims to improve clinical performance and perinatal outcome.

The rate of Caesarean Section has been used in many healthcare settings as an indicator of obstetrical performance. In 1985, the World Health Organization (WHO) proposed that, of all births, the percentage of caesarean sections should be between 5 and 15%; a percentage lower than 5% would suggest a limitation in the performance of caesarean sections, while a higher percentage of caesarean sections would not represent additional benefits<sup>1</sup>. Over the last decades, obstetrics has evidenced a notorious increase in the rate of caesarean sections. The increasing number of institutional births has resulted improvements in foetal and neonatal care and also in a growing number of caesarean sections. Significant factors are responsible for increasing trend of Caesarean Section in first-and third-world countries as health models, the standard of obstetrical care and cultural influences, other factors related are limited training in instrumented vaginal delivery among the younger generations of obstetricians, optimization of time, minimizing possible legal medical complications, and evident improvements in surgical and anaesthetic safety<sup>2</sup>. Finally, new phenomena like acceptance of Caesarean Section upon maternal request without any medical indications as a valid indication in the modern practice of obstetrics also contributors to changes in Caesarean Section rates.

Unfortunately, this increasing trend of Caesarean section has not always resulted to a guaranteed quality improvement in perinatal outcome. This worldwide concerning trend of an increasing caesarean rate has been reported and analysed not only from the perspective of reproductive medicine but also as a neonatal, financial, public health, legal, and ethical issue.

## MATERIALS AND METHODS

A retrospective observational study conducted at the College of Medicine and JNM Hospital,

WBUHS, Kalyani, Nadia, West Bengal, India. The study period was from January 2013 to December 2020. The data was obtained from the computerized data entry register of the hospital. Yearly data (January- December) of 2013 and 2020 were collected from the HMIS (Health Management Information System) sheet for annual performance comparison. Data relevant to delivery were collected, rest of the details regarding indications and type of caesarean sections were noted down from the OT register.

**Inclusion Criteria:** All deliveries that took place during the study period.

Perinatal outcome was determined in terms of number of live births per total deliveries conducted in the institute.

## STATISTICAL ANALYSIS

All data are registered on Microsoft Excel 2019, Version 16.0 spread sheet. Data analysis was done, table created after data compilation and interpretation is made.

## RESULTS

In our study all mothers were divided according to their mode of delivery (i.e. vaginal or C-section) according to their age. **Table 1** is showing that vaginal delivery rate is high in-between 20-24 years age group, whereas C-section is mostly (41.32 %) among 25-30 years age group mothers. There is very high number of un-booked cases in our hospital; most of them are referred from peripheral hospitals. Primipara mothers have delivered maximum vaginal birth (61.05%) successfully; C- Section rate is very high among multigravida mothers (55.47%). Most of the mothers delivered vaginally are term gestation (84.66 %), about (23.56 %) C-section mothers are in pre-term gestation. Mothers delivered vaginally have maximum percentage (83.68%) of babies with birth weight >2.5kg, significant number of C-Section mothers (21.67 %) have low birth weight baby.

Category	Mode of Delivery			
	Vaginal Delivery		LSCS	
	Percentage (%)	No of subjects	Percentage (%)	No of Subjects
<b>AGE</b>				
<20yrs	12.94	4450	05.51	1353
20-24yrs	44.36	15255	34.87	8561
25-30yrs	30.54	10502	41.32	10145
>30yrs	12.16	4182	18.30	4493
<b>BOOKING STATUS</b>				
Booked	23.64	8129	31.58	7753
Un-booked	76.36	26260	68.42	16299
<b>PARITY</b>				
Primi	61.05	20994	44.53	10933
Multi	38.95	13395	55.47	13619
<b>GESTATIONAL AGE</b>				
Pre-term	15.34	5275	23.56	5784
Term	84.66	29114	76.44	18768
<b>BIRTH WEIGHT</b>				
<2.5kg	16.32	5612	21.67	5320
>2.5kg	83.68	28777	78.33	19232

