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DIFFERENCES IN THE TIME TO ACHIEVE BROMAGE SCORE (2) IN POST-SPINAL ANESTHESIA CAESAREAN SECTION PATIENTS BETWEEN THE USE OF CONVENTIONAL METHODS AND ERACS

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ABSTRACT

Pregnancy, labor, and delivery lead to significant physiological changes, and having accurate knowledge of these changes is crucial for an effective spinal anesthetic technique during a caesarean section. Optimizing the mother's health before, during, and after a caesarean section is the goal of the ERACS care method, which is a specialized approach to surgical procedures. Issues with lower limb mobility, anxiety, and dependence on others are some mental health problems that may arise from prolonged recovery periods. Spinal anesthesia patients are evaluated using the Bromage scale to determine if they are ready to be released from the post-anesthesia room. Researchers at Panglima Sebaya Hospital aimed to compare the time taken by standard operating room procedures and ERACS to reach a Bromage Score (2) after spinal anesthesia in caesarean section patients. This study employed a cross-sectional design based on observational analytical research, which is a non-experimental quantitative technique. Out of 84 patients, 47 were treated with standard SC techniques, and 47 were treated with ERACS SC. The findings indicated that the conventional method took 181–240 minutes (3–4 hours) to achieve a Bromage score (2), while the ERACS method only took 60–120 minutes (1–2 hours). A significance value of 0.000 (2-tailed) was determined based on the independent t-test results. The results showed that the ERACS method required less time than the conventional method to achieve Bromage Score (2) in CS patients post-spinal anesthesia.

Keywords: bromage score; caesarean section; ERACS; spinal anesthesia

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INTRODUCTION

Anesthesia is a common practice in the medical field to numb patients during invasive surgeries such as caesarean sections. Local, general, and regional anesthesia are the three main types of these drugs (Mangku & Senapathi, 2010). Regional anesthesia is superior to general anesthesia in terms of safety for the mother, the amount of medication needed to control bleeding and other complications during induction, and the time required to recover from the anesthetic effects (Butterworth et al., 2013). Spinal anesthesia involves injecting local anesthesia into the subarachnoid space located between the L2-L3, L3-L4, or L4-L5 segments of the lumbar spine (Majid et al., 2011). As long as the block does not reach a high level, spinal anesthesia can satisfy the patient with its own set of benefits, including rapid recovery, fewer side effects, and less impact on the respiratory system. According to recent research conducted by the World Health Organization (WHO), the use of caesarean section (CS) procedures is increasing globally. It already accounts for more than 21% of births and is expected to continue to rise (World Health Organization, 2021). Furthermore, according to the 2018 RISKESDAS statistics, 17.6% of births in Indonesia occurred via CS. This percentage is predicted to increase by 5% to 15% annually, in line with the trend of birthing methods. The results presented here are consistent with the high volume of CS in East Kalimantan Province,

particularly in Paser Regency, where 43% of 5,052 births in 2022 were assisted by CS. In some circumstances, such as an intact uterus and a baby weighing more than 500 grams (Anggorowati & Sudiharjani, 2018), an artificial birthing method called caesarean section (CS) can be performed through an incision in the front abdominal wall and uterine wall. Hysterotomy, sometimes known as caesarean surgery, is a surgical procedure that allows a mother to give birth while the baby is still in the uterus (Sirait, 2021).

When the mother and fetus show signs that could endanger their lives, such as placenta previa or abnormal fetal position or presentation, the CS delivery technique is used (Cunningham et al., 2018). One of the most common CS delivery methods today is ERACS, or Enhanced Recovery After Caesarean Surgery. According to Nisak et al. (2023), ERACS is a procedure that improves maternal health before, during, and after caesarean section by implementing a specific care approach. ERACS is a program that helps patients recover more quickly after surgery. This program has several benefits, including a lower risk of complications and a shorter hospital stay. Additional benefits of ERACS include reducing opioid exposure and addiction rates, as well as improving the quality of healthcare services (Patel & Zakowski, 2021). The implementation of ERACS involves three (3) steps: preoperative preparation, intraoperative care, and postoperative care. This approach aims to ease the patient's mind with first-class services while accelerating care and recovery by prioritizing patient. According to research conducted by Tika et al. (2022), the ERACS method offers many advantages and benefits as a perioperative program for patients undergoing caesarean sections. These include a shorter hospital stay, less anxiety and depression, a lower risk of postoperative infections, and faster body recovery. In a different study, Nisak et al. (2023) found that mothers who used ERACS reported less discomfort during delivery than mothers who did not use ERACS. To help women cope with postoperative wound discomfort and allow them to move more quickly after childbirth, the ERACS approach uses minimal painkillers. Post-CS care is essential to help patients recover emotionally and physically after surgery. Because patients cannot move their lower limbs, psychological conditions such as anxiety, dependence, and depression can develop as a result of the five-day recovery interval.

