

Pregledni znanstveni članek/Review article

Managing postcaesarean section pain with opioid analgesia and the effect on breastfeeding: A literature review

Obvladovanje bolečine po carskem rezu z opioidno analgezijo in vpliv na dojenje: pregled literature

Uroš Višič^{1, 2, *}, Miha Lučovnik^{1, 3}

Key words: pain; delivery; opioid; mobilisation; nursing

Ključne besede: bolečina; porod; opioid; mobilizacija; zdravstvena nega

¹ University Medical Centre Ljubljana, Šlajmerjeva 4, 1000 Ljubljana, Slovenia

² University of Novo mesto, Faculty of Health Sciences, Na Loko 2, 8000 Novo mesto, Slovenia

³ University of Ljubljana, Faculty of Medicine, Zaloška cesta 4, 1000 Ljubljana, Slovenia

* Corresponding author/
Korespondenčni avtor:
urosvic@gmail.com

ABSTRACT

Introduction: Pain after caesarean section is an expected event that can affect the patient's recovery and first attempts at breastfeeding. The aim of this review was to determine the relationship between opioid pain management after caesarean section and support during the first breastfeeding attempts.

Methods: A descriptive method was used to conduct a literature search in the PubMed Central, ScienceDirect, and Google Scholar databases, which included literature published between 2013 and 2023. A combination of the following keywords was used in the search: "pain", "delivery", "opioid", "mobilisation" and "nursing". Primary sources were selected according to predefined inclusion and exclusion criteria. The search process and selection are illustrated using the PRISMA diagram. A thematic analysis was conducted by coding the data retrieved.

Results: The literature search yielded nine articles addressing the status of opioid pain management and breastfeeding after caesarean section. The results of the literature search were critically appraised using the MML tool. The main content pertained to the outcomes of identifying different interventions for the management of postoperative pain and initiation of breastfeeding after caesarean section.

Discussion and conclusion: In general, patients in different countries were found to be at higher risk of inadequate forms of pain management after caesarean section. We also identified the key research gaps that should be addressed to support further public health interventions for more appropriate pain management and the promotion of and support with breastfeeding after caesarean section.

IZVLEČEK

Uvod: Bolečina po carskem rezu je pričakovan dogodek, ki lahko vpliva na okrevanje otročnice in prvo dojenje. Namen tega pregleda je ugotoviti povezavo med obravnavo bolečine z opioidi po carskem rezu in podporo pri dojenju.

Metode: Izvedli smo pregled strokovne in znanstvene literature. Iskanje je potekalo po podatkovnih bazah PubMed Central, ScienceDirect in Google Scholar. Vključena je bila literature, objavljena med letoma 2013 in 2023. Pri iskanju so bile uporabljene kombinacije ključnih besed: »bolečina«, »porod«, »opioid«, »mobilizacija« in »zdravstvena nega«. Primarni viri so bili izbrani v skladu z merili za vključitev in izključitev. Postopek iskanja in izbor sta prikazana s pomočjo PRISMA diagrama. Tematska analiza je bila izvedena s kodiranjem rezultatov.

Rezultati: Identificirali smo 9 člankov, ki so obravnavali status obvladovanja bolečine z opioidi po carskem rezu. Rezultate smo kritično ovrednotili z orodjem PICO. Glavna vsebina so bili rezultati pri ugotavljanju različnih intervencij za obvladovanje pooperativne bolečine in za začetek dojenja po carskem rezu.

Diskusija in zaključek: Na splošno velja, da so otročnice v različnih državah bolj izpostavljene tveganju neučinkovitih načinov obvladovanja bolečine po carskem rezu. Opredelili smo ključne vrzeli, ki bi lahko bile nadaljne področje raziskovanja za ustrežnejše obvladovanje bolečine ter podpora dojenju po carskem rezu.



Received/Prejeto: 28. 8. 2023
Accepted/Sprejeto: 26. 7. 2024

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Introduction

Pain management after caesarean section is critically important and a top priority for parturients undergoing caesarean section (Komatsu et al., 2022). Opioids are commonly prescribed for pain management as they reduce the intensity of pain signals (Brown, 2020). The introduction of opioid substitutes has made it possible to administer lower doses of opioids during and after surgery (Boysen et al., 2023). However, managing breakthrough pain requires a standardised approach with planned non-opioid adjuncts and prescribed doses (Sangkum et al., 2021). The incidence of caesarean section varies widely around the world. In most European countries, the caesarean section rate is between 25% and 35% (Vila-Candel et al., 2020). In Slovenia, the rate has increased significantly over the years and has stabilised at around 21% (Visic et al., 2021). The highest rates have been observed in the Dominican Republic (56.4%). In the United States of America, caesarean section is the most common surgical procedure in hospitals, accounting for 31.9% of deliveries, while the global average for caesarean section deliveries is 18.6% (Landau et al., 2023).

