

Perioperative Complications of Repeat Cesarean section: An observational study at Mansoura University Hospital

Original
Article

Kareem S. Elhoul, Rafik I. Barakat, Ahmed Elawady

Department of Obstetrics and Gynecology, Faculty of Medicine, Mansoura University, Egypt.

ABSTRACT

Background: Cesarean section (CS) is a surgical technique of delivery that frequently saves the life of both the mother and the baby. It is known that multiple CS are associated with short and long-term risks for mothers and their babies.

Aim: To detect different intra- and post- operative maternal and fetal complications of repeat CS operated at Mansoura University Hospital (MUH).

Methods: This study was observational study and included 500 patients with history of one or more cesarean deliveries. All cases were subjected to full history taking, full examination, laboratory investigations and ultrasound work up. All pre-operative and intra-operative challenges and postoperative complications were recorded.

Results: Regarding preoperative challenges, 206 cases required blood transfusion, premature rupture of membranes was reported in 33 cases and intrauterine fetal death occurred in 14 women. Poor Doppler findings were noted in 75 cases. Regarding intra-operative challenges, 81 women had signs of impending uterine rupture, while actual rupture occurred in 5 cases. Surgical difficulties were common, 115 cases had frozen pelvis, and 337 women had adhesions. Maternal post-operative complications were relatively common as fever, scar complications, and need for blood transfusion. Regarding fetal complications, Fetal anomalies were found in 26 cases and need for NICU was found in 170 cases.

Conclusion: This study demonstrated high prevalence of maternal and fetal perioperative complications among women undergoing CS, particularly those with high parity, multiple previous CS, and with history of intrauterine fetal death. Emergent CS was significantly associated with increased complications compared to elective or urgent cases.

Key Words: Cesarean section, Mansoura University Hospital, Perioperative complications.

Received: 27 August 2025, **Accepted:** 01 September 2025

Corresponding Author: Kareem S. Elhoul, MSc, Department of Obstetrics and Gynecology, Faculty of Medicine, Mansoura University, Egypt. **Tel.:** 01559562323, **E-mail:** kareemcasioelhol@gmail.com

ISSN: 2090-7265, Vol. 15, 2025.

INTRODUCTION

Cesarean section is a major obstetric operation that has played a critical role in improving maternal and neonatal survival. Over the past two decades, international reports from the World Health Organization (WHO, (2015)) have documented a marked rise in CS rates worldwide^[1].

In Egypt, the situation is even more pronounced, with recent surveys estimating that almost three-quarters of all births occur by CS (UNFPA, (2021)). Multiple factors underlie this sharp increase, including women's preference for CS, convenience for practitioners, widespread availability of private healthcare, and socioeconomic influences. There are numerous factors which contribute to an increased CS rate, including a decline in vaginal birth after cesarean delivery (VBAC), increasing maternal age, rates of labor induction, decreased use of operative vaginal delivery, and medicolegal concerns^[2,3].

Multiple CS operations are known to increase both maternal and neonatal risks. For mothers, adverse outcomes may include severe adhesions, visceral injuries, hemorrhage requiring transfusion, abnormal placentation, hysterectomy, uterine rupture, etc.,. For neonates, repeat CS is associated with higher rates of early respiratory complications, such as transient tachypnea and respiratory distress syndrome, often requiring neonatal intensive care^[4,5].

Aim of Work

The aim of this study was to analyze different intra-operative and postoperative maternal and fetal complications encountered in cases with repeat cesarean section operated at Mansoura University Hospital (MUH) as a tertiary care centre.

PATIENTS AND METHODS

This observational study of perioperative complications of repeat cesarean section was conducted at Departments of Obstetrics and Gynecology, Mansoura University Hospital, Mansoura, Egypt. The study was conducted for one year (May 2024 – April 2025). This study included 500 females at age range from 20 to 40 years with repeat cesarean deliveries at Mansoura University Hospitals. We excluded cases with primary cesarean section, with placenta previa spectrum, and with previous laparotomy for any indication.

Ethical Consideration

The whole study design was approved by the Institutional Review Board, Faculty of Medicine, Mansoura University. IRB No. (MS.23.06.2459). Confidentiality and personal privacy were respected at all levels of study. Collected data were not used for any other purpose.