Patients undergoing spinal anesthesia are evaluated using the Bromage scale to determine their readiness to be released from the post-anesthesia room. The Bromage scale is useful for assessing motor function after anesthesia. It measures the duration of postoperative care and observation. The criteria for moving patients from the recovery room are when their Bromage score is equal to or lower than 2 on the scale. A patient is considered fully recovered from anesthesia if they achieve a Bromage score of 2 (Finucane, 2007). According to research conducted by Nuryana (2020), patients utilizing the Enhanced Recovery After Surgery (ERAS) method achieved the Bromage Scale more quickly compared to those using conventional methods, specifically in patients undergoing Cesarean Section (CS) with spinal anesthesia. For CS patients, the range of ERAS methods resulted in an average Bromage Scale achievement time of 27 minutes, with the longest approach taking 67 minutes. In contrast, for CS patients, the range of time required to complete the Bromage Scale was from 136 minutes for the fastest traditional approach to 195 minutes for the longest. With an operating room capable of handling six different types of surgeries, Panglima Sebaya Hospital stands as a primary medical facility in Paser Regency. Panglima Sebaya Hospital offers Cesarean Section among other surgical care. According to statistics collected from the Central Operating Room Recovery Room of Panglima Sebaya Hospital, the average monthly patient load for CS is 47, with 32 patients undergoing conventional CS and 15 patients undergoing ERACS. The Bromage Scale should be less than or equal to 2, and patients often require 45 minutes to an hour to be transferred to the recovery room before they are allowed to leave. In

light of this, the author intends to compare the duration required to achieve a Bromage Score of 2 in patients undergoing spinal anesthesia for Cesarean Section using conventional techniques and ERACS in the Central Operating Room Recovery Room at Panglima Sebaya Hospital. Pada penelitian ini memiliki tujuan untuk mengetahui perbedaan lama waktu pencapaian Bromage Score (2) pada pasien SC pasca spinal anestesi antara pengunaan metode konvensional dengan ERACS di Kamar Operasi RSUD Panglima Sebaya.

METHOD

This research strategy employs an analytical, quantitative, non-experimental, cross-sectional study design. A total of 84 patients were included in the sample, consisting of 47 conventional CS patients and 47 ERACS CS patients. Data collection for this project was conducted from March to May 2024. Research implementation permission was granted by Panglima Sebaya Hospital on March 20, 2024, with letter number: 400.5.4/958/WD.11.3/2024. Panglima Sebaya Hospital in Paser Regency served as the research location, specifically in the Recovery Room. Data – data tersebut dikumpulkan menggunakan lembar observasi kemudian data diolah secara komputerisasi dengan cara editing, coding, data entry, dan tabulating. Selanjutnya, data dianalisis dengan dilakukan uji statistik menggunakan uji independent t-test. Namun, sebelum dilakukan uji statistik independent t-test, maka terlebih dahulu dilakukan uji normalitas data untuk mengetahui normal atau tidaknya data yang digunakan. Uji normalitas data dilakukan dengan menggunakan rumus Kolmogorov Smirnov atau Shapiro-Wilk.

