

# The effectiveness of the ERACS (Enhanced Recovery After Caesarean Surgery) method on postoperative pain and the onset of colostrum excretion



Esty Puji Rahayu<sup>1\*</sup>, Fauziyatun Nisa<sup>1</sup>, Ratna Ariesta Dwi Andriani<sup>1</sup>, Fritria Dwi Anggraini<sup>1</sup>

## ABSTRACT

**Background:** Riskesdas in 2018 showed that the Caesarean birth rate in Indonesia was 17.6%. In addition to the many benefits of Caesarean section, postoperative patients face various problems ranging from healing after surgery, lactation process constraints and other discomforts. Various studies have been carried out to prove the superiority of the Enhanced Recovery after Caesarean Surgery (ERACS) method. This investigation seeks to evaluate the impact of ERACS on postoperative discomfort and the beginning of colostrum excretion.

**Methods:** In this study, a control group was used in a quasi-experimental study to assess the degree of postoperative discomfort and the beginning of colostrum excretion between the control group (non-ERACS) and the treatment group (Sectio Caesarean with ERACS method). For this study's simple random sample, there are 30 respondents in each group. The Chi-Square and multivariate logistic regression tests were used to evaluate the data and discover the variables' relationship.

**Results:** Based on the data analysis, it was found that ERACS was effective in reducing post-operative pain ( $p < 0.001$ ), and the coefficient of determination is 0.645, which means that the ERACS can influence 64.5% of the variation in the postoperative pain score variable. ERACS method is ineffective for accelerating the onset of colostrum excretion  $p = 0.267$  ( $p > 0.05$ ).

**Conclusion:** The type of mother's birth, the mother's psychological changes, pain, and the administration of medicines to the mother are all factors that can impact the mother's ability to excrete colostrum right away after delivery.

**Keywords:** ERACS, post-operative pain, colostrum.

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<sup>1</sup>Department of Midwifery Diploma,  
Faculty of Nursing and Midwifery,  
Universitas Nahdlatul Ulama Surabaya,  
Indonesia;

\*Corresponding author:

Esty Puji Rahayu;  
Department of Midwifery Diploma,  
Faculty of Nursing and Midwifery,  
Universitas Nahdlatul Ulama Surabaya,  
Indonesia;

esty@unusa.ac.id

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## INTRODUCTION

The provision of health care is crucial in the fight against poverty. Meanwhile, a nation's Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) can be used to gauge its public health status. According to the Survey Demografi dan Kesehatan Indonesia (SDKI), the MMR was 305 per 100,000 live births in 2017 before drastically declining, down to 200 per 100,000 live births in 2019. Additionally, the IMR fell, first by 24 per 1,000 live births in 2017 and then by 23 per 1,000 live births in 2019.<sup>1</sup>

The decrease in maternal mortality aligns with the increase in cesarean sections. Data from the SDKI shows an increase in Sectio Caesarean (SC) in Indonesia from 1991 to 2017 was 1.2-6.8%. Riset Kesehatan Dasar (Riskesdas or Indonesian Basic Health Research)

in 2018 showed that the Caesarean birth rate in Indonesia was 17.6%. In addition to the many benefits of Caesarean section, postoperative patients face various problems ranging from healing after surgery, lactation process constraints and other discomforts. Research in one of the hospitals showed that the average onset of colostrum in normal postpartum mothers was 13.6 hours, while the respondent for SC delivery was 26.6 hours. This long time difference shows the effect of cesarean section delivery on the release of colostrum.<sup>2</sup>

Enhanced recovery care is an effective way to increase the clinical benefits of SC. It can lead to an early push for rehabilitation and patient discharge.<sup>3</sup> As a result, Enhanced Recovery after Caesarean Surgery (ERACS) has recently been developed as a quick recovery program

following a Caesarean section. This program includes several therapies, from preoperative planning to intraoperative and postoperative care to patient release. The ERAS concept, first applied in intestinal surgery, was developed into the ERACS concept.<sup>4</sup> The ERAS idea has been shown to shorten hospital stays for patients, lessen postoperative complications, and boost patient satisfaction. The application of ERACS consists of three components: preoperative planning, intraoperative care, and postoperative care. The introduction of the ERACS program is thought to have further advantages, such as raising care standards and lowering opioid exposure and addiction. The mission of ERACS is to prioritize patient safety while delivering great patient care and a comfortable patient experience.<sup>3</sup> Today's mothers often discuss the ERACS method because

it reduces pain in mothers and makes it easier to return to normal activities.<sup>5</sup>

In order to demonstrate the superiority of the ERACS approach, numerous investigations have been carried out. These studies have demonstrated that ERACS can enhance the standard of treatment while lowering opioid exposure and addiction. However, no research proves that the ERACS method will reduce pain in every post-SC patient with the Visual Analogue Scale (VAS) scale, and no one has investigated how it affects the expulsion of colostrum and the lactation process. This study aims to analyze the effectiveness of ERACS on postoperative pain and the onset of colostrum excretion.