Table 1: Demographic distribution of mode of delivery

As shown in **Table 2** and **Figure 1** total no of vaginal delivery from Jan'2013 to Dec'2020 is about 34389 (58.34 %) where no of C-section are 24552 (41.66 %)

Mode of Delivery	Percentage (%)	No of Subjects
Vaginal Delivery	58.34	34389
C-Section	41.66	24552

Table 2: Institutional Delivery mode for last 7years

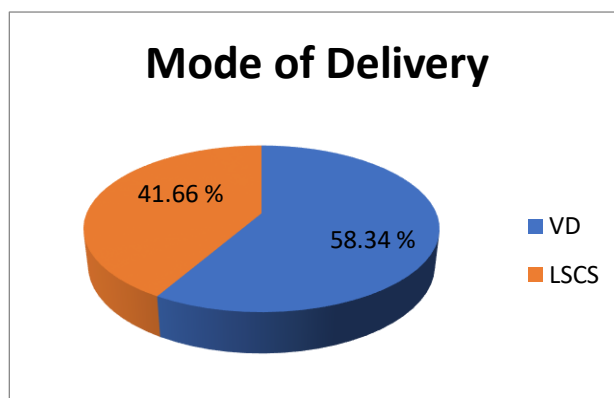


Figure 1: Institutional rate of delivery mode

In our hospital there is a very high number of emergency C-section (79.24 %), most of the emergency cases are referred cases from peripheral centres (Table 3).

Type of C-Section		
	Percentage (%)	No of Subjects
Emergency	79.24	19457
Elective	20.76	5095

Table 3: Institutional rate of different types of C-section

Figure 2 showing a very high number of C-section is for previous caesarean section (22.36 %) followed by pregnancy induced hypertension (14.38 %), foetal distress (12.75 %), oligohydramnios (12.04 %) etc.