RESULT

Characteristics of the Respondents

Table 1.
Univariate Analysis Results Based on Age, Height, and Weight

Variable	Mean ± SD	Minimum	Maximum
Age (years)	30.5 ± 5.1	20	45
Height (cm)	158.4 ± 6.5	145	175
Weight (kg)	65.1 ± 8.9	55	85

Time Required to Achieve Bromage Score (2) Post-Spinal Anesthesia in Caesarean Section Patients Using Conventional and ERACS Methods

Table 2.
Frequency Distribution of the Duration to Achieve Bromage Score (2) in Post-Spinal Anesthesia Caesarean Section Patients Using Conventional and ERACS Methods

Time (minutes)	Conventional (n=47)	ERACS (n=47)
0–30	0 (0%)	43 (91%)
31–60	17 (36%)	4 (9%)
61–120	17 (36%)	0 (0%)
121–180	13 (28%)	0 (0%)

Table 3.
Mean Time to Achieve Bromage Score (2) in Post-Spinal Anesthesia Caesarean Section Patients Using Conventional and ERACS Methods

Group	Mean ± SD	Minimum	Maximum
Conventional	137.5 ± 40.3	70	180
ERACS	17.3 ± 9.6	5	30

DISCUSSION

Characteristics of the Respondents

Age

According to Table 1, which discusses respondents' characteristics by age, the majority of mothers undergoing caesarean section, whether through conventional or ERACS methods, are aged between 17 and 35 years. These findings align with previous research that shows the majority of mothers who underwent caesarean sections in 2024 at Bahagia Hospital Makassar were aged between 20 and 35 years (Surmayanti *et al*., 2022). Meanwhile, mothers giving birth via caesarean section were aged between 20 and 34 years, according to research conducted at Budi Kemuliaan Hospital in 2020 (Soebrata et al., 2023). The ideal age for women to have children is between 20 and 35 years because, during this period, women are at their reproductive peak. Biologically, the best time for women to become pregnant is between 20 and 35 years of age, as fertility rates and egg production are at their highest during this period (Murray & Huelsmann, 2013). At this stage of a woman's life, her body is typically in the best condition to support pregnancy, and her uterus can provide the best environment for the growing baby (Soebrata *et al*., 2023).

Height

Mothers undergoing caesarean section, either with traditional or ERACS procedures, generally have a height range between 151–160 cm, according to Table 1, which discusses respondent characteristics by height. Septiana and Sapitri (2020) found that the majority of caesarean section patients at Prabumulih City Hospital had a height of 145 cm or more, which is consistent with the findings of this study. According to Septiana & Sapitri (2020), Rustam Mochat proposed that women with a height of 145 cm or less might have a narrow pelvis and are more likely to undergo a caesarean section during childbirth. However, this study's findings contradict that assumption. According to the research, a small pelvis, which can complicate the baby's passage through the birth canal, is highly associated with heights below 145 cm. Due to the correlation between pelvic circumference and overall body and spine dimensions, height is one of the variables that can contribute to a narrow pelvis. An average-height individual's pelvis is generally wider and larger than that of shorter individuals. Because the pelvis is part of the spine, its size can be influenced by spinal dimensions. Additionally, Kristiani *et al*. (2023) noted that environmental and genetic factors are among the many other variables that can affect pelvic size.

Weight

Table 1 shows that the majority of mothers undergoing caesarean sections, both through traditional and ERACS procedures, weigh between 61 and 70 kg. This group represents the respondent's weight-related characteristics. Researchers hypothesize that maternal weight during pregnancy, patients' desire to give birth more comfortably, and the growing popularity of caesarean sections all play a role in patient preferences regarding delivery procedures. Because overweight pregnant women are more likely to experience infertility issues and spontaneous miscarriages, According to the Institute of Medicine, between 50% and 60% of overweight and obese mothers put themselves and their unborn children at risk of complications such as venous thromboembolism, depression, premature birth, high blood pressure, and breastfeeding difficulties. Mothers who are underweight, compared to those who are obese, require extra fat. Premature labor and macrosomia are risks for mothers with unfavorable pregnancies (Zahra & Hidayat, 2023). Transverse skin incisions and cleaner transverse uterine incisions should be made in women who are obese. The use of subcutaneous layers is highly recommended, as there is a higher risk of infection in this population (Machado, 2012).

Time to Achieve Bromage Score (2) in Post-Spinal Anesthesia Caesarean Section Patients Using Conventional Methods

According to the results presented in Table 2, the conventional method of achieving a Bromage score (2) in post-spinal anesthesia caesarean section patients typically takes between 31 and 60 minutes, or approximately half an hour to an hour, with an average time of 67 minutes. Observation findings corroborate this, as 17 individuals (36%) required 31 to 60 minutes. The anesthetic drugs used in this study for patients undergoing caesarean section with the conventional technique were: a) Bupivacaine 12 mg + Fentanyl 25 mg; and b) Bupivacaine 0.5% 12.5 mg. Bupivacaine is an amide-type local anesthetic with a rapid onset of action and a long duration of effect. By blocking the passage of sodium ions across cell membranes, bupivacaine temporarily stops impulses from traveling along nerve fibers (Puar, 2021). To maximize the analgesic action of local anesthetics like bupivacaine, further medications or adjuvants are required.