Methods

Every case was subjected to detailed history taking including personal history (name, age, address, occupation, and special habits), obstetric history (Gravidity, Parity, full term, normal deliveries, preterm labours, stillbirths, difficult labours, abortions, and previous complications), medical and Surgical history.

Complete General Examination included vital signs (blood pressure, pulse, temperature and respiratory rate), and body mass index. Chest, heart, abdomen, and lower limbs were examined.

Obstetric ultrasound was done to assess fetal presentation and number, amniotic fluid volume, cardiac activity, placental position, and gestational age.

Basic Labs included complete blood picture, blood grouping (ABO, RH), random blood sugar, liver function tests (SGOT, SGPT), kidney function test (serum Creatinine), and coagulation profile (PT, APTT, INR). Pre-operative challenges recorded included antepartum hemorrhage, rupture uterus, infections, placental abruption, and tender scars.

Intra-operative challenges and complications included adhesions (adhesions between abdominal organs or between the peritoneum and abdominal wall), bladder injury, intestinal injury, intraoperative blood transfusion required, uterine problems (impending rupture, rupture uterus, vascular injury, hematoma formation), need of additional surgical interventions such as hysterectomy, and need for drainage during the operation because of hemostatic instability.

Post-operative complications included purpural pyrexia, sepsis, wound complications, post operative blood loss, postpartum hemorrhage, need for blood transfusion,

and need for ICU. The study also included fetal parameters as neonatal birth weight, admission to NICU and neonatal mortality rate.

Statistical Analysis

Data analysis was performed by SPSS software, version 26 (SPSS Inc., PASW statistics for windows version 26. Chicago: SPSS Inc.). Qualitative data were described using number and percent. Quantitative data were described using median (minimum and maximum) for non-normally distributed data and mean±Standard deviation for normally distributed data after testing normality using Kolmogorov-Smirnov test. Significance of the results obtained was judged at the (0.05) level. Chi-Square test was used to compare qualitative data between groups as appropriate. Student t test was used to compare 2 independent groups for normally distributed data.

RESULTS

Table (1) shows that the mean age of 27.25±2.5 years. A total of 388 women (77.6%) were educated, while 112(22.4%) were not. Despite the high education rate, 382 women (76.4%) came from low socio-economic backgrounds. Most participants had experienced multiple pregnancies, with 379 women (75.8%) having a gravidity of three or more and a median of 3 pregnancies (range 2–11). In contrast, 349 women (69.8%) had fewer than three live births, with a median parity of 2. Regarding cesarean deliveries, 264 women (52.8%) had undergone 2–3 previous CS, and 32(6.4%) had more than 3, with a median of 2 prior CS (range 1–6). Abortions were reported in 296 women (59.2%), with 32(6.4%) having more than three, and a median of Complicated CS occurred in 97 women (19.4%). Intrauterine fetal death was reported in 68 cases (13.6%). Secondary infertility was reported in 83 cases (16.6%). At the time of admission, 231 women (46.2%) were in labor. The ASA score distribution showed that 337(67.4%) were ASA I, 159(31.8%) ASA II, and only 4(0.8%) ASA III. For anesthesia, 492 women (98.4%) received spinal anesthesia, and only 8(1.6%) underwent general anesthesia.

Regarding obstetric ultrasound findings, most pregnancies were singleton, with 486 cases (97.2%), while 14 cases (2.8%) involved twins. Regarding fetal presentation, 446 fetuses (86.8%) were in cephalic presentation, 55(10.7%) were breech, and 13(2.5%) were in a transverse lie, based on a total of 514 fetuses scanned. Amniotic fluid assessment revealed that 431 cases (86.2%) had adequate fluid, while 41 cases (8.2%) had oligohydramnios, 24(4.8%) had polyhydramnios, and only 4 cases (0.8%) showed anhydramnios. Cardiac activity was viable in 486 fetuses (97.2%), while 14(2.8%) were non-viable. Placental hematoma was present in 18 cases (3.6%), while 482 cases (96.4%) had no evidence

of hematoma. The placental location was most commonly anterior (238 cases, 47.6%), followed by posterior (133 cases, 26.6%), fundal (124 cases, 24.8%), and low-lying in 5 cases (1.0%). The mean gestational age at the time of ultrasound was 36.48 ± 2.78 weeks, with a range from 17 to 42 weeks. Regarding cesarean type findings showed that among the studied sample of 500 women, 188 (37.6%) underwent elective cesarean sections, while the majority, 235 women (47.0%), had urgent cesarean deliveries. Emergent cesarean sections accounted for 77 cases (15.4%).