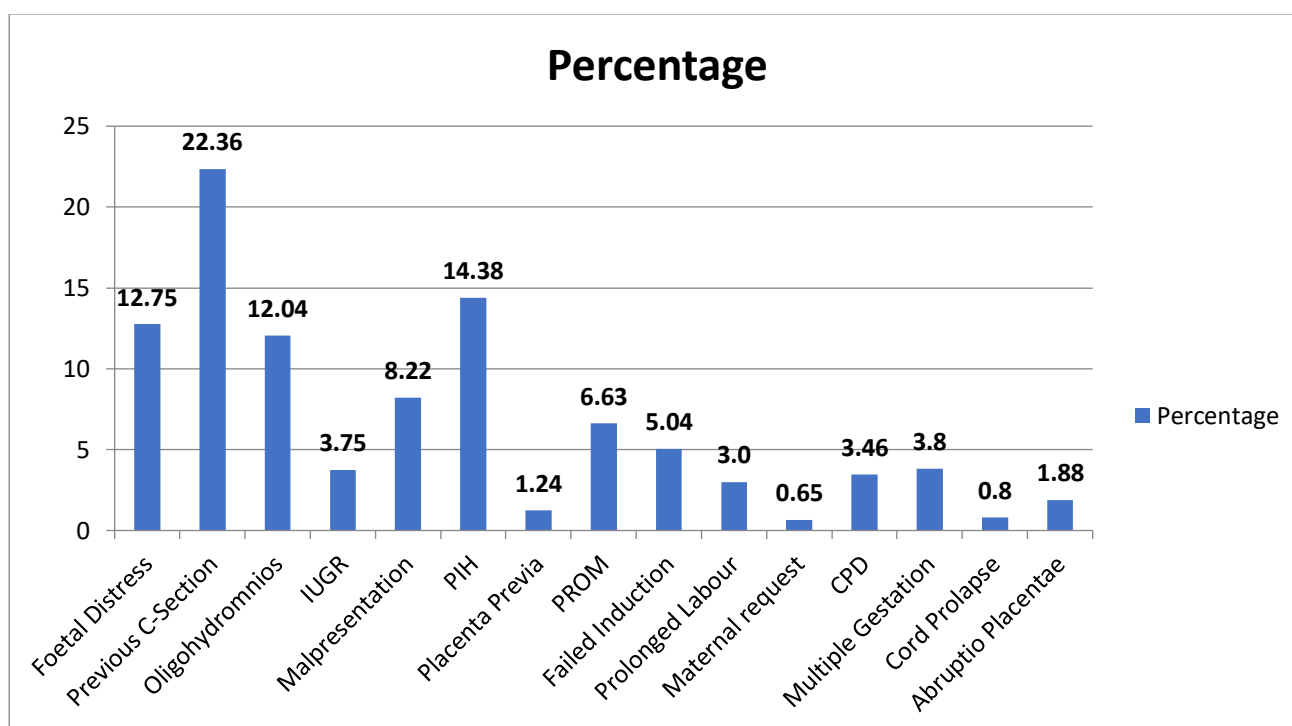


Figure 2: Indications of C-Section

Table 4 reflects the annual trend of delivery in the institute, with maximum number of deliveries in 2017. Maximum number of C-section was done in 2019 (3984), about 52.48% of total delivery. In the year 2013 maximum number of vaginal deliveries was performed (4919) about 69.99% of total delivery.

Year	Vaginal Delivery		C-Section		Total Delivery
	Percentage (%)	No of Subjects	Percentage (%)	No of Subjects	
2013	69.99	4919	30.01	2110	7029
2014	63.83	4828	36.17	2736	7564
2015	60.45	4475	39.55	2929	7404
2016	61.81	4531	38.19	2800	7331
2017	59.57	4829	40.43	3278	8107
2018	50.43	3738	49.57	3675	7413
2019	47.52	3607	52.48	3984	7591
2020	53.25	3462	46.75	3040	6502

Table 4: Number and Rate of Vaginal and C-Section Delivery Data Annually

**Figure 3** showing institutional trend of vaginal and C-Section trend over the years from 2013 to 2020. There is progressive decline in vaginal delivery rate and increase in C- section rate. In the year 2019 there was more C- section than vaginal delivery.

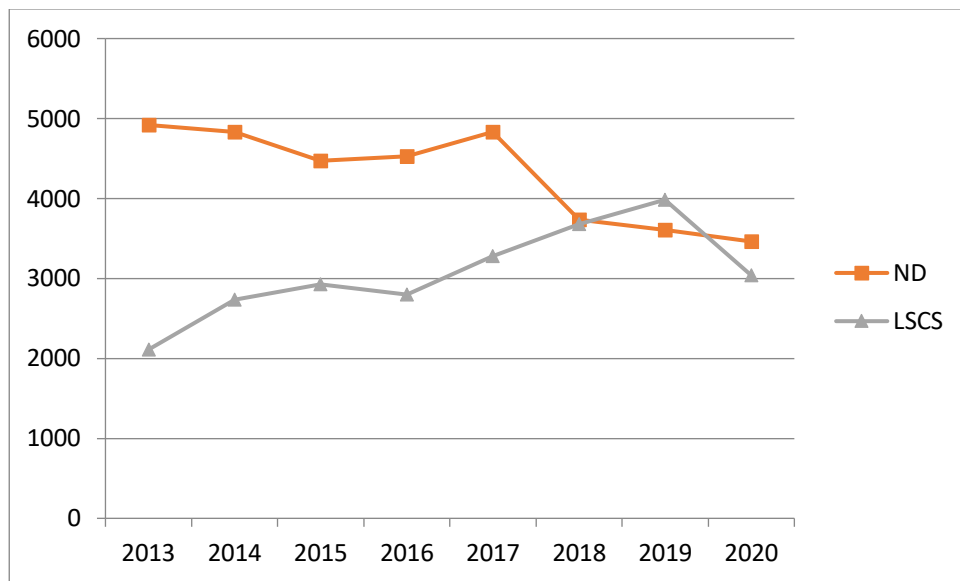


Figure 3: Institutional trend of Vaginal and C-Section( 2013 - 2020)