As with all surgical procedures, pain after a caesarean section is an expected event that can affect the patient's recovery (Carvalho & Butwick, 2017). While opioids provide adequate pain control, their side effects can negatively affect the mother-newborn bonding in the early postpartum period (Višić et al., 2022). Common side effects of opioid administration include sedation, dizziness, nausea, constipation, tolerance and respiratory depression (Daoust et al., 2020). While in some parturients with low analgesic requirements, a standard (non-opioid) analgesic regimen may lead to overmedication and analgesic-related side effects (Sangkum et al., 2021), this type of pain management enables early ambulation, breastfeeding, prevention of thromboembolic complications associated with caesarean section, as well as bonding between mother and newborn (Visic et al., 2021; Zipursky et al., 2023). ERAC (Enhanced Recovery After Cesarean) uses an interdisciplinary approach in which the patient is part of the support system consisting of all healthcare professionals. Intraoperative anaesthesia and postoperative multimodal pain management are the simplest components of appropriate treatment. The postoperative course requires increasing involvement of nursing staff in the early postoperative period (Patel & Zakowski, 2021).

Caesarean section requires optimal perioperative pain management, which not only enables early outpatient management, but also plays a key role in postoperative rehabilitation (Ismail et al., 2012). In a significant proportion of patients, it has been associated with moderate to severe postoperative pain, which can delay return to daily activities and also affect the first attempts at breastfeeding (Roofthoof

et al., 2021). The issue of breastfeeding support after caesarean section that would also focus on maternal outcomes has not been addressed until recently (Ahmadi et al., 2015; Wen et al., 2015). Although it is generally recognised that caesarean section has a negative impact on breastfeeding, individual population-based studies examining the association between caesarean delivery and breastfeeding are inconsistent (Cohen et al., 2018). Early skin-to-skin contact has been shown to promote breastfeeding and is associated with physiological and psychological benefits for both mother and infant (Mary et al., 2021). The first postpartum hours are therefore crucial for the establishment and continuation of breastfeeding (Cohen et al., 2018; Gianni et al., 2020).

Aims and objectives

The aim of this systematic review was to determine the effects of opioid analgesia after caesarean section in the early postpartum period. The specific aim of this review was to investigate the association between opioid treatment of pain after caesarean section and its impact on ambulation and the early stages of breastfeeding. The following research questions were addressed:

- What is the impact of opioid analgesia on activity performance in the early postcaesarean section period?
- What is the outcome of opioid analgesia and breastfeeding after caesarean section?

Methods

We conducted a literature review with quality assessment on the effect of pain management after caesarean section using only opioid analgesia on activity performance and breastfeeding initiation in the early postpartum period.

Review methods

The PubMed Central, ScienceDirect, and Google Scholar databases were used for the electronic search for the primary literature, supplemented by a manual search. The inclusion and exclusion criteria listed in Table 1 were applied in the literature search. Based on the guidelines by Streubert & Carpenter (2011), the suitability of the identified literature for inclusion in the study was first assessed. The search results were analysed in several rounds. In the first round, the titles were carefully screened, and if the suitability of a record for inclusion in the study could not be determined on the basis of the title, the abstract was reviewed. In the second round, abstracts were read carefully, and in the third round, articles were read and assessed for eligibility for inclusion. We used the following inclusion criteria: patients undergoing caesarean

Table 1: Inclusion and exclusion criteria
Tabela 1: Vključitvena in izključitvena merila

Type of criteria/ Vrsta meril	Inclusion criteria/ Vključitvena merila	Exclusion criteria/ Izključitvena merila
Topic	Caesarean section; opioid analgesia; breastfeeding.	Vaginal birth, regional analgesia, addiction to opioids.
Type of research	Literature review and meta-analysis, cohort study, prospective observational study, longitudinal study.	Unpublished material, abstract, reports, and literature without professional content.
Observed population	Patients after caesarean section with breastfeeding attempts.	Patients after vaginal birth and no breastfeeding experience.
Time frame	Articles published since 2013.	Articles published before 2013.

section, pain management with opioid analgesia, fully accessible articles published in English or Slovene since 2013. The following search strategy, consisting of a combination of keywords and Boolean operators, was used: ("caesarean section" OR "caesarean delivery") AND ("opioid analgesia" OR "opiate analgesia") AND ("breastfeeding" OR "lactation"). The literature search took place in April 2023. We focused on the topic of opioid pain management after caesarean section and its impact on breastfeeding after caesarean section.