## METHODS

### Materials

In order to compare the degree of postoperative discomfort and the beginning of colostrum excretion in 2 groups, the control group and the treatment group, this study used a quasi-experimental study using a control group. The control group is conventional post-SC patients (Non-ERACS), while the treatment group is post-section cesarean patients using the ERACS method. Then analyze the correlation between variables. The independent variable was section Caesarea using the ERACS method, while the dependent variable was post-operation pain and the onset of colostrum excretion. At Surabaya's Mother and Child Hospital, this study was carried out. Seventy people are living there. Simple random sampling was employed to choose the sample, which included 30 respondents who had undergone ERACS surgery and 30 respondents who had undergone non-ERACS surgery—the tool for interviewing post-operative patients using the VAS.

### Data collection procedure

The researcher applied for a research permit to LPPM Universitas Nahdlatul Ulama Surabaya to be addressed to Mother and Child Hospital in Surabaya. After getting permission, the researcher immediately coordinated and approached the head of the delivery and postpartum rooms. When conducting the research, the researcher gave informed consent about the respondents' willingness as the object of

research. Then the researchers gave a VAS questionnaire to Postoperative patients from the first day to the third day; besides that, the researchers observed the onset of colostrum excretion in postoperative patients. The instrument of this study was to use an observation sheet to determine the onset of colostrum excretion and a questionnaire to determine the level of postoperative pain.

### Data analysis

Direct/primary data were gathered, and data gathering involved filling out observation logs and recapitulating them. The data were examined using the Chi-Square test and multivariate analysis with logistic regression to ascertain the relationship between the variables.

## RESULTS

### Respondent's overview

Based on the data collection results, data were obtained on the respondents' age. Data presented in Table 1 is a frequency distribution table for the age of the respondents. According to Table 1, 36.7% of ERACS surgeries were performed on patients between the ages of 26 and 30. In contrast to ERACS, 30% of non-ERACS subjects were between 36 and 40.

In addition to the age of the respondents, there are general data on respondents based on parity. Data presented in Table 2 is a frequency distribution table for respondent parity. Based on Table 2

below, it can be seen that in operations with ERACS and non-ERACS, the most respondents with multipara were 53.3% each.

### Relationship between age and parity with post-operative pain

Based on the results of data collection obtained, data on the age of the respondents and postoperative pain score. Data shown in Tables 3 and 4 are frequency distribution tables for the age of the respondents.

### Relationship of age and parity with the onset of colostrum excretion

Table 5 shows frequency data regarding age and onset of colostrum excretion. Table 6 shows frequency data regarding parity and onset of colostrum excretion.

### The effectiveness of ERACS on postoperative pain

Based on the data collection results, postoperative pain data were obtained with the ERACS and non-ERACS methods. The shown in Table 7 is a frequency distribution table for the respondent's pain scores.

Based on Table 7, it can be seen that in respondents with ERACS, the highest pain level was mild pain, which was 76.7%. While Non-ERACS, all respondents experienced moderate pain. Based on the results of data analysis with the Chi-Square test, a significant relationship between ERACS and postoperative pain

**Table 1.** Frequency distribution of respondent's age.

Age	ERACS		Non-ERACS	
	Frequency	Percentage	Frequency	Percentage
20-25 years old	4	13.3	5	16.6
26-30 years old	11	36.7	8	26.7
31-35 years old	7	23.3	8	26.7
36-40 years old	6	20	9	30
>40 years old	2	6.7	0	0
Total	30	100	30	100

**Table 2.** Frequency distribution based on respondent parity.

Parity	ERACS		Non-ERACS	
	Frequency	Percentage	Frequency	Percentage
Primipara	13	43.4	14	46.7
Multipara	16	53.3	16	53.3
Grandemultipara	1	3.3	0	0
Total	30	100	30	100

