Original Research Article

A Study of the indications of caesarean section in a tertiary care hospital at West Bengal: An observational study

Biswajyoti Guha[1], Mayur Chakraborty[2], Syed Shahnawaz Al Hossaini[3*], Ayon Mitra[3], Biswajit Mukherjee[4], Tapan Kumar Chatterjee[5], Tapan Kumar Maity[6]

[1]Associate Professor,Department of Obstetrics & Gynaecology,ICARE Institute of Medical Sciences and Research,Haldia, Purba Medinipur 721645, West Bengal, India
[2]Research Scholar, Department of Pharmaceutical Technology, Faculty of Engineering and Technology, Jadavpur University, Kolkata 700032, West Bengal, India
[3]Assistant Professor,Department of Obstetrics & Gynaecology,ICARE Institute of Medical Sciences and Research Haldia, Purba Medinipur 721645, West Bengal, India
[4]Professor, Department of Pharmaceutical technology, Faculty of Engineering and Technology, Jadavpur University, Kolkata 700032 West Bengal, India
[5]Coordinator (M Pharm. Course in Clinical Pharmacy & Pharmacy Practice), Department of Pharmaceutical Technology, Faculty of Engineering and Technology, Jadavpur University, Kolkata 700032 West Bengal, India
[6]Professor & Head, Department of Pharmaceutical Technology, Faculty of Engineering and Technology, Jadavpur University, Kolkata 700032 West Bengal, India

Received: 30-10-2020 / Revised: 20-11-2020 / Accepted: 10-01-2021

Abstract

Background: In recent decades, we have observed a remarkable increase in the rate of caesarean section (CS) in both developed and developing countries, especially in India. Its prevalence has increased alarmingly in the last few years, which has motivated this research to identify the indications and determinants, influencing cesarean section delivery in the study area and determine the associated correlates for emergency and elective cesarean sections. **Materials & Methods:** The prospective study was conducted at a tertiary care hospital with all pregnant women undergoing elective and emergency caesarean section. Interval between the time of administration of antibiotic & time of delivery was assessed. Data on the use of antibiotic prophylaxis in caesarean sections was collected using a customized proforma. Other data included were indication for caesarean section, route of administration of antibiotics, type of antibiotics, dosage of antibiotics, time of incision, and duration of operation. All the methods were compared to Hospital protocol and NICE protocol. Its prevalence has increased alarmingly in the last few years, which has motivated this research to identify the indications and determinants, influencing cesarean section delivery in the study area and determine the associated correlates for emergency and elective cesarean sections. Results were expressed as proportions, percentages & as averages +/- standard deviation (SD) with corresponding ranges. **Results:** The mean age (mean ± s.d.) of the patients was 28.94±3.88 years with range 19 - 42 years and the median age was 29 years. Test of proportion showed that proportion of single gravidity 216(70.8%) was significantly higher than that of multi-gravidity 89(29.2%) (Z=8.74;p=0.000001). Most of the caesarean section 26(8.5%) were underwent as per maternal wish (Z=1.21;p=0.47). Most of the patients 280(91.8%) had intact membrane as compared to ruptured membrane 25(8.2%) (Z=10.19;p=0.000001). The mean duration of surgery (mean± s.d.) of the patients was 75.13±16.96 minutes with range 35-148 minutes and the median was 75 minutes. Most of the surgeries 250 (82%) were performed between 60-89 minutes which was significantly higher (Z=8.04;p=0.00001). **Conclusion:** Caesarean sections are effective in saving maternal and infant lives, but only when they are required for medically indicated reasons. Unnecessary cesarean section may have an adverse impact upon maternal, neonatal, and infant morbidity and mortality. The high cost of cesarean section may result in catastrophic health expenditure for families and additional pressure upon health systems, especially in low- and middle-income countries.