**Table 5** shows total 1625 number of still births (2.75%) among 58941 total births from 2013 to 2020.

	No of Subjects	Percentage (%)
<b>Live Birth</b>	57316	97.25
<b>Still Birth</b>	1625	2.75

Table 5: Perinatal Outcome

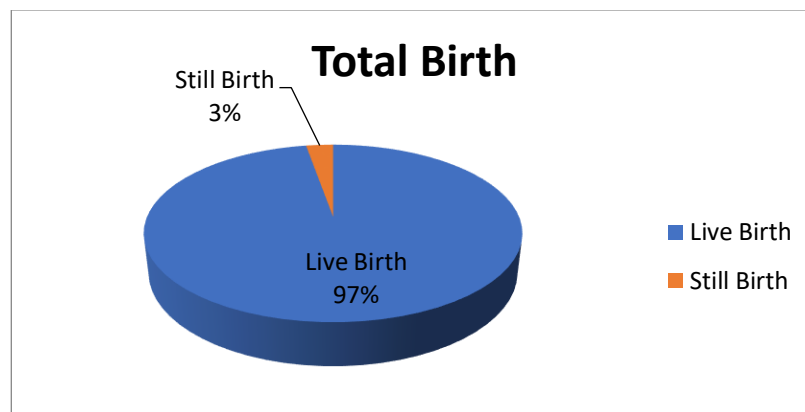


Diagram 04: Perinatal Outcome

## DISCUSSION

In the days of modern obstetrics, focus of obstetrics thinking has changed increasingly towards the perinatal survival and prevention of birth trauma to the baby. The awareness of perinatal mortality and morbidity associated with safety of caesarean, expert anaesthesia, potent antibiotics, blood transfusion facilities and better

neonatal care have increased incidence of caesarean section very fast<sup>3</sup>.

Over the last years, the unprecedented and steady rise in the rates of C-Section have led to increased research, debate and concern among healthcare professionals, governments, policy-makers, scientists and clinicians all over the world. It also raises the possibility of negative impact on

maternal and neonatal health<sup>4</sup> which has received support from a number of studies<sup>5,6,7</sup>.

In Table 01, there is increased number of C-Section between 25-30 years of age. This may be due to most of 2<sup>nd</sup> gravidae mothers who had previous C-Section fall into this age group.

We also found higher C-Section among Un-booked (68.42 %) cases rather booked (31.58 %) cases. In our institute there is very high number of un-booked referred cases from peripheral hospitals who underwent emergency C-Section. Adequate antenatal visits, timely referral can significantly reduce emergency C-Section number in our hospital. A study done by Jaspinder Kaur in Punjab, India shown similar result, about 55.38% un-booked case went through C-section<sup>8</sup>.

C-Section among multigravida (55.47%) is much higher rather primi gravida (44.53%). However, a study done in Brazil by D'Orsireports an association between primiparity and Caesarean Section<sup>9</sup>. This increased no of C-Section among multigravida may be due to over-estimation of risk among previous C-section patients.

Our study has shown that higher number of preterm babies (23.56%) were associated with C-Sections. Though the occurrence of birth asphyxia, trauma and meconium aspiration is reduced by Caesarean deliveries but the risk of respiratory distress, surfactant deficiency and pulmonary hypertension is increased. There occurs a physiological event in last few weeks of pregnancy coupled with onset of spontaneous labour which is accompanied by hormonal changes in foetus & its mother resulting in preparation of foetus for neonatal transition<sup>10</sup>. It also leads to increase in workload and costs in neonatal unit because a significantly higher transfer rate to Neonatal Intensive Care Unit (NICU) is observed among this group<sup>11</sup>.