**Table 3.** Cross-table based on age and pain score.

Age	Pain Score						Total
	ERACS			Non-ERACS			
	Light	Moderate	Severe	Light	Moderate	Severe	
20-25 years old	3	1	0	0	5	0	9
26-30 years old	8	3	0	0	8	0	19
31-35 years old	4	3	0	0	8	0	15
36-40 years old	6	0	0	0	9	0	15
>40 years old	2	0	0	0	0	0	2
Total	23	7	0	0	30	0	60

**Table 4.** Cross-table based on parity and pain score.

Parity	Pain score						Total
	ERACS			Non-ERACS			
	Light	Moderate	Severe	Light	Moderate	Severe	
Primipara	11	2	0	0	14	0	27
Multipara	12	4	0	0	15	0	32
Grandmultipara	0	1	0	0	0	0	1
Total	23	7	0	0	30	0	60

**Table 5.** Cross-table based on age and onset of colostrum excretion.

Age	Onset of Colostrum								Total
	ERACS				Non-ERACS				
	1-6 hours	7-12 hours	12-18 hours	18-24 hours	1-6 hours	7-12 hours	12-18 hours	18-24 hours	
20-25 years old	2	2	0	0	3	2	0	0	9
26-30 years old	10	1	0	0	5	2	0	1	19
31-35 years old	5	1	0	0	7	1	0	1	15
36-40 years old	5	1	1	0	5	1	1	1	15
>40 years old	1	0	0	1	0	0	0	0	2
Total	23	5	1	1	20	6	1	3	60

**Table 6.** Cross-table based on parity and onset of colostrum excretion.

Parity	Onset of Colostrum								Total
	ERACS				Non-ERACS				
	1-6 hours	7-12 hours	12-18 hours	18-24 hours	1-6 hours	7-12 hours	12-18 hours	18-24 hours	
Primipara	11	1	0	0	11	2	0	2	27
Multipara	12	4	1	0	9	4	1	1	32
Grandmultipara	0	0	0	1	0	0	0	0	1
Total	23	5	1	1	20	6	1	3	60

was found ( $p < 0.001$ ). The multivariate test showed that the ERACS method reduces postoperative pain scores ( $p < 0.001$ ).

### The effectiveness of ERACS on the onset of colostrum excretion

Based on data collection in the first 24 hours after surgery with both ERACS and non-ERACS, data on the onset of colostrum excretion was obtained. Data shown in [Table 8](#) is a frequency distribution

table on the onset of colostrum excretion.

Based on [Table 8](#), it can be seen that most respondents with ERACS onset of colostrum came out in the range of 1-6 hours after surgery, which was 76.6%. Likewise, the majority of respondents with non-ERACS were in the first 1-6 hours after surgery, namely 66.7%, but this number was less than the number of ERACS respondents with the onset of breastfeeding in the range of 1-6 hours.

## DISCUSSION

Women's health is at its peak when they are 20-35. From a biological point of view, this age is the right time to get pregnant because the fertility rate is very high, and the eggs produced are abundant. The risk of having a baby born with defects is less because the quality of the eggs produced at this age is generally still very good.<sup>6</sup> As a result, most participants in this study—ERACS and non-ERACS—were between 20 and 35.

**Table 7. Frequency distribution based on respondent's pain level.**

Pain Level	ERACS		Non-ERACS	
	Frequency	percentage	Frequency	percentage
light	23	76.7	0	0
moderate	7	23.3	30	100
severe	0	0	0	0
Total	30	100	30	100

**Table 8. Frequency distribution based on onset of colostrum excretion.**

The onset of colostrum excretion	ERACS		Non-ERACS	
	Frequency	Percentage	Frequency	Percentage
1-6 hours	23	76.7	20	66.7
7-12 hours	5	16.7	6	20
13-18 hours	1	3.3	1	3.3
19-24 hours	1	3.3	3	10
Total	30	100	30	100

There are many causes or indications for a mother to have a cesarean section, both ERACS and non-ERACS. Research conducted at the DKT Gubeng Pojok Hospital Surabaya in 2016 showed that the number of mothers giving birth SC in the age group 20-35 years most experienced SC with indications of former SC, premature rupture of membranes, and position abnormalities.<sup>7</sup> This is also connected to the parity-based response rate. Most of the respondents in this study were multiparous, and they selected the SC with signs of a previous SC the most.