Keywords: Caesarean section, indications, observational study

Introduction

Caesarean sections are effective in saving maternal and infant lives, but only when they are required for medically indicated reasons. At population level, caesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates. Caesarean sections can cause significant and sometimes permanent complications, disability or death particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications. Caesarean sections should ideally only be undertaken when medically necessary [1, 2]. In 2011, WHO conducted a systematic review of systems used to classify caesarean section, and concluded that the Robson classification is the most appropriate system to fulfil current international and local needs. WHO recommended building upon this to develop an internationally

**Correspondence*
Dr. Syed Shahnawaz Al Hossaini
Assistant Professor,Department of Obstetrics & Gynaecology, ICARE Institute of Medical Sciences and Research Haldia, Purba Medinipur 721645, West Bengal, India
E-mail: snhossaini@gmail.com

applicable caesarean section classification system [3]. The system classifies all women into one of 10 categories that are mutually exclusive and, as a set, totally comprehensive. The categories are based on five basic obstetric characteristics that are routinely collected in all maternities: parity (nulliparous, multiparous with and without previous caesarean section); onset of labour (spontaneous, induced or pre-labour caesarean section); gestational age (preterm or term); foetal presentation (cephalic, breech or transverse); and number of foetuses (single or multiple) [2].According to the WHO systematic review, if the increase in CS rate was between 10% and 15%, the maternal and neonatal mortality was decreased [4-6]. However, above this level, increasing the rate of CS is no longer associated with reduced mortality [5]. What is more, unexpected long-term risks of CS continue to be reported such as ectopic pregnancy, unexplained stillbirth, placenta previa, placenta abruption,[7, 8] haemorrhage and hysterectomy, endometriosis, increased hospital readmission and even an increase in gallbladder disease and appendicitis [9, 10]. It is also worth noting that increasing evidence suggests that cesarean delivery jeopardizes infant, child, and even adult health [6]. It was reported that CS delivery can increase the rate of cardio metabolic disease (childhood overweight and obesity, type 1 diabetes), autoimmune and inflammatory disorders (allergic rhinitis, food allergy and atopy, asthma, celiac disease, inflammatory bowel disease), and autism [11]. Unnecessary cesarean section may have an adverse impact upon maternal, neonatal, and infant morbidity and mortality. The high cost of cesarean section may result in catastrophic health expenditure for families and additional pressure upon health systems, especially in low- and middle-income countries [12, 13]. Therefore, the overuse of cesareans is a real public health concern and it is urgent to reduce the rate of CS. To date, no consensus has been reached on the main factors driving the cesarean epidemic. Its prevalence has increased alarmingly in the last few years, which has motivated this research to identify the indications and determinants, influencing cesarean section delivery in the study area and determine the associated correlates for emergency and elective cesarean sections.

Materials and methods

Study Design: It was a prospective observational single centre study.
Study Setting: The data was collected from the patient's file in the nursing station within the hospital premises. The hospital was a tertiary care hospital [Vision Care Hospital-a unit of AMRI (Advanced Medical Research Institute) Hospital, Kolkata]
Study Duration: The study was conducted over a period of 9 months starting from July 2014 & continued till March 2015.
Inclusion Criteria: All the pregnant women undergoing caesarean delivery in tertiary care hospital were included in the study.
Exclusion Criteria: Those women who were already on antibiotics were excluded from the study.
The prospective study was conducted at a tertiary care hospital with all pregnant women undergoing elective and emergency caesarean section. Interval between the time of administration of antibiotic & time of delivery was assessed. Data on the use of antibiotic prophylaxis in caesarean sections was collected using a customized proforma. Other data included were indication for caesarean section, route of administration of antibiotics, type of antibiotics, dosage of antibiotics, time of incision, and duration of operation. All the methods were compared to Hospital protocol and NICE protocol. Its prevalence has increased alarmingly in the last few years, which has motivated this research to identify the indications and determinants, influencing cesarean section delivery in the study area and determine the associated correlates for emergency and elective cesarean sections. All raw data was recorded in Excel (Microsoft Windows 2007 Home-Basic version; Microsoft Office 2007) sheet. Results were expressed as proportions, percentages & as averages +/- standard deviation (SD) with corresponding ranges. Institutional ethics committee permission was taken.

Results

Data collection process for this study was started from July 2014 & continued till March 2015.Total data of 305 pregnant women undergone caesarean section was included in the study. The collected data were statistically analysed & compared with hospital protocol & NICE protocol.Statistical Analysis was performed with help of Epi Info (TM) 3.5.3. EPI INFO is a trademark of the Centers for Disease Control and Prevention (CDC). Descriptive statistical analysis was performed to prepare the tables with corresponding percentages. Test of proportion was used to find the Standard Normal Deviate (Z) to compare the difference proportions and Chi-square (x^2) test was performed to find the associations. $p \leq 0.05$ was taken to be statistically significant.