The use of opioids is one example of an adjuvant. Opioids are defined as any chemical substances, whether naturally occurring or synthetic, that bind to morphine receptors and effectively reduce pain during and after surgery (Badi *et al*., 2022). A reliable synergistic effect can be achieved by combining moderate doses of bupivacaine with opioid adjuvants; this combination extends the duration of the sensory block without exacerbating sympathetic block or delaying recovery (Nahakpam *et al*., 2020). The results of this study support previous research indicating that patients undergoing spinal anesthesia post-caesarean section with a dose of bupivacaine 0.5% 20 mg require 190-235 minutes to achieve a Bromage score (2), whereas a dose of bupivacaine 0.5% 15 mg requires 155-195 minutes (Nuriyadi, 2012). Further research conducted in November 2018 at Dr. Moewardi Surakarta Hospital and other indicated that, compared to bupivacaine 5 mg + fentanyl 50 mcg, bupivacaine 12.5 mg provides a longer duration of motor blockade and a faster onset of effects. This data suggests that recovery times are shorter with the combination of bupivacaine 5 mg and fentanyl 50 mcg. The authors of the study hypothesize that the addition of 50 mcg fentanyl and the volume of the local anesthetic reduce the concentration of bupivacaine, which subsequently affects the binding of bupivacaine to proteins, thus explaining the delayed onset and shorter duration of motor blockade (Indradata *et al*., 2021).

Duration to Achieve Bromage Score (2) in Cesarean Section Patients Post-Spinal Anesthesia with Enhanced Recovery After Cesarean Surgery (ERACS) Method

According to findings in Table 2, related to the time required to achieve a Bromage Score of (2) in patients undergoing Cesarean Section (CS) post-spinal anesthesia, the ERACS method typically results in a duration of 0 minutes to 30 minutes, or 0 hours to half an hour. On average, 43 patients (91%) achieved a Bromage Score of (2) within 17 minutes, with a range of 0-30 minutes. These findings are supported by observational data. Levobupivacaine 0.5% 10 mg + fentanyl 25 mg was administered to all sample patients undergoing CS using the ERACS technique in this study. The time required to achieve the Bromage Score is influenced by the anesthetic medication given to the patients (2). Consistent with previous studies, this research indicates that levobupivacaine significantly reduces the resolution time for Bromage 0 motor blockade compared to bupivacaine, even when both drugs are given with the same amount of additional opioids (Bremerich *et al*., 2007). Furthermore, Artawan et al. (2021) and others have shown that isobaric levobupivacaine groups have much shorter motor and sensory blockade durations. As the S(-) non-racemic enantiomer of bupivacaine, levobupivacaine has a lower toxicity profile for the cardiovascular and central nervous systems.

Levobupivacaine is used as a replacement for the more commonly used bupivacaine due to its claimed advantages, such as a broader effect on sensory nerve fibers compared to motor fibers and a lower risk of cardiotoxicity in overdose compared to the racemic form of bupivacaine. Because the protein binds faster, levobupivacaine is less hazardous. Moreover, compared to patients receiving bupivacaine, levobupivacaine has milder side effects, including hypotension, bradycardia, nausea, and vomiting (Duggal *et al*., 2015). For all patients consuming it, fentanyl significantly enhances the quality of anesthesia and prolongs the analgesic period. Patients who use opioids may experience the highest quality of anesthesia when both drugs work synergistically in various ways (Ferrarezi *et al*., 2021). Levobupivacaine 0.5% 10 mg + fentanyl 25 mg will work synergistically to enhance the effectiveness and duration of postoperative analgesia after a Cesarean Section, making the mother more comfortable without negatively impacting the baby's health.