Contrary to vaginal or regular deliveries, cesarean delivery can result in greater difficulties. Incision-related pain, the possibility of thrombosis, the possibility of functional impairment, decreased muscle elasticity, abdominal and pelvic floor muscles, bleeding, bladder injury, infection, swelling in the lower extremities, and lactation issues are some of the complications that can develop in post-SC mothers. Postoperative pain is characterized by tissue damage and postoperative muscle spasm. Recently, it has been demonstrated that the mechanisms generating postoperative pain include peripheral and cerebral sensitization.<sup>8</sup>

This study suggests no relationship between parity and postoperative pain scores. It is possible because a variety of factors influence postoperative pain. The surgery duration, likely due to more extensive dissection, and a lower dermatomal level of sensory anesthesia

at the time of incision are factors linked to significant postoperative pain. These factors may increase nociceptive input to the spinal cord and enhance central sensitization.<sup>9</sup>

No matter the delivery method, vaginal or cesarean, breastfeeding is typically influenced by several factors, including assistance from medical professionals, the mother's health (physical and psychological), socio-cultural shifts, hospital administration, infant health, mother's attitude, family environment, substitute marketing rules, breastfeeding, and parity.<sup>10</sup>

This study also suggests no relationship between age and the onset of colostrum excretion. It is in accordance with Dewi (2016)'s research, which is that there is no relationship between parity and early breastfeeding practice on the first day of post-SC.<sup>10</sup>

Due to the intraoperative pathway's use of non-opioid analgesics like acetaminophen and non-steroidal anti-inflammatory drugs (started in the operating room unless contraindicated) and non-opioid analgesics like intrathecal morphine (50-150 g) or epidural morphine (1-3 mg) as well as supplemental local anesthetic wound infiltration or truncal blocks in some circumstances, (if unable to receive the above-recommended drugs). These multimodal analgesic regimens should strongly emphasize regularly scheduled non-opioid analgesia that is started before the beginning of pain (i.e., shortly after fetal delivery and

not on the first pain request).<sup>11</sup> The other findings are that opioids affect the central nervous system and that their use should be minimized, but opioids also have good analgesic properties and will undoubtedly work according to various drug receptors, which can also help reduce the side effects caused by opioid use postoperatively.<sup>12</sup>

Additionally, patients are advised to mobilize early along the surgical course. Following cesarean delivery, time-based objectives for ambulation include reducing insulin resistance, venous thromboembolic risk, and hospital duration of stay through early mobilization. An example of a recommended aim is getting out of bed and sitting up as tolerated within eight hours. Obstacles to early mobilization should be eliminated, including urine catheters, intravenous poles, and inadequate pain management.<sup>11</sup>

It is consistent with other studies that found that intrathecal opioids, followed by acetaminophen and nonsteroidal anti-inflammatory medications (NSAIDs) every six hours or four times daily, were frequently administered to post-ERAS patients for pain control. Patients received oral acetaminophen after receiving scheduled intravenous (IV) acetaminophen for 24 hours. There was oral oxycodone accessible for severe pain. Decoupling opioid administration from that of other pain drugs was the goal of inpatient pain treatment (e.g., NSAIDs and acetaminophen). Implementing an ERAS program in patients having elective cesarean deliveries was linked to decreased exposure to opioids while inpatient and when outpatient, as well as adjustments to the surgical procedure and care measures without worsening the surgical results.<sup>13</sup>

The Society for Obstetric Anesthesia and Perinatology (SOAP) recommends using ERACS preoperatively, during surgery, and afterward, focusing on post-Caesarean recovery. The mission of ERACS is to provide evidence-based, patient-centered treatment to all women that meet the requirements, maximizes post-cesarean recovery, and enhances mother and newborn health.<sup>14</sup>

Based on data analysis with the Chi-Square test, it was found that there is no significant relationship between ERACS and the onset of colostrum excretion

( $p=0.267$ ). This may occur as a result of a variety of variables that influence colostrum production. The type of mother's delivery is one of many factors that affect colostrum excretion. Normal delivery and SC are connected with the provision of medicines to the mother, which might impact the release of colostrum right after delivery, as well as psychological changes in the mother and discomfort. Colostrum production is also influenced by the baby's suction power, the oxytocin massage, and the early start of breastfeeding.<sup>15</sup>

## CONCLUSION

Based on the results of the data analysis, it was found that ERACS was effective in reducing postoperative pain. The ERACS can influence 64.5% of the postoperative pain score variable variation. However, ERACS is not effective in accelerating the onset of colostrum excretion.

## CONFLICT OF INTEREST

The authors claim that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## ETHICAL CLEARANCE

No. 203/EC/KEPK/UNUSA/2023.

