

## Original Research

# Evaluation Of Surgical Complications After Cesarean Section

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### Abstract

**Background:** Cesarean section is one of the most commonly performed obstetric procedure worldwide with its own set of complications. This study was done to evaluate surgical complications after cesarean section.

**Materials & Methods:** A total of 100 participants were included in the study. The primary study group comprised exclusively of women who underwent caesarean section, while the control group included women who had vaginal deliveries only. The odds ratio for risk factors was computed using a multivariable regression model that accounted for all conceivable risk factors.

**Results:** Women in the cesarean section category were of advanced age, gave birth to smaller infants, and experienced a notably higher occurrence of pre-eclampsia/eclampsia episodes compared to those in the group that underwent vaginal delivery.

**Conclusion:** The risk of complications following a Caesarean section is notably heightened in cases involving multiple cesarean sections, obesity, and smoking.

**Keywords:** Complications, Cesarean sections.

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### Introduction

The caesarean section rate is rising rapidly and continuously in many parts of the world. In 1985, WHO stated that the ideal rate on a population level should be 10–15% with no decrease in maternal or perinatal mortality obtained with rates above that. <sup>1</sup> This was based on the evidence available at the time, and the validity of this statement has since been questioned and an updated version with a softer statement that caesarean section should be performed when needed, focusing more on the lack of evidence regarding optimal rates and how to improve this knowledge in the future. <sup>2,3</sup> The rate has since then increased to 24.5% in Western Europe, 32% in North America and 41% in South America. <sup>4,5</sup> Since the procedure is often performed on indications other than medical, a complete understanding of the risks of this abdominal surgical procedure is most important. <sup>4</sup> Cesarean section (CS) is a surgical procedure that often saves the lives of both the mother and the baby. <sup>6</sup> A previous CS is one of the main indications for cesarean delivery in the current pregnancy. Other indications include cephalopelvic disproportion, placenta previa, eclampsia,

HELLP syndrome and fetal distress. <sup>7,8</sup> The CS rate has increased substantially over the past few years due to older maternal age, defensive obstetric practice, maternal request for a CS, and medico-legal concerns. <sup>9,10</sup> According to the American Center for Disease Control and Prevention, the cesarean delivery rate was 20.7% in 1995 in the United States (US) which substantially increased to 31.9% in 2016. <sup>11</sup> Cesarean section (CS) is a common obstetric procedure used to overcome problems associated with vaginal delivery, such as cephalo-pelvic disproportion and fetal distress. However, it carries maternal and fetal risks. The maternal risks include infection, anesthetic complications, surgical injury, bleeding, and thromboembolism. <sup>12</sup> Repeat CS also increase the risk of dense adhesions, bladder injury, bowel injury, and incision-related problems like wound dehiscence. Both maternal and fetal complications are expected to increase in emergency operations compared to elective ones. <sup>13</sup> According to information from the World Health Organization (WHO), the rate of CS has significantly risen globally in the last thirty years. <sup>14</sup> Despite increasing CS rates, the maternal mortality

associated with it is decreasing due to improved anesthetic techniques, availability of antimicrobial agents, and modern blood banking techniques.<sup>15</sup> The risk of intra-operative complications and uterine rupture is increased in women who have had repeat CS, making these patients a high-risk group.<sup>16</sup> Hence, this study was conducted to evaluate surgical complications after cesarean section.

**Materials & Methods**

A total of 100 participants were included in the study. The primary study group comprised exclusively of women who underwent cesarean section, while the control group included women who had vaginal deliveries only. In the analysis of complications occurring within 42 days, each delivery was treated as a separate event. The surgical complications examined encompassed bowel obstruction, incisional hernia, abdominal pain, and short-term complications within the 42-day postpartum period. To identify potential risk factors and facilitate adjusted comparisons, the population was categorized into subgroups based on infant birthweight (above or below the median) and maternal age (< 30 years, 30–34 years, and ≥ 35 years).

The data were processed using SPSS software, and differences were assessed through chi-squared tests. Comparisons between caesarean section and vaginal delivery were conducted using both univariate and multivariable regression analyses for unadjusted and adjusted data, respectively. The odds ratio for risk factors was computed using a multivariable regression model that accounted for all conceivable risk factors.

**Results**

Women in the cesarean section category were of advanced age, gave birth to smaller infants, and experienced a notably higher occurrence of pre-eclampsia/eclampsia episodes compared to those in the group that underwent vaginal delivery. Within the cesarean section group, there was a notable increase in the risks of all surgical complications compared to the control group. The odds ratio (OR) for bowel obstruction was 2.88, and for incisional hernia, it was 2.78. Likewise, the risks of undergoing surgery specifically for bowel obstruction and incisional hernia were elevated in comparison to the controls, with odds ratios of 2.05 and 3.28, respectively.

**Table 1: Maternal characteristics**

	Cesarean n (%)	Vaginal n (%)	P value
Total (100)	20(20%)	80(80%)	
Maternal age at delivery			
Mean (years)	32.54	27.82	<0.001
<30 years	10 (50%)	55(68.75)	
30-35years	6 (30%)	20 (25)	
>35years	4 (20%)	5(6.25)	
Mean birthweight infant (g)	3370	3402	<0.001
Smoking	1(5%)	5(6.25)	0.9
Pre-eclampsia/eclampsia	2(10)	2(2.5)	<0.001

**Table 2: Surgical complications after delivery**

		Unadjusted OR	P value	Adjusted OR	P value
Bowel obstruction	VD	1			
	CD	3.42	<0.001	2.88	<0.001
Surgery for bowel obstruction	VD	1			
	CD	2.85	<0.001	2.05	<0.001
Incisional hernia	VD	1			
	CD	2.64	<0.001	2.78	<0.001
Surgery for incisional hernia	VD	1			
	CD	4.12	<0.001	3.28	<0.001
Abdominal pain	VD	1			
	CD	1.18	<0.001	1.52	<0.001
Placenta previa	VD	1			
	CD	62.85	<0.001	61.42	<0.001

**Discussion**

There are various reasons why a fetus cannot, or should not, be delivered vaginally.<sup>17,18</sup> Some of these

indications are inflexible, as a vaginal birth would be dangerous in certain clinical scenarios. For example, a cesarean delivery is often the recommended approach if

the patient has had a prior classical cesarean scar or previous uterine rupture. However, due to the potential complications of cesarean delivery, much study has been done looking for ways to reduce the cesarean rate. Hence, this study was conducted to evaluate surgical complications after cesarean section.