The literature was screened for suitability for inclusion in the literature review using the guidelines described by Streubert & Carpenter (2011). We included publications that contained data on postcaesarean pain management with opioids for the defined population. We included publications with original results that were available as full text or comprehensive abstracts. Given the advances in the field of postcaesarean pain management, the literature search was limited to publications from the last 10 years. Relevant publications not yet found in the literature search and identified manually through other sources such as web browsers, organisations and citation searches, were included as additional records. All inclusion and exclusion criteria are listed in Table 1.

Results of the review

Our literature search yielded 37 records. After removing duplicates ($n = 2$) and adding records from other sources ($n = 12$), 23 records were screened for relevance. After removing irrelevant records ($n = 9$), the full texts of the publications were collected ($n = 14$). The literature review was conducted on the basis of nine ($n = 9$) relevant publications. The identified publications were categorised into two groups according to the reported outcome of the study: a) pain management after caesarean section with opioid use and b) breastfeeding after caesarean section with opioid use. Nine articles were included in the study, as shown in Figure 1. Table 3 shows the characteristics of each study included in our literature review. We carefully screened all selected publications and extracted the following information: description of the study period, study population, and results (outcomes related to opioid analgesia and breastfeeding after caesarean section).

Quality assessment of the review and description of data processing

The results of the literature review included one qualitative and eight quantitative studies from different countries. The selected literature was included in the final review on the basis of relevance, topicality and accessibility. The typology of the nine sources retrieved and included in the final literature review was determined based on the hierarchy of evidence in scientific research (Polit & Beck, 2018). The inclusion of multi-methods research can address the complex aspects of healthcare services research that can not be analysed using a single method (Harrison et al., 2021). Therefore, the reliability of the reviewed studies was determined based on a critical appraisal using the PICO model (P – patient, I – intervention, C – comparison, O – outcome), where we critically appraised the qualitative studies using a control (Brandt Eriksen & Faber Frandsen, 2018) and established that the selected studies were suitable for inclusion in the data analysis. The criteria for assessing the quality of the studies were the structure and coherence of the research and the reliability of the sources used. In the final phase, we identified nine studies, determined the codes and classified them into three categories according to their level of significance: A – excellent, B – good, C – sufficient (Table 2).

Table 2: Level of evidence for the studies included in the review**Tabela 2: Stopnja dokazov pri vključenih študijah**

Author, year, country / Avtor, leto, država	Level of evidence / Stopnja dokazov
Bjornstad & Reder, 2020, Norway	A
Chao et al., 2019, USA	B
Chang et al., 2022, Taiwan	C
Fassoulaki et al., 2021, Greece	A
Hooda et al., 2023, India	B
Landau et al., 2021, USA	A
O'Connor et al., 2022, USA	B
Oommen et al., 2021, Norway	B
Patzkowski et al., 2023, USA	C

Legend/legenda: A – excellent/odlično; B – dobro/good; C – zadostno/fair; USA – United States of America/Združene države Amerike