Difference in Time to Achieve Bromage Score (2) in Cesarean Section Patients Post-Spinal Anesthesia between Conventional Methods and Enhanced Recovery After Cesarean Surgery (ERACS)

The 2-tailed significance value was set at 0.000 according to the independent t-test findings in Table 4. This finding indicates that the ERACS approach takes longer than the standard method to achieve a Bromage Score of (2) in patients undergoing Cesarean Section after spinal anesthesia. Data in Table 4.2 further shows the time difference between the two methods; traditional Cesarean Sections often take 31-60 minutes, while ERACS procedures usually take only 0-30 minutes. Partially due to the type of anesthesia administered to patients, the ERACS approach requires less time than the traditional method to achieve a Bromage Score of (2) in patients undergoing Cesarean Section post-spinal anesthesia. This aligns with the idea that, after spinal anesthesia, the patient's leg muscles are still susceptible to the effects of general anesthesia. The density of the local anesthetic determines how the drug flows and how much area is anesthetized (Butterworth *et al*., 2013). The length of spinal blockade is largely influenced by the dose of local anesthetic; longer motor recovery periods are associated with higher doses of local anesthetic (Ikhwandi *et al*., 2023).

Additionally, other factors come into play, such as informing patients about mobilization. This includes explaining that patients can move their toes, ankles, and flex them 0-6 hours after the initial Cesarean Section. Patients still feel anxious about moving after surgery, so this information is crucial. The anesthetic given to patients undergoing conventional Cesarean Section is bupivacaine 0.5% 12.5 mg or fentanyl 25 mg + bupivacaine 12 mg, according to previous research. On the other hand, levobupivacaine 0.5% 10 mg + fentanyl 25 mg is prescribed to patients undergoing ERACS. Patients undergoing spinal anesthesia for Cesarean Section will experience a shorter sensory and motor blockade if given 10 mg fentanyl and 0.5% levobupivacaine. These results are consistent with previous research showing faster motor recovery times in the levobupivacaine group compared to the bupivacaine group (Artawan *et al*., 2021). Consistent with previous studies, this research establishes that the ERACS approach requires more time than the standard method to achieve a Bromage Score in patients undergoing Cesarean Section (Nuryana, 2020). Early mobilization level 1, defined as the ability to move the lower extremities, differs significantly in patients treated with ERACS compared to those treated with non-ERACS care, according to other research (Zuleikha et al., 2023). Furthermore, previous research has shown that patients undergoing ERACS were able to achieve early mobilization at level 1 in 17 participants (94.4% of the total) and level 2 in 1 participant (5.6%), consistent with our study results (Nuraeni *et al*., 2024).

CONCLUSION

The conclusions drawn from this study indicate that, between March and May 2024, patients undergoing post-spinal anesthesia caesarean section at Panglima Sebaya Hospital required an average of 67 minutes, or 31 to 60 minutes, to achieve a Bromage score (2) when using the conventional method. Using the ERACS method, patients undergoing post-spinal anesthesia caesarean section at Panglima Sebaya Hospital between March and May 2024 typically required an average of 17 minutes or 0–30 minutes (around 0–0.5 hours) to achieve Bromage score (2). Panglima Sebaya Hospital found that between March and May 2024, patients undergoing post-spinal anesthesia caesarean section required longer to achieve a Bromage score (2) when using the conventional approach compared to the ERACS method.

REFERENCES

Anggorowati, & Sudiharjani, N. (2018). Mobilisasi Dini dan Penyembuhan Luka Operasi Pada Ibu Post Sectio Caesarea (SC) di Ruang Dahlia Rumah Sakit Umum Daerah Kota Salatiga. Prosiding Seminar Nasional Dan Internasional Universitas Muhammadiyah Semarang, 30–35.

Artawan, I. M., Yulianto Sarim, B., Sagita, S., & Etty Dedi, M. A. (2021). Perbandingan Anestesi Spinal Menggunakan Bupivakain Hiperbarik Dengan Levobupivakain Isobarik Pada Seksio Sesarea. Jurnal Anestesi Obstetri Indonesia, 4(2), 93–99. https://doi.org/10.47507/obstetri.v4i2.74

Bremerich, D. H., Fetsch, N., Zwissler, B. C., Meininger, D., Gogarten, W., & Byhahn, C. (2007). Comparison of intrathecal bupivacaine and levobupivacaine combined with opioids for Caesarean section. Current Medical Research and Opinion, 23(12), 3047–3054. https://doi.org/10.1185/030079907X242764

Butterworth, J., Mackey, D. C., & Wasnick, J. (2013). Morgan and Mikhail'sClinical Anesthesiology. In Lange medical book (5th ed.). McGraw-Hill Education. https://books.google.co.id/books/about/Morgan_and_Mikhail_s_Clinical_Anesthesio.html?id=Lah3FOY_kgYC&redir_esc=y

Cunningham, K.J., L., S.L., B., J.S, D., B.L, H., B.M, C., & C.Y, S. (2018). Overview of obstetrics. In Williams Obstetrics (25th ed.). McGraw-Hill Education.