In the present study, women in the cesarean section category were of advanced age, gave birth to smaller infants, and experienced a notably higher occurrence of pre-eclampsia/eclampsia episodes compared to those in the group that underwent vaginal delivery. A study by Larsson C et al, 79 052 women from the Swedish Medical Birth Register who delivered by caesarean section only from 2005 through 2016 were identified and compared with a control group of women delivering vaginally only from the same register and the same period of time. By cross-linking data with the National Patient Register the risks for bowel obstruction, incisional hernia and abdominal pain were analysed, as well as risk factors for these complications. They also analysed acute complications, uterine rupture, and placenta praevia. Caesarean section is associated with an increased risk for bowel obstruction (OR 2.92; CI 2.55–3.34), surgery for bowel obstruction (OR 2.12; CI 1.70–2.65), incisional hernia (OR 2.71; CI 2.46–3.00), surgery for incisional hernia (OR 3.35; CI 2.68–4.18), and abdominal pain (OR 1.41; CI 1.38–1.44). Smoking, obesity, and more than one section delivery added significantly to the risk for these complications. Caesarean section is considered a safe procedure, but awareness of the risk for serious complications is important when deciding on mode of delivery. In this study, more than one section, obesity and smoking significantly increased the risk for complications after caesarean section. Prevention of smoking and obesity among fertile women worldwide must continue to be a high priority.<sup>19</sup> In the present study, within the cesarean section group, there was a notable increase in the risks of all surgical complications compared to the control group. The odds ratio (OR) for bowel obstruction was 2.88, and for incisional hernia, it was 2.78. Likewise, the risks of undergoing surgery specifically for bowel obstruction and incisional hernia were elevated in comparison to the controls, with odds ratios of 2.05 and 3.28, respectively. Another study by Alshehri KA et al, determined the surgical and obstetrical outcomes and complication for the mother and the neonate after 4 or more CSs and compare it with mothers who had less than 4 previous CSs. The case-control study was conducted by reviewing the records of all women who underwent multiple CSs from 2013 to 2018. The study group comprised of 394 women who had 4 or more CSs, and our control group comprised of similar number of women who had previous history of two or three CS. A total of 788 patients were enrolled in the study. They found that adhesions were the most

common complications in study group with a considerable increase in number of both moderate and severe adhesions in the study group compared to the controls with p-value of <0.001. Increasing number of CS leads to an increase of the complications risk. Among the complications, adhesions were the most common in study group, followed by intraoperative bleeding.<sup>20</sup> Cesarean delivery (CD) is one of the most common procedures performed in the United States, accounting for 32% of all deliveries. Postpartum surgical site infection (SSI), wound infection and endometritis is a major cause of prolonged hospital stay and poses a burden to the health care system. SSIs complicate a significant number of patients who undergo CD – 2-7% will experience wound infections and 2-16% will develop endometritis. Many risk factors for SSI have been described. These include maternal factors (such as tobacco use; limited prenatal care; obesity; corticosteroid use; nulliparity; anemia; twin gestations; and previous CD), intrapartum and operative factors (such as chorioamnionitis; premature rupture of membranes; prolonged rupture of membranes; prolonged labor, particularly prolonged second stage; large incision length; subcutaneous tissue thickness > 3 cm; subcutaneous hematoma; lack of antibiotic prophylaxis; emergency delivery; and excessive blood loss), and obstetrical care on the teaching service of an academic institution. Effective interventions to decrease surgical site infection include prophylactic antibiotic use (preoperative first generation cephalosporin and intravenous azithromycin), chlorhexidine skin preparation instead of iodine, hair removal using clippers instead of razors, vaginal cleansing by povidone-iodine, placental removal by traction of the umbilical cord instead of by manual removal, suture closure of subcutaneous tissue if the wound thickness is >2 cm, and skin closure with sutures instead of with staples. Implementation of surgical bundles in non-obstetric patients has been promising. Creating a similar patient care bundle comprised evidence-based elements in patients who undergo CD may decrease the incidence of this major complication. Each hospital has the opportunity to create its own CD surgical bundle to decrease surgical site infection.<sup>21</sup> As previously discussed, there is a significant risk of infection after cesarean delivery. In addition to postpartum hemorrhage, wound infection and endometritis are the other common complications after a cesarean section. In a study examining the efficacy of vaginal cleansing, postoperative endometritis was reduced from 8.7% to 3.8% with cleansing.<sup>22</sup> A study investigating adjunctive azithromycin saw a decrease in wound infection from 6.6% to 2.4% with the additional antibiotic, and serious adverse events decreased from 2.9% to 1.5%.<sup>23</sup> However, given that over a million women have a cesarean every year, these percentages still represent a

significant number of women suffering from infectious complications.

### Conclusion

While a Caesarean section is generally deemed a safe medical procedure, it is crucial to be cognizant of the potential for serious complications when determining the preferred mode of delivery. This study underscores that the risk of complications following a Caesarean section is notably heightened in cases involving multiple sections, obesity, and smoking.

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