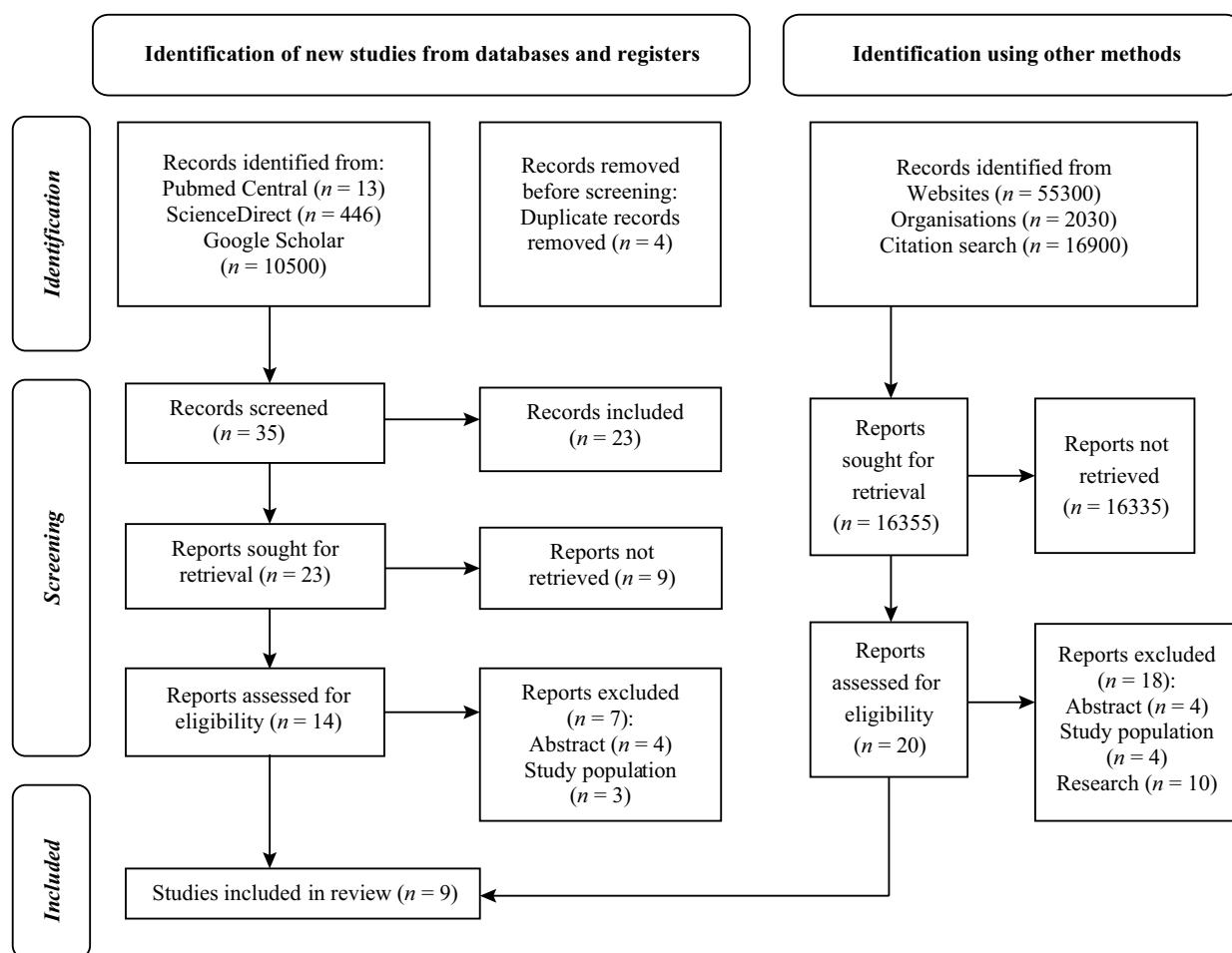


Figure 1: Flow diagram of literature selection (Page et al., 2020)

Slika 1: Diagram pregleda selekcijiranja literature (Page et al., 2020)

Results

Our literature review examined nine studies describing the effects of opioid treatment of postcaesarean section pain and breastfeeding initiation in developed countries around the world (United States of America – four studies; Norway – two studies; Greece – one study; India – one study; Taiwan – one study). Of the nine studies included in this review, six studies, namely Bjornstad & Reder (2020), Chao et al. (2019), Fassoulaki et al. (2021), O'Connor et al. (2022), Oommen et al. (2021), and Patzkowski et al. (2023), assess pain management with opioid analgesia. These studies also compare opioid analgesia and its side effects. Several studies report adverse effects such as nausea, vomiting, and dizziness. It can be assumed that the first attempt at breastfeeding after a caesarean section is unsuccessful. In this case, skin-to-skin contact is also prevented. Chao et al. (2019), Hooda et al. (2023), and Landau et al. (2021) compare different opioid pain regimens and breastfeeding outcomes after caesarean section.

Most studies report on the prevalence of opioid use immediately after surgery. The reports indicate that patients experienced mild or severe problems in the initial postcaesarean period. The main findings were divided into thematic categories using codes, which were further divided into the following two clusters: Category I: *Opioid analgesia after caesarean section* and Category II: *Breastfeeding support after induced opioid analgesia* and are presented in Table 4.

Category I: Opioid analgesia after caesarean section

Bjornstad & Reder (2020) report on patients' high pain intensity on the visual analogue scale (VAS ≥ 4 -7/10) and opioid requirement in the first 24 hours after caesarean section. Patients also received an additional opioid pain relief. In this study, low levels of ambulation were observed due to inadequate opioid pain relief and a high prevalence of side effects, such as fatigue, weakness and nausea. Patzkowski et al. (2023) report a mean VAS pain score of $> 4/10$ (in 72% of cases). Of all the patients included in this study, 96%

Table 3: General characteristics of the studies included in the review**Tabela 3: Značilnosti vključenih raziskav**