Table (1): Demographic data, obstetric history, vital signs, obstetric ultrasound finding and cesarean type of studied cases:

	N= 500	%
Age (years)		
Mean $\pm$ SD	27.25 $\pm$ 2.5	
Education		
Not educated	112	22.4
Educated	388	77.6
Socio-economic state		
Low	382	76.4
Average	107	21.4
High	11	2.2
Gravidity		
<3	121	24.2
≥ 3	379	75.8
Median (min-max)	3(2-11)	
Parity		
<3	349	69.8
≥ 3	151	30.2
Median (min-max)	2(1-7)	
Number of previous CS		
1	204	40.8
2-3	264	52.8
>3	32	6.4
Median (min-max)	2(1-6)	
Abortions		
No	204	40.8
1-3	264	52.8
>3	32	6.4
Median (min-max)	0(0-7)	
Previous Complicated CS		
No	403	80.6
Yes	97	19.4
Causes of previous complicated CS	N= 97	
Abruptio placenta	1	1.0
DVT	4	4.1
Gestational DM	49	50.5
Gestational HTN	2	2.1
Preeclampsia	2	2.1
Preterm labor	1	1.0
Pulmonary embolism	3	3.1
Rupture uterus	3	3.1
Postpartum Hemorrhage	1	1.0
vesicular mole	2	2.1
IUFD		
-VE	432	86.4
+VE	68	13.6

	N= 500	%
Secondary infertility		
-ve	417	83.4
+ve	83	16.6
In Labour		
-ve	269	53.8
+ve	231	46.2
ASA score		
I	337	67.4
II	159	32.6
Type of anesthesia		
General	8	1.6
Spinal	492	98.4
Obstetric ultrasound		
Number		
Single	486	97.2
Twin	14	2.8
Presentation	N=514	
Cephalic	446	86.8
Breech	55	10.7
Transverse	13	2.5
AF		
adequate	431	86.2
anhydramnios	4	0.8
oligohydramnios	41	8.2
polyhydramnios	24	4.8
Cardiac activity		
unviable	14	2.8
viable	486	97.2
Placenta Hematoma		
-ve	482	96.4
+ve	18	3.6
Placenta		
anterior	238	47.6
fundal	124	24.8
low lying	5	1.0
posterior	133	26.6
Gestational age (weeks)		
Mean $\pm$ SD	36.48 $\pm$ 2.78 $\pm$	
(Min-MAX)	(17-42)	
Cesarean type		
Elective	188	37.6
Urgent*	235	47.0
Emergent**	77	15.4

*Urgent CS: All cesarean sections done within hours from diagnosis; **: Emergent CS: All cesarean sections done within minutes from diagnosis.

Table (2) shows that 206 cases need blood transfusion for pre-operative preparation, pre-labour Rupture Of Membrane defined by RCOG as the rupture of the fetal membranes before the onset of labor contractions at or beyond 37 weeks of gestation was found in 33 cases, IUFD refers to Intra Uterine Fetal Death which is defined by NICE as death of the fetus at or after the 24+0 weeks of pregnancy and was found in 14 cases, poor doppler indices as reversed or absent end diastolic flow of umbilical artery were found in 75 cases, and 12 cases had hernia preoperative.

Impending rupture is separation of edges of the uterine scar was found in 81 cases, CS hysterectomy is done for only one case with rupture uterus, anesthetic complications such as failed spinal anaesthesia, hypotension, vomiting and aspiration was found in 10 cases. Frozen pelvis was found in 115 cases, adhesions was found in 337 cases, high bladder was found in 184 cases and upper segment caesarean section (USCS) was found in 183 cases.

Table (2): Prevalence of pre-, and intra- operative challenges among studied sample:

Pre-operative	N= 500	%
Need blood transfusion	206	41.2
PROM	33	6.6
IUFD	14	2.8
Poor doppler	75	15.0
hernia	12	2.4
Intra-operative		
Impending rupture	81	16.2
Rupture uterus	5	1.0
CS hysterectomy	1	0.2
Aesthesia complications	10	2.0
Frozen pelvis	115	23.0
adhesions	337	67.4
High bladder	184	36.8
USCS	183	36.6

Table (3) shows intra-operative complications where Organ injury was found in 18 cases, need for drains was found in 149 cases, uterine artery ligation was found in 192 cases and uterine extensions were found in 43 cases. Regarding maternal postoperative complications, fever was found in 130 cases, infection was found in 87 cases, wound complications were found in 85 cases, blood transfusion was done to 181 cases, Postpartum hemorrhage (PPH) was found in 56 cases and need for ICU was found in 14 cases. Regarding fetal complications, Fetal anomalies were found in 26 cases and need for NICU was found in 170 cases.