Duggal, R., Kapoor, R., & Moyal, G. (2015). A comparison of intrathecal levobupivacaine with hyperbaric bupivacaine for elective cesarean section: A prospective randomized double-blind study. Journal of Obstetric Anaesthesia and Critical Care, 5(2),78. https://doi.org/10.4103/2249-4472.165135

Ferrarezi, W. P. P., Braga, A. de F. de A., Ferreira, V. B., Mendes, S. Q., Brandão, M. J. N., Braga, F. S. da S., & Carvalho, V. H. (2021). Spinal anesthesia for elective cesarean section. Bupivacaine associated with different doses of fentanyl: randomized clinical trial. Brazilian Journal of Anesthesiology (Elsevier), 71(6), 642–648. https://doi.org/10.1016/j.bjane.2021.03.030

Finucane, B. T. (2007). Complications of Regional Anesthesia (2nd ed.). https://link.springer.com/book/10.1007/978-0-387-68904-3

Ikhwandi, A., Fajar Apsari, R. K., & Rahardjo, S. (2023). Perbandingan Anestesi Spinal Bupivakain Low Dose dan Conventional Dose dalam Mencapai Adekuasi Blok

Sensorik untuk Prosedur Seksio Sesarea: Penelitian Noninferioritas Acak Tersamar Tunggal. Jurnal Anestesi Obstetri Indonesia, 6(3), 150–158. https://doi.org/10.47507/obstetri.v6i3.150

Indradata, F., Dwi Purnomo, H., Thamrin, M. H., Budi Santoso, S., Tri Arianto, A., & Supraptomo, R. (2021). Perbandingan Efektivitas Anestesi Spinal dengan Bupivacain 12,5 Mg dan Bupivacain 5 Mg yang ditambah Fentanyl 50 Mcg pada Seksio Sesarea. Jurnal Anestesi Obstetri Indonesia,4(1),11–17. https://doi.org/10.47507/obstetri.v4i1.55

Kristiani, Y., Ibrahim, R., & Jingsung, J. (2023). Hubungan Tinggi Badan Dengan Kejadian Cephalopelvicdisproportion (Cpd) Pada Ibu Bersalin Di Rumah Sakit Umum Dewi Sartika Kota Kendari. Jurnal Pelita Sains Kesehatan, 4(3), 23–31.

Machado, L. S. (2012). Cesarean section in morbidly obese parturients: practical implications and complications. North American Journal of Medical Sciences, 4(1), 13–18. https://doi.org/10.4103/1947-2714.92895

Majid, A., Judha, M., & Istianah, U. (2011). Keperawatan perioperatif (1st ed.). Gosyen Publishing.

Mangku, G., & Senapathi, T. G. A. (2010). Buku ajar ilmu anestesia dan reanimasi. PT Indeks.

Murray, M. L., & Huelsmann, G. M. (2013). Persalinan & Melahirkan. EGC.

Nahakpam, S., Dhanachandra, L., Devi, N. J., Wahab, Z., Samjetsabam, L., Kumaragurubaran, T. R., Thongram, K., & Keishab, B. (2020). A Comparative Study on Three Different Doses of Fentanyl with Bupivacaine in Spinal Anaesthesia in Caesarean Section. Journal of Evidence Based Medicine and Healthcare, 7(7), 327–332. https://doi.org/10.18410/jebmh/2020/70

Nasman Puar. (2021). Anestesi Spinal Levobupivacaine Isobarik pada Sectio Caesarea. Medicinus, 34(1), 52–54. https://doi.org/10.56951/medicinus.v34i1.56

Nisak, A. Z., Kusumastuti, D. A., & Munawati, M. (2023). Perbedaan Metode Konvensional Dan Eracs Dengan Tingkat Nyeri Pada Pasien Post Sectio Cesarea. Jurnal Ilmu Keperawatan Dan Kebidanan, 14(1), 261–268. https://doi.org/10.26751/jikk.v14i1.1689

Nuraeni, N. Y., Yudono, D. T., Sumarni, T., & Susanto, A. (2024). Gambaran Manajemen Nyeri Post Enhanced Recovery After Caesarean Surgery (ERACS). Jurnal Ilmiah Wahana Pendidikan, 4(1), 1–23.