<i>Author, year, country/Avtor, leto, država</i>	<i>Research typology/Raziskovalna tipologija</i>	<i>Data/Podatki</i>	<i>Research aim/Raziskovalni cilj</i>	<i>Statistical analysis/Statistična analiza</i>	<i>Key findings/Ključne ugotovitve</i>
Bjornstad & Reder, 2020, Norway	Retrospective cohort study	50 patients included.	Pain management in elective CS.	The mean average VAS was 4 and the mean worst VAS pain intensity was 7; 34 patients reported an average VAS ≥ 4 , and seven reported a VAS pain intensity ≥ 7 .	High pain intensity and need for opioids in the first 24 hours after CS; contribution to nausea and especially pruritus; low mobilisation rate on the postoperative day due to inadequate pain relief.
Chao et al., 2019, USA	Retrospective cohort study	217 subjects in primary CS, and 37 subjects in repeat CS.	Pain management with patients who underwent prior or repeat elective CS.	Opioid consumption was significantly lower in the repeat group compared to the primary CS group ($p < 0.005$); the repeat CS group had statistically significant lower opioid consumption in the postprocedure time intervals (0 – 72 h) ($p < 0.005$); the highest opioid consumption was recorded in the 25 – 48h.	None of the patients received additional regional analgesic procedures; CS recurrences were not treated differently in postoperative pain management allowing for BF / care for the newborn.
Chang et al., 2022, Taiwan	Meta-analysis of randomised controlled trials	23 studies with 2589 parturients	Effects of opioids administered through intravenous PCA in patients who have undergone CS.	Fentanyl had better analgesic effects after 4 hours ($MD = -0.75$, 95% $CI = 1.16$; 0.34) and 8 hours ($MD = 0.93$; 95% $CI = -1.57$; -0.28), and fentanyl was more likely to cause pruritis.	Opioids cause opioid induced respiratory depression and sedation; delayed lactogenesis and BF decline; opioid-induced nausea, increased likelihood of developing pruritis after CS.
Fassoulaki et al., 2021, Greece	Cohort observational study	173 patients who underwent elective CS.	Comparing subcutaneous morphine in the postanaesthesia care unit.	Hospital opioid exposure (mean daily morphine equivalents) 10.7 equivalents (95% $CI = 10.2 - 11.3$).	Presence of persistent pain; 32% reported intermittent use of analgesic at home; lack of healthcare promotion for pain management; awareness of the impact on BF and its consequences.
Hooda et al., 2023, India	Prospective, double-blinded, randomised study	300 patients in elective CS.	Comparing the effect of different analgesic regimens (ambulation and BF) after CS.	In group 1 (diclofenac), the time taken to initiate BF was significantly shorter than in group 2 (tramadol) ($p = 0.028$); in group 2, the time taken to initiate movement was significantly shorter ($p < 0.001$).	Adequate analgesia influences early BF performance and movement in the immediate postcaesarean period; patients report nausea, fatigue, refusal of first BF attempt.
Landau et al., 2021, USA	Retrospective cohort study	2983 cases of elective CS.	Opioid-sparing analgesia during CS.	Oxycodone users before intervention (32.7%; $p < 0.001$); the difference for non-opioid users is greater in academic hospitals (20.3%; 95% $CI = 17.4 \pm 23.1\%$) than in community hospitals (8.7%; 95% $CI = 2.6 \pm 14.4\%$); CS.	Postoperative analgesic protocols were tailored to individual opioid use; pain scores were higher in patients prescribed an opioid; new methods of pain assessment resulted in a 30% reduction in hospital opioid use after CS.