Table 1: Age distribution

Age Group (in years)	Number	%
<20	4	1.3%
20-29	173	56.7%
30-39	125	41%
≥40	3	1%
Total	305	100%

The mean age (mean ± s.d.) of the patients was 28.94±3.88 years with range 19 - 42 years and the median age was 29 years. Test of proportion showed that proportion of patients in the age group between 20-29 years (56.7%) was significantly higher than other groups (Z=1.98;p=0.04) [Table 1].

Table 2: Distribution of booking weight

Weight (in kg)	Number	%
<60	3	1%
60-69.9	62	20.3%
70-79.9	152	49.8%
80-89.9	74	24.3%
≥90	14	4.6%
Total	305	100%

The mean weight (mean ± s.d) of the patients was 76.65±7.53 kg with range 58.7-91 kg and the median weight was 76.8 kg [Table 2]. Test of proportion showed that proportion of patients with weight between 70-79 kg (49.8%) was significantly higher (Z=3.22;p=0.00001).

Table 3: BMI distribution

BMI (in kg/m^2)	Number	%
20-24.9	0	0%
25-29.9	73	23.9%
>30	232	76.1%
Total	305	100%

The mean BMI (mean± s.d.) of the patients was 30.51±1.25 kg/m^2 with range 27.16- 33.31 kg/m^2 and the median BMI was 30.47 kg/m^2 [Table 3].

Table 4: Gravidity distribution

Gravidity	Number	%
1	216	70.8%
2	89	29.2%
Total	305	100%

Test of proportion showed that proportion of single gravidity 216(70.8%) was significantly higher than that of multi-gravidity 89(29.2%) (Z=8.74;p=0.000001) [Table 4].

Table 5: Distribution of parity

Parity	Number	%
P0+0	38	12.5%
P0+1	237	77.7%
P1+0	1	0.3%
P1+1	23	7.5%
P1+2	6	2.0%
Total	305	100%

Most of the patients 237 (77.7%) had parity as P0+1 followed by patients 38 (12.5%) parity as P0+0 which were significantly higher than other parities (Z=7.73; p=0.00001). Only 1 patient had P1+0 [Table 5]. Most of the caesarean section 26(8.5%) were underwent as per maternal wish (Z=1.21;p=0.47) [Table 5/Fig. 1].

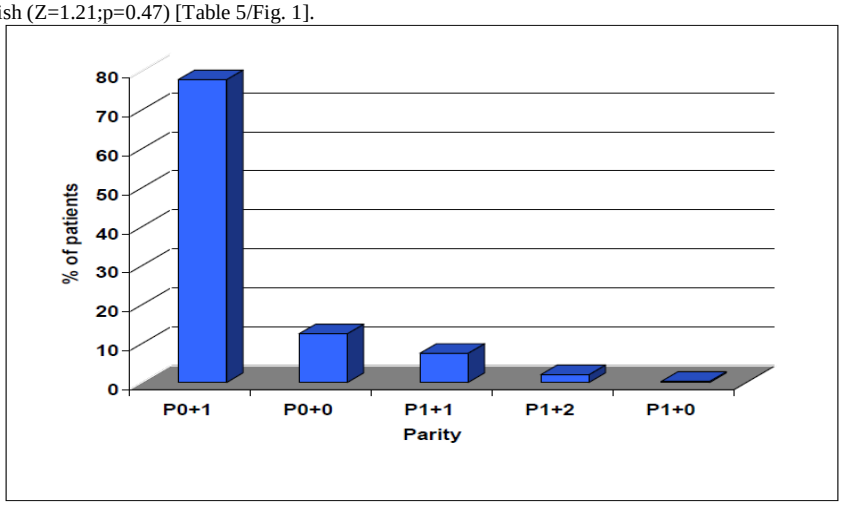

Fig 1: Graphical representation of distribution of parity

Table 6: Indication for caesarean section

Indication for caesarean section	**Number**	**%**
Secondary gravida with PROM &hypothyroidism	6	2%
34 wks pregnancy with GDM	3	1%
36 wks pregnancy for C/S	6	2%
36 Wks pregnancy for C/S with less foetal movement	7	2.3%
At 34 wks with less foetal movement & irritable uterus	10	3.3%
At 37 weeks with pre-term labour	3	1%
At term With high floating head	3	1%
At term with SLE & nephritis	7	2.3%
Elective LUCS	8	2.6%
Elective LUCS, P0+0 at term Rh-ve pregnancy with IUGR for safe confinement	3	1%
G2P1, once passed CS with hypothyroidism	2	0.7%
GDM on insulin 37 weeks	3	1%
High floating head	3	1%
IVF baby at term for safe confinement	3	1%
Maternal wish	26	8.5%