Table (3): Prevalence of intra-operative complications among studied sample:

Intra-operative complications	N= 500	%
Organ injury	18	3.6
Need for drains	149	29.8
Uterine artery ligation	192	38.4
Uterine extensions	43	8.6
Maternal Postoperative complications		
Fever*	130	26.0
Infection**	87	17.4
Wound complications***	85	17.0
Blood transfusion****	181	36.2
PPH*****	56	11.2
need for ICU	14	2.8

Intra-operative complications	N= 500	%
Fetal complications		
# Fetal anomalies		
-ve	474	94.8
+ve	26	5.2
Need for NICU##		
-ve	330	66.0
+ve	170	34.0

*: Cases who were feverish post-operatively; **: Cases with high total leucocyte count; ***: Wound complications are cases with sub cutaneous drain; ****: Cases who received Blood products mainly packed RBCs, some cases received plasma and platelets; *****: Post-partum haemorrhage either primary or secondary post partum haemorrhage; #: Fetal congenital anomalies; ##: 34 % of neonates need NICU most of them are preterm.

Table (4) shows a significant association between emergent cesarean sections and the occurrence of total perioperative complications, with 16.6% of women in the complications group undergoing emergent CS compared to only 2.4% in the non-complications group ($p=0.012$). In contrast, elective and urgent CS types did not show significant associations with complications ($p=0.083$ and $p=0.933$, respectively). This suggested that emergent cesarean deliveries are linked to a higher risk of perioperative complications.

Table (4): Relation between presence of Total perioperative complications and caesarean type among studied sample:

Cs type	Total perioperative complications		P value
	-ve (n= 42)	+ve (n= 458)	
Elective	21(50)	167(36.5)	0.083
Urgent	20(47.6)	215(46.9)	0.933
Emergent	1(2.4)	76(16.6)	0.012*

DATA expressed as number (%); Used test: Chi-Square test; *: Statistically Significant.

DISCUSSION

Cesarean section (CS) is a common major surgical procedure in obstetrics. When properly indicated, it could stop poor obstetric outcomes and could be a life-saving approach for the mother as well as for the fetus. Major complications accompanied by cesarean section involve severe adhesions, hemorrhage, pelvic organ injuries, thromboembolic diseases, anesthesia-related adverse events, and wound complications, etc..^[6].

The caesarean section rate is rising rapidly all over the world. In 1985, WHO stated that the perfect ratio on a population level should be 10–15% with no reduction in maternal or perinatal mortality acquired with rates beyond that^[7].

There are several factors that participate in elevated CS rate, comprising a drop in vaginal birth after cesarean

delivery, increasing maternal age, rates of labor induction, decreased use of operative vaginal delivery, and medico-legal concerns^[3]. The increase in the use of CS globally comprises multiple factors and interactions, including women and families' preferences, health professional's views and beliefs, convenience, remuneration, healthcare organization and financing structures^[8].

Our aim was to detect different intra-operative and postoperative maternal and foetal complications of repeat cesarean section operated at Mansoura University Hospital (MUH) as a tertiary center. An observational study was performed on 500 participants and conducted at Mansoura University Hospital.