Continues/Se nadaljuje

Author, year, country/Avtor, leto, država	Research typology/Raziskovalna tipologija	Data/Podatki	Research aim/Raziskovalni cilj	Statistical analysis/Statistična analiza	Key findings/Ključne ugotovitve
O'Connor et al., 2022, USA	Retrospective cohort study	46 patients who underwent urgent/elective CS.	Pain scores and opioid analgesic utilisation during hospitalisation in women delivering by CS.	The mean daily dose of opioid (buprenorphine) was 14.6 mg (4 – 32 mg); the mean pain score 12 – 24 h after CS was 5.03; patients receiving neuraxial opioid required more parenteral opioid than those who did not receive neuraxial analgesia (16.4 mg (<i>SD</i> = 21.1) vs 5.3 mg (<i>SD</i> = 3.6), <i>p</i> = 0.42).	Buprenorphine should not inhibit the analgesic effect of a neuraxial opioid; 14.4% of receiving buprenorphine had significantly increased pain; patients had mild to severe problems with nausea, drowsiness, fatigue and pruritus.
Oommen et al., 2021, Norway	Prospective observational study	1101 healthy patients.	Effect of intrapartum fentanyl administered intravenously or through epidural analgesia on early BF.	Fentanyl was four times more likely to cause non-exclusive BF compared to no opioid exposure (<i>OR</i> = 4.20, 95% <i>CI</i> = 2.49 ± 7.09, <i>p</i> < 0.001); a reduction in exclusive BF (81% vs. 89%; <i>p</i> = 0.014) and spontaneous suckling (68% vs. 83%; <i>p</i> < 0.001) was observed.	Spontaneous suckling was negatively associated with fentanyl use during labour (<i>p</i> < 0.001); known BF problems with lactation and first BF attempt and outcome.
Patzkowski et al., 2023, USA	Retrospective cohort study	169 patients after elective CS.	Understanding postCS pain and opioid use.	In subarachnoid block, 72% of patients received fentanyl and morphine (median fentanyl = 20 mcg; <i>MME</i> = 0.15 mg), 24% morphine alone (<i>MME</i> = 0.2 mcg), and 3% fentanyl alone.	One in seven (14%) patients reported a mean VAS > 4/10, and 96% of these patients received opioid analgesia; including poor BF results.

Legend/legenda: CS – caesarean section/carski rez; PCA – patient controlled analgesia/nadzorovana analgezija; *p* – level of statistical significance/stopnja statistične značilnosti; % – percentage/odstotek; *MD* – mean difference/mediana; *SD* – standard deviation / standardni odklon; *MME* – morphine miligram equivalents/ekvivalenti morfija; *CI* – confidence interval/interval zaupanja; *OR* – odds ratio/razmerja obetov; *BF* – breastfeeding/dojenje; *VAS* – visual-analogue scale/vizualno-analogni skala; *USA* – United States of America/Združene države Amerike

received opioid analgesia and additional opioid pain relief with known side effects. In a study by O'Connor et al. (2022), patients treated with opioid analgesia reported significantly higher VAS pain scores of > 4/10, which was considered statistically significant (*p* < 0.001). The study by Landau et al. (2021) concludes that postoperative analgesic protocols should be tailored to the individual patient due to the high prevalence of the most frequent side effects. Pain scores were higher in the opioid analgesia group than in the non-opioid group with a statistical significance of *p* < 0.001. The new standard for pain assessment significantly reduced in-hospital opioid use by 30% and promoted early adaptation in the postpartum period and initiation of breastfeeding. Oommen et al. (2021) compared opioid and non-opioid exposure and directly demonstrated the impact of fentanyl use on lower spontaneous suckling rates and breastfeeding difficulties at key moments. Fassoulaki et al. (2021) report on a lack of healthcare promotion and the impact of opioids in the postoperative period. Chao et al. (2019) found that opioid analgesia was associated

with a statistically significant increase in the likelihood of developing pruritus (*p* < 0.005). All of these side effects raised patient concerns about breastfeeding outcomes in neonatal care. Hooda et al. (2023) demonstrate that the use of opioid analgesia has a statistically significant impact on early postpartum ambulation (*p* < 0.001) and breastfeeding initiation (*p* < 0.028) due to nausea and fatigue resulting from opioid-based postoperative pain relief. Chang et al. (2022) report adverse effects of all treatment modalities and conclude that that analgesic treatment should be individualised taking into account the known side effects of opioid analgesia and other pain treatment modalities. Opioid analgesia should be the treatment of choice, as they are aware of all side effects of opioids. The outcome of breastfeeding is often uncertain and places a high burden of stress on the mother. Patients with repeat caesarean section reported higher pain scores and requested a multiple dose of opioid analgesia, probably due to the psychological impact of the overall perception of the experience.

Table 4: Distribution of codes by category
Tabela 4: Razporeditev kod po kategorijah

Categories/Kategoriji	Codes/Kode	Author/Avtor
Category I – Opioid analgesia after caesarean section	Low levels of ambulation – inadequate opioid pain relief – known side effects – significantly higher VAS pain – postoperative analgesic protocols – individualised treatment of patients – lack of healthcare promotion – affecting early ambulation.	Bjornstad & Reder, 2020; Fassoulaki et al., 2021; Hooda, 2023; Landau et al, 2021; O'Connor et al, 2022; Oommen et al., 2021; Patzkowski et al, 2023
Category II – Breastfeeding support after induced opioid analgesia	Late response to breastfeeding – exposure to opioids and suckling rates – delayed lactogenesis and skin-to-skin – bonding strategies – lower spontaneous suckling rates – lack of healthcare promotion.	Chang et al., 2022; Chao et al., 2019; Fassoulaki et al., 2021; O'Connor et al, 2022; Oommen et al., 2021