P0+0 at 34weeks with HTN	6	2%
P0+0 at 37 wks with raised BP & floating head	6	2%
P0+0 with oligoamnios and IOGR at 36 weeks with less foetal movement	4	1.3%
P0+1 at term with CPD	18	5.9%
P0+1 at term with high floating head	15	4.9%
P1+1,Post-CS at 36 wks with IUGR+ oligohydramnios	17	5.6%
P1+2 at 36 wks, Post-CS PIH	12	3.9%
Post C/S at 30 wks leaking in early labour	14	4.6%
Post C/S at term with fibroid anterior wall	4	1.3%
Pregnancy at term with GDM, Rh-ve Pregnancy	7	2.3%
Pregnancy at term with high floating head	3	1%
Pregnancy at term with IUGR	4	1.3%
Pregnancy at term with PIH	9	3%
Pregnancy full favour for LUCS	6	2%
Preterm IUGR, oligohydramnios with no foetal movement	14	4.6%
Prime at 37 weeks with hypothyroidism	4	1.3%
Prime gravida postdated pregnancy	6	2%
Prime gravida with fibroid uterus	6	2%
Prime gravida with PET at 32 weeks with CTG	4	1.3%
Prime PIH IUGR with PROM	6	2%
Primigravida at 30 wks with thin IVF Pregnancy with PROM	14	4.6%
Primigravida at 36 wks, 5 days in early labour	7	2.3%
Primigravida at 38 wks with non Progress of labour	3	1%
Primigravida at term with fibroid	3	1%
Primigravida at term with IUGR with reduced foetal movement	5	1.6%
Primigravida with jaundice at 36 wks	4	1.3%
PROM 34 weeks ,suspicious CBG	2	0.7%
Severe IUGR with anhydramnios in labour at 35 wks	3	1%
With shortness of breath & hypothyroidism	6	2%
Total	305	100%

Most of the caesarean section 26(8.5%) were underwent as per maternal wish (Z=1.21;p=0.47) [Table 6].

Table 7: Amniotic membrane during operation

Amniotic membrane during operation	Number	%
Intact	280	91.8%
Ruptured	25	8.2%
Total	305	100%

Most of the patients 280(91.8%) had intact membrane as compared to ruptured membrane 25(8.2%) (Z=10.19;p=0.000001) [Table 7].

Table 8: Time interval between administration of antibiotic and delivery

Time interval (in minute)	Number	%
<30	61	20%
30-60 (As per hospital protocol)	209	68.5%
>60	35	11.5%
Total	305	100%

The mean time interval between administration of antibiotic and delivery (mean± s.d.) of the patients was 44.99±16.83 minutes with range 5-90 minutes and the median was 45 minutes. Most of the time interval 209(68.5%) were as per hospital protocol which was statistically significant (Z=5.79; p=0.0001) [Table 8].

Table 9: Duration of surgery

Duration of surgery	Number	%
30-59	15	4.9%
60-89	250	82.0%
90-119	32	10.5%
120-149	8	2.6%
Total	305	100.0%

The mean duration of surgery (mean± s.d.) of the patients was 75.13±16.96 minutes with range 35-148 minutes and the median was 75 minutes. Most of the surgeries 250 (82%) were performed between 60-89 minutes which was significantly higher (Z=8.04;p=0.00001) [Table 9/Fig. 2].