Nuriyadi. (2012). Perbedaan Lama Waktu Pencapaian Nilai Skala Bromage 2 dengan Spinal Anestesi Bupivacain 0,5% 20 mg dan 15 mg pada Pasien Pasca Sectio Caesaria di RSUD Muntilan. Poltekkes Kemenkes Yogyakarta.

Nuryana, R. (2020). Efektivitas Penggunaan Teknik Spinal Anestesi Enhanced Recovery After Surgery (Eras) Dengan Teknik Spinal Anestesi Konvensional Terhadap Pencapaian Bromage Score Pada Pasien Seksio Cesaria Di Recovery Room RSU Muhammadiyah Lampung [Poltekkes Kemenkes Yogyakarta. http://eprints.poltekkesjogja.ac.id/id/eprint/10526

Patel, K., & Zakowski, M. (2021). Enhanced Recovery After Cesarean: Current and Emerging Trends. Current Anesthesiology Reports, 11(2), 136–144. https://doi.org/10.1007/s40140-021-00442-9

Septiana, M., & Sapitri, A. (2020). Faktor-Faktor Yang Berhubungan Dengan Persalinan Sectio Caesarea. Lentera Perawat, 1(2).

Sirait, B. I. (2021). Seksio Sesaria [Universitas Kristen Indonesia]. http://repository.uki.ac.id/9660/1/BahanKuliahSeksioSesaria.pdf

Soebrata, E. S., Rifki, M., & Windiany, E. (2023). Faktor-Faktor yang Berhubungan Dengan Persalinan Seksio Caesarea di Rumah Sakit Budi Kemuliaan Tahun 2020. Jurnal Kebidanan Dan Kesehatan Reproduksi, 1(2), 09–15. https://doi.org/10.61633/jkkr.v1i2.6

Surmayanti, Fitriana Jufri.P, & Sainah. (2022). Karakteristik Persalinan Sectio Caesarea (SC) di RSU Bahagia Makassar. Sehat Rakyat: Jurnal Kesehatan Masyarakat, 1(3), 205–214. https://doi.org/10.54259/sehatrakyat.v1i3.1083

Tika, T. T., Sidharti, L., Himayani, R., & Rahmayani, F. (2022). Metode ERACS Sebagai Program Perioperatif Pasien Operasi Caesaragus. Jurnal Medika Hutama, 03(02), 2386–2391.

Tri Badi, Sulastri Sulastri, & Immanuel Rianto Sitorus. (2022). Gambaran Lama Kerja Analgesi Pada Spinal Anestesi Menggunakan Bupivakain 0,5 % Hiperbarik 12,5mg Dengan Tambahan Morfin 0,2 Mg Terhadap Waktu Respon Nyeri Pasien Pasca Sectio Caesarea Di RS Vita Insani. Jurnal Riset Rumpun Ilmu Kesehatan, 1(1), 195–200. https://doi.org/10.55606/jurrikes.v1i1.1976

World Health Organization. (2021). Caesarean section rates continue to rise, amid growing inequalities in access. https://www.who.int/news/item/16-06-2021-caesarean-section-rates-continue-to-rise-amid-growing-inequalities-in-access

Zahra, T. A., & Hidayat, F. (2023). Hubungan Pertambahan Berat Badan Pada Ibu Selama Kehamilan Dengan Kejadian Bblr. Jurnal Muara Medika Dan Psikologi Klinis, 3(1), 15–21. https://doi.org/10.24912/jmmpk.v3i1.24797

Zuleikha, A. T., Kurniawaty, E., Wahyuni, A., & Sidharti, L. (2023). Perbandingan Efek Samping dan Kenyamanan Pasien Pasca Operasi Sectio Caesarea Metode Eracs dan Non Eracs. Malahayati Nursing Journal, 5(7), 2201–2211. https://doi.org/10.33024/mnj.v5i7.10177.