Category II: Breastfeeding support after induced opioid analgesia

The findings of the authors of the studies included in this literature review can be summarised as follows. Some research results show that an appropriate theoretical approach and information on pain assessment (praise, encouragement, motivation, integration) in the early stages after caesarean section can increase breastfeeding by up to 45%. Breastfeeding after opioid-assisted pain management is very delicate, and early ambulation, contact with the newborn, and care for the newborn must be achieved. Breastfeeding as an intervention is the most important strategy for mother-newborn bonding in the postnatal period. According to Fassoulaki et al. (2021) and O'Connor et al. (2022) opioid analgesia and the first breastfeeding attempt and its outcomes in the early postcaesarean period depend on the basic nursing activities. Investigating the side effects and outcomes of breastfeeding and newborn care, and comparing opioid exposure to non-opioid exposure, Chang et al. (2022), Chao et al. (2019), and Oommen et al. (2021) demonstrated the impact of opioid use on lower spontaneous suckling rates and difficulties with breastfeeding. In this context, a statistically significant and worrying finding was the decrease in exclusive breastfeeding ($p < 0.014$) and spontaneous suckling ($p < 0.001$) that correlated with opioid analgesic use. Due to delayed lactogenesis, skin-to-skin contact and rooming-in with the newborn were recommended.

Discussion

Before the modernisation and upgrading of the concept of postoperative pain management, opioid analgesia was one of the key modalities of pain management. Modern treatment trends have been deliberately introduced to reduce opioid consumption and facilitate adaptation to the postcaesarean situation. The prevalence of opioid treatment of postcaesarean pain has a significant impact on postcaesarean nursing activities and breastfeeding. As noted by Chao et al. (2019), opioid analgesia causes opioid-induced nausea, vomiting, sedation, and a

higher likelihood of pruritus. Health education and nursing interventions encourage skin-to-skin contact with the newborn and try to initiate the first attempt at breastfeeding as early as possible after caesarean section. We found that although all the studies included in our review aimed to improve the quality of patient care, they mainly focused on meeting physical needs rather than psychological support for successful adjustment to the early postcaesarean period. In the studies by Chang et al., (2022), Chao et al. (2019) and O'Connor et al. (2022), mainly physical deviations in opioid pain management after caesarean section were identified that resulted in nausea, vomiting, sedation, pruritus and a higher likelihood of developing delayed complications such as fatigue and drowsiness indicated by opioids. Loss of sensation and numbness were also reported in approximately 72% of cases.

In most of the populations observed, it was not adequately defined whether the pain treatment was administered for a first or a repeat caesarean section. The results suggest that pain relief after elective caesarean section is inadequate with regard to acute pain management immediately after caesarean section. A more tailored approach may be required to optimise pain management after caesarean section. Additional strategies to reduce the risks of opioid use include multimodal approaches to pain management, using a combination of local pain relief techniques and systematic analgesics for a synergistic analgesic effect. The introduction of the computerised opioid bundle was associated with a reduction in the number of opioids prescribed and opioid consumption during inpatient treatment. The implementation of nursing activities influences confidence and self-assurance in early adjustment. Willingness to cooperate is also mainly related to treatment outcomes in the postcaesarean period. Various studies such as Bjornstad & Reder (2020), Chang et al. (2022), Chao et al. (2019), Fassoulaki et al. (2021), Hooda et al. (2023) and Oommen et al. (2021) have also addressed the issue of lactogenesis and breastfeeding after caesarean section, but have not presented definitive outcomes on breastfeeding in the early postpartum period. They described first attempts and attempts to establish contact with the newborn rather than describing and

defining support in terms of establishing nursing interventions. Dalili et al. (2020), Gianni et al. (2020), Kling Oms Lii et al. (2016), and Zanardo et al. (2010) report that surgery affects postpartum prolactin levels and slows lactation, which may have consequences. Zanardo et al. (2010) consider psychophysical and emotional support for women breastfeeding after a caesarean section to be essential for an effective initiation of breastfeeding after a caesarean section.