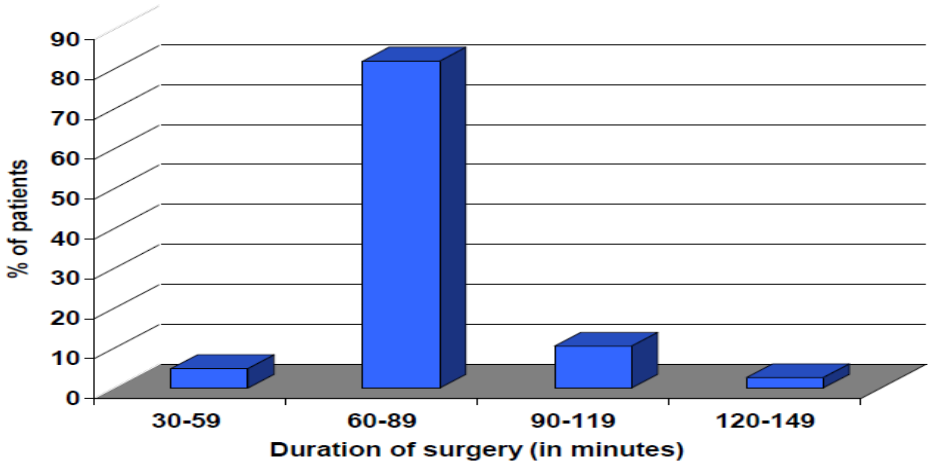

Fig 2: Graphical representation of duration of surgery

Discussion

Caesarean delivery is becoming more & more prevalent now a days. Caesarean section is the most important factor associated with postpartum bacterial infections, with a infection rate reported to be 1-25%, which is 5-20 times higher than that of vaginal delivery. Postpartum infection remains to be among the top five causes of pregnancy-related maternal mortality & morbidity worldwide [14]. Following caesarean delivery maternal mortality & morbidity may result from a number of infections including urinary tract infection (UTI) & surgical site infection (SSI), which increase hospital stay & cost per case [15]. In this study, table 1 shows that total 305 no. of patients the mean age (mean ± s.d.) of the patients was 28.94±3.88 years with range 19 - 42 years and the median age was 29 years. It was showed that proportion of patients in the age group between 20-29 years (56.7%) was significantly higher than other groups (Z=1.98; p=0.04). Daniel S et al study [16] showed that the mean age in elective and emergency group was 28yrs and 25yrs respectively.Singh N et al study [13] revealed that age distribution showed that majority of the women were in the age group of 20–29 years, i.e., 67 (77%) in elective and 48 (79%) in emergency cesarean groups, respectively. Eight (9%) and six (9%) women were in the age group of 30–34 years in the elective and emergency cesarean groups, respectively. Similarly, 9% of the women were in the age group of 19 years in both the groups. The percentage of women in the two groups did not differ significantly (χ^2 = 1.0295, P = 0.905)**.** The percentage of primigravida women was higher in emergency cesarean section, whereas the percentage of multigravida women was higher in the elective cesarean section group (χ^2 = 28.1948, P = 0.0001).Liu Y et al study [6] revealed that pregnancy women with age between 25 and 29 years had the lowest CS rate and pregnancy women 35 years old or greater had the highest CS rate. Women 35 years old or greater had as high as 69.08% CS rate. In table 5 shows that most of the patients 237(77.7%) had parity as P0+1 followed by patients 38 (12.5%) parity as P0+0 which were significantly higher than other parities (Z=7.73; p=0.00001). Only 1 patient had P1+0. RF Lamont et al in a study of current debate on the use of antibiotic prophylaxis for caesarean section show similar parities where P0+1 were significantly higher than other parities [17].Test of proportion showed that in the present study proportion of single gravidity 216(70.8%) was significantly higher than that of multi-gravidity 89(29.2%) (Z=8.74;p=0.000001) [Table 4]. Most of the women had 94% and 81% cesarean section in singleton pregnancy in the elective and emergency groups, respectively, whereas 6% and 19% cesarean for multiple pregnancies in the elective and emergency groups, respectively. Reason for the difference of cesarean in multiple pregnancies was that most of the women came directly in labor in emergency [13]. Hofmeyr *et al*. studied that women had planned cesarean section with twin pregnancy [18]. Lee *et al*. also reported the different trends of cesarean delivery for twin births in their study [19]. Chaitanya KT et al study [20] showed, primigravida were high in number (71.2%), followed by multigravida (18.7%), G2A1 in 9.5% and G3A2 in 0.5% [20].In the present study most of the caesarean section 26(8.5%) were underwent as per maternal wish (Z=1.21;p=0.47) [Table 6]. The most frequent indications for elective cesarean sections were previous cesarean section, 29 (33%). Other indications were fetal distress, 17 (19%); malpresentations, 11 (13%); and maternal request, 8 (9%). The main indications for emergency cesarean sections were fetal distress (39 (62%)) and others were previous cesarean section in labor (12 (19%) [13]. Those females who presented with previous history of cesarean had greater chances of elective cesarean section, and it was statistically significant (P = 0.0001). Maternal request was also significantly associated with elective cesarean section (0.022). Those females who had presented with fetal distress had 1.5 times more chances of elective cesarean section, but this was not statistically significant (P = 0.474) [13].In primigravidae, labour related primary caesarean accounted for 46.5% which included failed induction and non - progress of labour. Malpresentations and multifetal gestations constituted 6.5% and 4.5% respectively. APH and PPROM were (n=13) 6.5% each. Foetal distress which included NRFHR and MSAF were 12.5 and 4.5% respectively. 6% of primary caesarean deliveries were done for FGR with doppler abnormality and 2% for macrosomic foetuses. 4.5% of first time operative deliveries had medical co-morbidities like either GDM on insulin or severe and non-severe HDP [21]. Implementation of standard labour management strategies can reduce primary caesarean section rates without compromising maternal or foetal safety [22].The most common indications in Chaitanya KT et al study was found to be fetal distress (32.1%), malpresentations (16.7%), deep transverse arrest (15.9%), CPD (9%) and non-progression of labour (7.4%). The study done by Datta et al also shows a highest indication rate for fetal distress (19.77%) followed by non-progression of labour (17.87%) followed by altered Doppler values with severe FGR (10.26%) [20]. Another study by Das RK et al showed previous LSCS was the leading indication to the CS rate (29.96%) followed by arrest of labour (13.94%), CPD (11.84%), foetal distress (10.97%), breech presentation (5.74%), oligohydroaminous/IUGR (5.21%), failed induction of labour (5.21%), pregnancy induced hypertension(PIH) (4.87%) and multifetal gestation (3.84%), prematurity (3.31%). 12.01% patients had various complications mainly infection (6.27%) and hemorrhage (3.48%) [23].In table 8 shows the mean time interval