## AUTHOR CONTRIBUTIONS

All authors contributed equally to this study.

## REFERENCES

1. Kemenkes RI. Profil Kesehatan Indonesia Tahun 2019. Jakarta: Kementerian Kesehatan Republik Indonesia; 2020. 21 p.
2. Hobbs AJ, Mannion CA, McDonald SW, Brockway M, Tough SC. The impact of caesarean section on breastfeeding initiation, duration and difficulties in the first four months postpartum. *BMC Pregnancy Childbirth*. 2016;16:90.
3. Tika TT. Metode ERACS Sebagai Program Perioperatif Pasien Operasi Caesar. *J Med Utama*. 2022;3(2):2386–91. Available from: <http://jurnalmedikahutama.com/index.php/JMH/article/view/463>
4. Ituk U, Habib AS. Enhanced recovery after cesarean delivery. *F1000Research*. 2018;7.
5. Nariswari SL. ERACS, Metode Persalinan yang Diklaim Kurangi Rasa Sakit pada Ibu [Internet]. *Kompas.com*. 2021. Available from: <https://lifestyle.kompas.com/read/2021/09/14/142842420/eracs-metode-persalinan-yang-diklaim-kurangi-rasa-sakit-pada-ibu?page=all>
6. Amir F, Yulianti S. Hubungan Paritas dan Usia Terhadap Persalinan Sectio Ccaesarea di RSU Bahagia Makassar Tahun 2020. *J Kesehat DELIMA PELAMONIA*. 2020;4(2):75–84. Available from: <http://dx.doi.org/10.37337/jkdp.v4i2.179>
7. Pontoh AH. INDIKASI PERSALINAN SECTIO CAESAREA BERDASARKAN UMUR DAN PARITAS. *Midwifery J Akbid Griya Husada Surabaya*. 2017;4(1):52.
8. Nurhayati NA, Andriyani S, Malisa N. RELAKSASI AUTOGENIK TERHADAP PENURUNAN SKALA NYERI PADA IBU POST OPERASI SECTIO SAECAREA. *J Sk*

Keperawatan. 2015;1(2):52–61. Available from: <http://dx.doi.org/10.35974/jsk.v1i2.87>

9. Jasim HH, Sulaiman SABS, Khan AH, S Rajah UA. Factors Affecting Post Caesarean Pain Intensity among Women in the Northern Peninsular of Malaysia. *J Clin Diagn Res*. 2017;09/01. 2017;11(9):IC07-IC11. Available from: <https://pubmed.ncbi.nlm.nih.gov/29207737>
10. Maharani Dewi U. FAKTOR YANG MEMPENGARUHI PRAKTIK MENYUSUI PADA IBU POST SECTIO CAESAREA DI RSI A. YANI SURABAYA. *J Heal Sci*. 2018;9(1). Available from: <http://dx.doi.org/10.33086/jhs.v9i1.183>
11. Bollag L, Lim G, Sultan P, Habib AS, Landau R, Zakowski M, et al. Society for Obstetric Anesthesia and Perinatology: Consensus Statement and Recommendations for Enhanced Recovery After Cesarean. *Anesth & Analg*. 2021;132(5):1362–77. Available from: <http://dx.doi.org/10.1213/ane.0000000000005257>
12. Suandika M, Muti RT, Tang W-R, Haniyah S, Astuti D. Impact of Opioid-Free Anesthesia on Nausea, Vomiting and Pain Treatment in Perioperative Period: A Review. *Bali Med J*. 2021;10(3):1408–14. Available from: <http://dx.doi.org/10.15562/bmj.v10i3.2984>
13. Hedderson M, Lee D, Hunt E, Lee K, Xu F, Mustille A, et al. Enhanced Recovery After Surgery to Change Process Measures and Reduce Opioid Use After Cesarean Delivery: A Quality Improvement Initiative. *Obstet Gynecol*. 2019;134(3):511–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/31403591>
14. Bollag L, Nelson G. Enhanced Recovery After Cesarean (ERAC) - beyond the pain scores. *Int J Obstet Anesth*. 2020;43.
15. Dina AA, Sumarah S, Kurniati A. HUBUNGAN JENIS PERSALINAN DENGAN WAKTU PENGELUARAN KOLOSTRUM PADA IBU BERSALIN KALA IV DI KOTA YOGYAKARTA TAHUN 2016. *J Kesehat Ibu dan Anak*. 2017;11(2):43–8. Available from: <http://dx.doi.org/10.29238/kia.v11i2.39>



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