Regarding demographic and obstetric history findings showed that the mean age of 27.25 ± 2.5 years. A total of 388 women (77.6%) were educated, while 112 (22.4%) were not. Despite the high education rate, 382 women (76.4%) came from low socio-economic backgrounds. Most participants had experienced multiple pregnancies, with 379 women (75.8%) having a gravidity of three or more and a median of 3 pregnancies (range 2–11). In contrast, 349 women (69.8%) had fewer than three live births, with a median parity of 2 (range 1–7). Regarding cesarean deliveries, 264 women (52.8%) had undergone 2–3 previous CS, and 32 (6.4%) had more than 3, with a median of 2 prior CS (range 1–6). Abortions were reported in 296 women (59.2%), with 32 (6.4%) having more than three, and a median of 0 (range 0–7). Complicated CS occurred in 97 women (19.4%). Among these, 49 cases (50.5%) were due to gestational diabetes, 27 (27.8%) to preeclampsia, and smaller proportions to conditions such as DVT (4 cases, 4.1%), uterine rupture (3 cases, 3.1%), and pulmonary embolism (3 cases, 3.1%). Intrauterine fetal death was reported in 68 cases (13.6%). Secondary infertility was reported in 83 cases (16.6%) reported secondary infertility. At the time of admission, 231 women (46.2%) were in labor. The ASA score distribution showed that 337 (67.4%) were ASA I, 159 (31.8%) ASA II, and only 4 (0.8%) ASA III. For anesthesia, 492 women (98.4%) received spinal anesthesia, and only 8 (1.6%) underwent general anesthesia.

Akter *et al.*,^[9] evaluated the maternal and perinatal outcomes accompanied by repeat caesarean sections (RCS). Their study recorded that the mean age of 31 ± 2.5 years. women were educated, while (34%) were not. In spite of the high education rate, 15 women (15%) came from low socio-economic backgrounds. Most participants had experienced multiple pregnancies, with 80 women (80%) having a gravidity of three or more and a median of 3 pregnancies. In contrast, 20 women (20%) had fewer than three live births. Complicated CS occurred in 65 women (65%). Among these, 6 cases (6%) were due to gestational diabetes, 8 (8%) to preeclampsia. For anesthesia, 70 women (70%) received spinal anesthesia, and only 30 (30%) underwent general anesthesia.

Regarding laboratory investigations findings showed that the mean hemoglobin level among the studied sample was 10.72 ± 1.34 g/dL. The mean platelet count was $226.76 \pm 70.81 \times 10^9/L$, which falls within the normal reference range, suggesting that most participants had adequate platelet levels. The mean international normalized ratio (INR) was 1.02 ± 0.048 .

Also, Vila-Candel *et al.*,^[10] recorded that the mean hemoglobin level among the case group was 10.1 ± 1.5 g/L. The mean platelet count was $146 \times 10^9/L$, which falls within the normal reference range. The mean international normalized ratio (INR) was ≥ 1.06 .

Regarding cesarean type findings showed that among the studied sample of 500 women, 188 (37.6%) underwent elective cesarean sections, while the majority, 235 women (47.0%), had urgent cesarean deliveries. Emergent cesarean sections accounted for 77 cases (15.4%). Ajibo *et al.*,^[11] identified determinants of low fifth minute Apgar score among newborns delivered by cesarean section. Their study recorded that 71 (64.5%) underwent elective cesarean sections, while the emergent cesarean sections accounted for 77 cases (15.4%).

Also, our study agreed with Alshehri *et al.*,^[12] found that 155 (39.3%) underwent elective cesarean sections, while the emergent cesarean sections accounted for 239 cases (60.7%).

Regarding prevalence of pre-operative challenges findings showed that pre-operative challenges were common among the studied sample. A significant number of women, 206 (41.2%), required blood transfusion. Premature rupture of membranes (PROM) was reported in 33 cases (6.6%), and intrauterine fetal death (IUFD) occurred in 14 women (2.8%). Poor Doppler findings, which may indicate compromised fetal blood flow, were noted in 75 cases (15.0%). Additionally, 12 women (2.4%) had hernias detected pre-operatively.

Also, Alshehri *et al.*,^[12] recorded that 22 (5.6%), required blood transfusion. Premature rupture of membranes (PROM) was reported in 7 cases (1.8%), and intrauterine fetal death (IUFD) occurred in 26 women (6.6%). Regarding prevalence of intra-operative challenges findings showed that intra-operative challenges were frequently encountered among the studied sample, 81 women (16.2%) had signs of impending uterine rupture, while actual rupture occurred in 5 cases (1.0%). Cesarean hysterectomy was performed in 1 case (0.2%), reflecting a rare but severe complication. Anesthetic complications were reported in 10 women (2.0%). Surgical difficulties were common, with 115 cases (23.0%) complicated by frozen pelvis, and 337 women (67.4%) presenting with adhesions. A high bladder was noted in 184 cases (36.8%), (USCS) Upper Segment Cesarean Section was documented in 183 women (36.6%).