between administration of antibiotic and delivery (mean± s.d.) of the patients was 44.99±16.83 minutes with range 5-90 minutes and the median was 45 minutes. It was found that most of the time interval 209(68.5%) were as per hospital protocol which was statistically significant (Z=5.79; p=0.0001).In this study 209 patients out of 305 patients had compliance with Hospital protocol. David C Classen et al on timing of administration of prophylactic antibiotics & the risk of surgical wound infection showed in most of the patients (i.e. 71%) the interval between administration of antibiotic & delivery was in between 30-60 mins prior to skin incision [24].In the present study the mean duration of surgery (mean± s.d.) of the patients was 75.13±16.96 minutes with range 35-148 minutes and the median was 75 minutes. Most of the surgeries 250 (82%) were performed between 60-89 minutes which was significantly higher (Z=8.04 ;p=0.00001).The Dimitrov A et al [25] study was prospective and includes 82 elective and emergent CS. The mean stay of the women in the operating theater is 90 min. The preparation for the anesthesia/analgesia is 23 min (range 8-41). The proper time of the operation is 44.3 min. The opening time of the uterus is 37 sec (10-190) and the closer on two layers is 17 min (10-35). Leaving the visceral and parietal peritoneum unsutured can spare 5.5 min. The elective CS takes more time than the emergent one [25]. Rameshkumar R et al [26] revealed that thirteen patients had previous one Lower Segment Cesarean Section (LSCS), sixteen had two LSCS and one had three LSCS. Commonest indication was abnormal uterine bleeding followed by leiomyoma of uterus. Mean duration of surgery was 97 min [25].

Conclusion

The rate of caesarean section is increasing with time. Individualization of the indication and careful evaluation, following standardized guidelines, practice of evidenced-based obstetrics and audits in the institution, can help us limit CS. Individualization of the indication and careful evaluation, following standardized guidelines and practice of evidenced-based obstetrics followed by audits in the institution, can help us limit the caesarean rates. Most of caesarean sections were emergency caesarean sections.