Mary et al. (2021) and Wen et al. (2015) state that hospitals designated as breastfeeding-friendly, i.e. hospitals that offer breastfeeding-related interventions, provide women and their newborns with the best opportunities and intentions to support breastfeeding and promote optimal outcomes. These include hospital practices that support breastfeeding intention, professional and appropriate support for breastfeeding initiation, staff who do not formula feed newborns, and community resources that support breastfeeding. Dalili et al. (2020) found that among multiparous patients, promotion of breastfeeding and non-use of formula milk were important hospital practices. Among women who had given birth by caesarean section, breastfeeding initiation and rates of exclusive or any breastfeeding at six months were lower. As argued by Hobbs et al. (2016), a professional approach to supporting nursing interventions ultimately leads to effective breastfeeding.

Our literature review has several advantages. It is one of the few reviews that include the results of breastfeeding attempts after caesarean section in the early postpartum period. Most breastfeeding attempts after caesarean section are made in the early postpartum period, during hospitalisation, which is also a great achievement for the nursing staff. As concluded by Mary et al. (2021), developing suitable interventions to help more women breastfeed requires an understanding of the many factors that influence feeding choices. The benefits of our study suggest that breastfeeding outcomes after caesarean section are based on the doctrine of breastfeeding management according to the current standards and quality at a global level. Gianni et al. (2020) and Kling Oms Lii et al. (2016) agree that there is a notable need to identify interventions aimed at establishing and maintaining exclusive breastfeeding. Future studies should be strengthened by including data on patient-reported outcomes and measuring the initiation and duration of breastfeeding after caesarean section.

Despite the strengths of our survey, there are certain limitations to its results. The first limitation is the inclusion of published literature from 2013 onwards due to advances in the field of pain management after caesarean section. The second limitation is the considerable heterogeneity of the studies included. In most cases, the limitations of the databases mainly emphasise a more medical approach to breastfeeding in terms of lactation. Different approaches, including

initial and subsequent attempts at breastfeeding and meeting the emotional needs of both parties in the postcaesarean period tend to fall under the domain of nursing.

Promoting supportive interventions in the antenatal and postnatal period has a significant impact on breastfeeding in the postcaesarean period. The findings define nursing as recognising the patient's psychophysiological needs and implementing solutions to achieve the set goals, regardless of the expected outcome. Hobbs et al. (2016) linked the implementation of theoretical knowledge to the importance of early skin-to-skin contact. This measure certainly helps with the initiation and outcomes of breastfeeding following a caesarean section. Hospital practices can design precise interventions (timing and modality) to facilitate evaluation of the nursing interventions implemented.

Conclusion

This literature review emphasises the urgent need for further research, including a more extensive follow-up study on the benefits of non-opioid pain management and subsequent breastfeeding after caesarean section. The review shows a relatively high prevalence of adverse effects with opioid analgesia. Future studies should aim to increase the efficacy of different interventions (combining local pain relief techniques) with non-opioid analgesia to achieve a synergistic analgesic effect. Counselling by healthcare personnel is a key intervention to promote optimal breastfeeding practices after caesarean section. Promotion of optimal breastfeeding outcomes should be ensured across the continuum in different settings.

Conflict of interest/Nasprotje interesov

The authors declare that no conflicts of interest exist./Avtorja izjavljata, da ni nasprotja interesov.

Funding/Financiranje

The study received no funding./Raziskava ni bila finančno podprta.

Ethical approval/Etika raziskovanja

The study required no special authorisation from the ethics committee. The study was conducted in accordance with the principles of the Helsinki-Tokyo Declaration (World Medical Association, 2013) and the Code of Ethics for Nurses and Nurse Assistants of Slovenia (2024)./Raziskava ni potrebovala posebnega dovoljenja komisije za etiko. Raziskava je pripravljena v skladu z načeli Helsinško-tokijske deklaracije (World Medical Association, 2013) in s Kodeksom etike v zdravstveni negi in oskrbi v Sloveniji (2024).

Author contribution/Prispevek avtorjev

The first author, under the mentorship of the second author, prepared the conceptual design of the study, conducted a selective literature review, data processing, and evaluation and justification of the results. The second author participated in the management of the content of the theoretical work, confirmed the methodology and evaluated the results. Prvi avtor je pod mentorstvom drugega avtorja pripravil idejno zasnovo, selektivni pregled literature, obdelavo podatkov te evalvacijo in utemeljite rezultatov. Soavtor je sodeloval pri usmerjanju vsebine teoretičnega dela, usmerjal je vsebine teoretičnega dela, potrdil metodologijo ter evalviral prikazane rezultate.

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Cite as/Citirajte kot:

Višić, U., & Lučovnik, M. (2024). Managing postcaesarean section pain with opioid analgesia and the effect on breastfeeding: A literature review. *Obzornik zdravstvene nege*, 58(3), 185–195. <https://doi.org/10.14528/snr.2024.58.3.3256>