Alshehri *et al.*,^[12] reported that 3 women (0.8%) had signs of impending uterine rupture, while actual rupture occurred in 1 case (0.3%). Cesarean hysterectomy was performed in 13 case (3.3%), reflecting a rare but severe complication. Anesthetic adverse events were recorded in 10 women (2.0%). Surgical difficulties were common, with 115 cases (23.0%) complicated by frozen pelvis, and 16 women (4.1%) presenting with adhesions. A high bladder was noted in 5 cases (1.3%), (USCS) was documented in 183 women (36.6%).

Regarding prevalence of maternal Postoperative complications, results showed that maternal post-operative complications were relatively common among the studied sample. Post-operative pyrexia was recorded in 130 women (26.0%), and infection occurred in 87 cases (17.4%). wound complications were noted in 85 women (17.0%). A significant number of cases, 181(36.2%), required blood transfusion after surgery. Maternal complications of a more severe nature were rare, occurring in 3 cases (0.6%). Postpartum hemorrhage (PPH) affected 56 women (11.2%), and 14 women (2.8%) required admission to the intensive care unit (ICU) mostly due to preeclampsia.

Also, Kaplanoglu *et al.*,^[13] evaluated the effect of repeat cesarean sections in adolescent pregnancies on morbidity, obstetric and perinatal results, included 116 patients. Their study recorded that post-operative pyrexia was recorded in 5 women (13.9%), and infection occurred in 2 cases (5.6%). A significant number of patients, 4(11.1%), required blood transfusion after surgery. Postpartum hemorrhage (PPH) affected 2 women (5.6%), and 1women (2.8%) required admission to the intensive care unit (ICU).

Regarding fetal complications findings showed fetal anomalies were present in 26 cases (5.2%), while the majority of fetuses, 474(94.8%), had no detected anomalies. A significant proportion of neonates, 170(34.0%), required admission to the neonatal intensive care unit (NICU), compared to 330(66.0%) who did not need NICU care.

Kaplanoglu *et al.*,^[13] evaluated the effect of repeat cesarean sections in adolescent pregnancies on the morbidity, obstetric and perinatal outcomes, performed on 52 patients. Their study recorded that foetal anomalies were present in 5 cases (13.9%). A significant proportion of neonates, 1(2.8%), required admission to the neonatal intensive care unit (NICU).

Regarding prevalence of Maternal intraoperative post-operative, fetal and all perioperative complications findings showed that a high prevalence of complications among the studied sample. Maternal intraoperative complications were reported in 442 cases (88.4%), while maternal postoperative complications occurred in 268 women (53.6%). Fetal complications were noted in

172 cases (34.4%). When considering all perioperative complications, both maternal and fetal, the total number of affected cases was 458(91.6%).

In agreement with us, Akter *et al.*,^[9] recorded that maternal intraoperative complications were recorded in 18 cases (18.55%), while maternal postoperative complications occurred in 24 women (24.48%). Foetal complications were noted in (31.57%) cases. number of affected cases was 458(91.6%).

Regarding relation between presence of Total perioperative complications and demographic and obstetric history findings showed that total perioperative complications were significantly associated with high parity ($p= 0.001$), greater number of previous cesarean sections ($p= 0.03$), and history of intrauterine fetal death (IUFD) ($p= 0.027$). Other factors such as age, socio-economic status, gravidity, abortions, surgical history, and secondary infertility showed no significant association.

In agreement with us, Sultana *et al.*,^[14] compared the causes and outcomes of recurrent versus first-time C-sections among 120 women. Their study recorded that total perioperative complications were significantly accompanied by high parity ($p= 0.042$), and history of intrauterine fetal death (IUFD) ($p= 0.001$). Other factors such as age, socio-economic status, gravidity, abortions, surgical history, and secondary infertility showed no significant association.

Regarding relation between presence of Total perioperative complications and Cesarean type findings showed that a significant association between emergent cesarean sections and the occurrence of total perioperative complications, with 16.6% of women in the complications group undergoing emergent CS compared to only 2.4% in the non-complications group ($p= 0.012$). In contrast, elective and urgent CS types did not show significant associations with complications ($p= 0.083$ and $p= 0.933$, respectively). This suggested that emergent cesarean deliveries are linked to a higher risk of perioperative complications.