References

1. Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J et al. on behalf of the WHO Multi-Country Survey on Maternal and Newborn Health Research Network. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Global Health 2015;3(5):e260-70.
2. WHO Statement on Caesarean Section Rates. Available at https://apps.who.int/iris/bitstream/handle/10665/161442/WHO_RHR_15.02_eng.pdf;jsessionid=105922008CBDD017CC74CB1EDE6973C9?sequence=1 [Accessed on October 21, 2020]
3. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, et al. Classifications for cesarean section: a systematic review. PLoS ONE. 2011;6(1):e14566.
4. WHO Statement on caesarean section rates. Reproductive Health Matters 23:149–150.
5. Betran AP, Torloni MR, Zhang JJ, et al. WHO Working Group on Caesarean Section. WHO Statement on Caesarean Section Rates. BJOG 2016;123:667–70.
6. Liu Y, Wang X, Zou L, Ruan Y, Zhang W. An analysis of variations of indications and maternal-fetal prognosis for caesarean section in a tertiary hospital of Beijing: A population-based retrospective cohort study. Medicine (Baltimore). 2017;96(7):e5509.
7. Tihtonen K, Nyberg R. Long-term effects of uterine cesarean section scar. Duodecim 2014;130:461–8.
8. Gilliam M. Cesarean delivery on request: reproductive consequences. Semin Perinatol 2006;30:257–60.
9. Lydon-Rochelle M, Holt VL, Martin DP, et al. Association between method of delivery and maternal rehospital-ization. JAMA 2000;283:2411–6.
10. Bewley S, Cockburn J II. The unfacts of 'request' caesarean section. BJOG 2002;109:597–605.
11. Huesch MD, Doctor JN. Cesarean delivery on maternal request. JAMA 2013;310:978.
12. Festin MR, Laopaiboon M, Pattanittum P, Ewens MR, Henderson-Smart DJ, Crowther CA. Caesarean section in four South East Asian countries: Reason for, rates, associated care practices and health outcomes. BMC Pregnancy Childbirth 2009;9:17.
13. Singh N, Pradeep Y, Jauhari S. Indications and determinants of cesarean section: A cross-sectional study. Int J App Basic Med Res 2020;10:280-5
14. Dalton E, Castillo E. Post partum infections: A review for the non-OBGYN. Obstet Med. 2014;7(3):98-102.
15. Conroy K, Koenig AF, Yu YH, Courtney A, Lee HJ, Norwitz ER. Infectious morbidity after cesarean delivery: 10 strategies to reduce risk. Rev Obstet Gynecol. 2012;5(2):69-77.
16. Daniel S, Viswanathan M, Simi B N, Nazeema A. Study of maternal outcome of emergency and elective caesarean section in a semi-rural tertiary hospital. National Journal of Medical Research 2014; 4(1):14-18.
17. Lamont RF, Kusanovic JP, Sobel JD, Vaisbuch E, Mazaki-Tovi S, Kim SK, et al. Current debate on the use of antibiotic prophylaxis for caesarean section. BJOG 2011;118:193-201.
18. Hofmeyr GJ, Barrett JF, Crowther CA. Planned caesarean section for women with a twin pregnancy. Cochrane Database of Systematic Reviews 2015;12.: CD006553.
19. Lee HC, Gould JB, Boscardin WJ, El-Sayed YY, Blumenfeld YJ. Trends in cesarean delivery for twin births in the United States: 1995-2008. Obstet Gynecol 2011;118:1095-101.
20. Chaitanya KT, Manjeera LM. A clinical study of primary caesarean section at a tertiary care hospital in coastal city: an observational study. Int J Reprod Contracept Obstet Gynecol 2020; 9:4040-4.
21. Shenoy HT, Shenoy ST, Remash K. Determinants of primary vs previous caesarean delivery in a tertiary care institution in Kerala, India. International Journal of Clinical Obstetrics and Gynaecology 2019; 3(5): 229-236.
22. Shanthi C, Mahalakshmi NK. A clinical study of effect of standard labour protocols on rates of primary caesarean section at a tertiary care centre, Madurai, India. Int J Reprod Contracept Obstet Gynecol. 2018; 7:3766-8.
23. Das RK, Subudhi KT, Mohanty RK. The rate and indication of caesarean section in a tertiary care teaching hospital eastern India. Int J Contemp Pediatr 2018;5:1733-9.
24. Classen DC, Evans RS, Pestotnik SL, Horn SD, Menlove RL, Burke JP. The timing of prophylactic administration of antibiotics and the risk of surgical-wound infection. N Engl J Med. 1992 ;326(5):281-6.
25. Dimitrov A, Stamenov G, Krŭsteva K. Obshta i poetapna prodŭlzhitelnost na tsezarovoto sechenie [The overall and step-by-step duration of cesarean section]. Akush Ginekol (Sofiia). 1999;38(3):7-10.
26. Rameshkumar R, Moni S, Dhanlaxmi L, Kamat L. Non-descent vaginal hysterectomy in previous cesarean section: a retrospective study of 30 cases. Int J Reprod Contracept Obstet Gynecol 2017;6:2771-5.

Conflict of Interest: Nil
Source of support:Nil