The Caesarean Section rate in our institute increased 16.74% in last 7 years: 2013: 30.01 %, 2020: 46.75 %, in the United States caesarean section rate has also increased dramatically during the last 50 years 1970: 5%, 1990: 23.5% and 2016: 31.9%.<sup>12, 13</sup>.

The rising caesarean section rate in the United Kingdom continues to generate many debates in Scotland. The caesarean rate rose from 8.5% in 1975 to 16% in 1994. In 1985, the WHO stated that the CS should not exceed 15% in any population group.<sup>1</sup> In last decades, an invariable upward

trend has been evident mainly in low- and middle-income countries, China (64.1%), Columbia (46.4%), Dominican Republic (56.4%), Egypt (51.8%), Iran (47.9%) and Brazil (55.6%), 80% for second deliveries when the first was by caesarean, are some examples.<sup>14,15</sup>

At all India level, the rate has increased from 2.9% of the child birth in 1992-93 to 7% in 1988-99 and further to 10.2% in 2005-06, according to NFHS data sets.<sup>16</sup>

In our study we have found 41.66 % of total deliveries are by C-section for last 7 years. Which is significantly high compared to WHO recommendation.<sup>1</sup> This may be due to our institute is tertiary care hospital receiving high risk cases from 3 districts Nadia, North 24 Pgs and Hooghly. This also explains very high rate of emergency C-Section (79.24 %) in our hospital (Table 3).

We have seen high number of C-Section is indicated for Previous C-Section, Pregnancy induced hypertension, Foetal distress, oligohydromnioscases (Diagram 02).

In our institute most, common indication is previous C-Section. Though the rate of uterine rupture is very low, the over estimation of risk decreases no of TOLAC (Trial of Labour After Caesarean) in our hospital. McMahan et al<sup>17</sup> has noted that higher rate of maternal and foetal morbidity exists with VBAC as compared to Elective Caesarean Section which has been also supported by Crowther et al.<sup>18</sup>

Pregnancy Induced Hypertension is 2<sup>nd</sup> most frequent cause of C-Section in our hospital. Due to lack of awareness in the population regarding regular antenatal check-up leads to delayed diagnosis of PIH, fatal complications, last moment referral are rising emergency C-section requirement for termination of pregnancy. Careful antenatal check-up can also decrease incidence by early detection and intervention of Oligohydromnios, Intrauterine growth restriction cases.

Foetal Distress was 3<sup>rd</sup> most common cause in our institute, foetal distress is diagnosed by Foetal Heart Rate and presence of meconium stained amniotic liquor. However, accurate method of diagnosis foetal distress is to perform foetal scalp blood pH estimation which is considered a gold standard for assessing foetal wellbeing but is not done at our set up. Cardiotocography monitoring



is known to overestimate foetal distress.<sup>19</sup> In the study we have found an alarming rising trend of C-Section over the years which is mostly due to-

- Delayed diagnosis and referral of high-risk cases
- Decreased tolerance for foetal risk(Routine C-Section for breech pregnancy)
- Avoiding perianal trauma (Preferring C-Section over Forceps Delivery)
- Decreased VBAC rate(Over estimation of risk)
- Lack of obstetrical skills among obstetricians (vaginal breech, Operative vaginal delivery, vaginal twin delivery etc.)
- Maternal Obesity

Fear of litigation, health insurance system, Caesarean Section by maternal choice are influencing Caesarean delivery rate.

Limitations of the study were due to its inappropriate record of follow up of both mothers and the neonate. This being a data based retrospective study the same was not possible.

## CONCLUSION

Encouraging vaginal delivery improves foetal and maternal health and changes the existing beliefs and attitude towards safe mode of delivery. Potential complications of caesarean section should be explained in case of caesarean section simply on maternal request and may even incur several risks for the child.