In agreement with us, Qin *et al.*,^[15] assessed the efficacy of transcutaneous electrical nerve stimulation (TENS) therapy in the postoperative care of patients who have had caesarean section, performed on 108 women. Their study recorded that that a significant association between emergent cesarean sections and the occurrence of total perioperative complications, and elective and urgent CS types did not show significant associations with complications ($p= 0.50$ and $p= 0.51$, respectively). This suggests that emergent cesarean deliveries are linked to a higher risk of perioperative complications.

CONCLUSION

The current study demonstrated a high prevalence of maternal and fetal perioperative complications among women undergoing cesarean sections, particularly in those with high parity, multiple previous cesareans, and a history of intrauterine fetal death. Emergent cesarean deliveries were significantly associated with increased complications compared to elective or urgent cases. Intraoperative challenges such as adhesions, frozen pelvis, and high bladder were common, and postoperative issues included fever, infection, hemorrhage, and the need for blood transfusions.

CONFLICT OF INTERESTS

There is no conflict of interests.

FUNDING

No sources of funding were used to conduct this review.

REVIEWER DISCLOSURESS

No relevant financial or other relationships to disclose.

REFERENCES

- Asiyanbola O, Ohaeri B, OJO IO (2022): Cesarean section: a delivery option and a life saving method of delivery among pregnant women. *Commonwealth J Acad Res.* 3(12), 1-11.
- Gibbons L, Belizán JM, Lauer JA, et al. (2010): 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.* 30(1), 1-31.
- Macones GA, Caughey AB, Wood SL, et al. (2019): Guidelines for postoperative care in cesarean delivery: Enhanced Recovery After Surgery (ERAS) Society recommendations (part 3). *American journal of obstetrics and gynecology.* 221(3), 247. e241-247. e249.
- Arlier S, Seyfettinoğlu S, Yilmaz E, et al. (2017): Incidence of adhesions and maternal and neonatal morbidity after repeat cesarean section. *Archives of gynecology and obstetrics.* 295(2), 303-311.
- Gedefaw G, Demis A, Alemnew B, et al. (2020): Prevalence, indications, and outcomes of caesarean section deliveries in Ethiopia: a systematic review and meta-analysis. *Patient safety in surgery.* 14(1), 11.
- Regmi A, Ojha N, Singh M, et al. (2022): Risk factors associated with surgical site infection following cesarean section in tertiary care hospital, Nepal. *International journal of reproductive medicine.* 2022(1), 4442453.
- Larsson C, Djuvfelt E, Lindam A, et al. (2021): Surgical complications after caesarean section: A population-based cohort study. *PLoS One.* 16(10), e0258222.
- Betran AP, Ye J, Moller A-B, et al. (2021): Trends and projections of caesarean section rates: global and regional estimates. *BMJ global health.* 6(6), e005671.
- Akter F, Sattar N, Nessa Z, et al. (2024): Maternal and Perinatal Outcome of Repeat Caesarean Sections in Shaheed Suhrawardy Medical College Hospital. *TAJ: Journal of Teachers Association.* 37(2), 361-369.
- Vila-Candel R, Piquer-Martín N, Perdomo-Ugarte N, et al. (2023): Indications of induction and caesarean sections performed using the Robson classification in a university hospital in Spain from 2010 to 2021. *Healthcare.* 11(11), 1521.
- Ajibo BD, Wolka E, Aseffa A, et al. (2022): Determinants of low fifth minute Apgar score among newborns delivered by cesarean section at Wolaita Sodo University Comprehensive Specialized Hospital, Southern Ethiopia: an unmatched case control study. *BMC Pregnancy and Childbirth.* 22(1), 665.
- Alshehri KA, Ammar AA, Aldhubabian MA, et al. (2019): Outcomes and complications after repeat cesarean sections among king abdulaziz university hospital patients. *Materia socio-medica.* 31(2), 119.
- Kaplanoglu M, Karateke A, Un B, et al. (2014): Complications and outcomes of repeat cesarean section in adolescent women. *International journal of clinical and experimental medicine.* 7(12), 5621.
- Sultana D, Zabin D, Begum D, et al. (2024): Understanding the Recurrence of Cesarean Sections: Common Causes and Outcomes. *Obstetrics and Gynecology Research.* 7.
- Qin Y, Liu CL, Liu L (2024): The role of TENS therapy in reducing the incidence of post-Caesarean section wound infection. *International wound journal.* 21(7), e70001.