It is essential to bring down the unnecessary caesarean section rates. According to the WHO, 15% of deliveries have precise indication for caesarean section where it is mandatory for the preservation of maternal and/or foetal health. Increasing rates of Lower Segment Caesarean Sections puts forward various question that, whether a LSCS need to be reflected as a normal delivery in this twenty first century.

## References

1. World Health Organization. Appropriate technology for birth. *Lancet*. 1985; 2: 436-7.
2. Trends in Cesarean Section by Andres Sarmiento, Universidad de los Andes, Bogota,

Columbia, 2018. Available at: <https://dx.doi.org/10.5772/intechopen.77309>. Accessed on 4 th January 2020. J. Thomas, S. Paranjothy, London: RCOG Press, 2001.

3. Changing trends in cesarean section: from 1950 to 2020 *Babulal S. Patel, NoopurKedia, Sushma R. Shah, Saumya P. Agrawal, Vismay B. Patel, Adwait B. Patel* DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20201842>
4. M. Wagner, *Lancet*, 2000, 356,1677.
5. J. Thomas, S. Paranjothy, London: RCOG Press, 2001.
6. J. Villar, E. Valladares, D. Wojdyla, N. Zavaleta, G. Carroli, A. Velazco, *Lancet* 2006,367,1819.
7. M.H. Hall, S. Bewley, *Lancet*, 1999,354,776.
8. Current trend of caesarean sections and vaginal births, JaspinderKaur, Sargun Singh and KawaljitKaurPelagia Research Library *Advances in Applied Science Research*, 2013, 4(4):196-202 ISSN: 0976-8610
9. E. D'Orsi, D. Chor, K. Giffin, A. Angulo-Tuesta, G.P. Barbosa, A.S. Gama, A.C. Reis, *Cad. Saúde Pública.*,2006,22,2067
10. A. Ramachandrappa, L. Jain, *ClinPerinatol.*, 2008,35,373.
11. T. Kolas, O.D. Saugstad, A.K. Daltveit, S.T. Nilsen, P. Øian, *American Journal of Obstetrics and Gynecology*,2006,195,1538.
12. Kerr JMM. The technique of cesarean section, with special reference to the lower uterine segment incision. *Am J ObstetGynecol* 1926;12:729-34
13. Recent trends in cesarean delivery in the United States. Factsheet: NCHS Data Brief, September 2017. Available at: <https://www.cdc.gov/nchs/products/databriefs/db287.htm>. Accessed on 2 nd December 2019.
14. Chalmers. Appropriate technology for birth. *Lancet*. 1985;2(8452):436-7.
15. Betran AP. The increasing trend in cesarean section rates: Global, regional and national estimates: 1990 - 2014. *Plos One*. 2016;11(2):e0148343.

16. Beogo I. Determinants and materno-fetal outcomes related to cesarean section delivery in private and public hospitals in low-and middle-income countries: A systematic review and meta-analysis protocol. *BMC Syst Rev.* 2017;6(1):5.
17. M.J. McMahon, E.R. Luther, W.A. Bowes, A.F. Olshan, *N Engl J Med.*, 1996,335,689.
18. C.A. Crowther, J.M. Dodd, J.E. Hiller, R.R. Haslam, J.S. Robinson, *PLoS Med.*, 2012,9, e1001192
19. M. Dabbas, A. Al-Sumadi, *ClinExpObstet Gynecol.*, 2007,34,146.

*Received: 05.01.2021*

*Accepted: 12.01.2021*

*Published online: 15.01.2021*

*Citation:* Chaudhury R, Bera G, Roy Chowdhury R, Pal M. A study on the trend of vaginal delivery versus caesarean section- An institutional record based retrospective observational study. *J Indian Acad Obstet gynecol.* 2021;2(2):18-25.

Dept of Obs. & Gyn, College of Medicine & JNM Hospital,  
Kalyani, West Bengal

✉ Email: gairikbera10@gmail.com