

A Literature Review on Factors Influencing Cesarean Section, Postoperative Pain, and Nursing Interventions

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Abstract

Currently, the cesarean section rate continues to rise globally, with its influencing factors and postoperative health outcomes becoming key focuses of public health and clinical attention. This review aims to systematically examine the status of postoperative incision pain following cesarean delivery, its impact on maternal quality of life, the effectiveness of nursing interventions, and to identify future research directions.

Keywords

Cesarean section; Postoperative pain; Nursing interventions

1. Rising Cesarean Section Rates and Their Causes

Data indicates that in 2015, the global number of cesarean sections reached approximately 29.7 million, accounting for 21.1% of births that year—double the 12.1% rate recorded in 2000 (Boerma, T., Ronsmans, C., Melesse, D. Y., Barros, A. JD., Barros, F. C., Juan, L. J., Moller, A. B., Say, L., Hosseinpour, A. R., Yi, M., Neto, D. L., & Temmerman, M., 2018). It is estimated that the global cesarean section rate will increase to 38 million by 2030, representing 28.5% of births (Betrán, A. P., Ye, J., Moller, A.-B., Zhang, J., Gülmezoglu, A. M., & Torloni, M. R., 2021).

In China, Yin, S., Chen, L., Zhou, Y., Yuan, P. b., Guo, X. Y., Lu, J., Ge, L., Shi, H. F., Wang, X. X, Li, L. Y., Qiao, J., Zhao, Y. Y., Qi, H. B., Ma, X. D., & Wei, Y. (2023) conducted a cross-sectional analysis of the Chinese Hospital Database (HQMS, 2020), revealing a total of 3,400,162 cesarean sections nationwide, accounting for 44.5% of all deliveries. Among these, low-risk pregnant women—defined as those assessed as full-term, singleton, cephalic presentation, and without prior cesarean history—still opted for

cesarean delivery in 40.0% of cases.

Cesarean section is a type of surgical procedure used for delivering infants. It is frequently employed in cases of abnormal fetal presentation, abnormal birth canal, or high-risk pregnancies to improve pregnancy outcomes and ensure the safety of both mother and baby (Xu, Y., & Kuang, J. J., 2022; Zhang H., 2022; Nie, H. Z., 2020). During the procedure, the doctor will make an incision in the mother's abdomen to open the abdominal cavity, and then make an incision in the uterus to help the baby deliver. After the baby is delivered, the doctor will help the mother suture the incision in the uterus and abdomen. The entire procedure takes a short time. In addition, due to the use of narcotic drugs, the mother will not feel pain during the cesarean section.

This means mothers can conclude the delivery process more comfortably within a shorter timeframe. This stands in stark contrast to vaginal delivery: mothers undergoing vaginal birth endure a longer labor period and must tolerate intense pain during fetal expulsion. Fear and apprehension regarding labor pain and the delivery process itself are among the core reasons pregnant women opt for cesarean sections (Jenabi, E., Khazaei, S., Bashirian, S., Aghababaei, S., & Matinnia, N., 2020). An increasing number of women are opting for cesarean sections due to shifts in ideology and their desire to avoid experiencing pain during childbirth.

Additionally, concerns about infant safety, previous adverse childbirth experiences, influence from family and friends' experiences, urinary incontinence, and pelvic floor or vaginal injuries et al. are also factors that lead pregnant women to choose cesarean delivery. (Colomar, M., Opiyo, N., Kingdon, C., Long, Q., Nion, S., Bohren, MA., et al., 2021; O'Donovan, C., & O'Donovan, J., 2018; Jenabi, E., et al., 2020).

2. Postoperative Incision Pain Following Cesarean Section: Incidence and Influencing Factors

Although women who undergo cesarean sections do not experience pain during delivery, they may feel pain during the postoperative healing period of the surgical incision. Pain is one of the most common adverse reactions following cesarean delivery.

Factors influencing pain include: Physiological factors: BMI, surgical procedure, anesthesia method, intraoperative blood loss, etc. (Nie, H. Z., 2020). Psychological factors: Preoperative anxiety is positively correlated with pain (Zhang, Q. M., 2022). A study conducted by Liu, J. Y. (2012) found that women who actively chose cesarean sections underestimated their pain expectations.

Multiple studies indicate that the incidence of acute pain within 24–48 hours after cesarean delivery ranges from approximately 50% to 80%, with severity reaching moderate to severe levels (Demilew, B. C., et al., 2024; Bimrew, D., Kebede, A., & Kassahun, G., 2022). In resource-limited settings, where analgesic strategies are inadequate or studies employ different analgesic regimens, the incidence of acute pain

is significantly higher (Bimrew, D., Kebede, A., & Kassahun, G., 2022; Demilew, B. C., et al., 2024). Postoperative chronic pain may persist for 3 to 12 months, ranging from mild to moderate in intensity, with an incidence rate of 10% to 20%. This pain typically diminishes over time (Jin, J., et al., 2016; Wang, L. Z., Huang, J. Y., Hu, H. J., & Xia, F., 2025). Research has found that higher pain intensity during movement within 24 hours postoperatively is associated with an increased risk of chronic pain at 3, 6, and 12 months postoperatively (Jin, Y., et al., 2016; Demilew, B. C., et al., 2024).

3. Nursing Interventions and Outcomes

Zhang, A. R., & Su, H. T. (2011) reported that 90.5% of postpartum patients used intravenous analgesia pumps, but only 66.7% of patients confirmed the analgesic effect. Evidence-Based Guidelines (PROSPECT, 2021) and Sultan, P., & Carvalho, B. (2021) consistently recommend administering low-dose intrathecal/epidural morphine during spinal/epidural anesthesia, combined with multimodal analgesia (NSAID + local/regional blocks such as TAP/QL/ESP), to reduce postoperative pain scores and systemic opioid usage. Recent studies indicate that intrathecal morphine (ITM) often achieves adequate analgesia within the 100–150 µg dose range. However, adverse effects (nausea, pruritus, respiratory depression) correlate with dosage, necessitating monitoring and dose adjustment per guidelines (Crandon, et al., 2025; Rawal, N., 2023).

Individualized anesthesia care enhances postoperative analgesia efficacy and reduces VAS pain scores by strategically administering analgesic pumps at key perioperative time points, delivering comprehensive holistic care (Luo, Y. H., Xu, M. Y., Guo, L. D., & Xu, X. H., 2023; Yu, W. J., & Zhang, Y. L., 2023; Li, C., Yuan, Y. P., & Cui, X. H., 2019).

Xu, H., Wang, Y. Q., & Liu, S. Y. (2025). A study revealed that the incidence of inadequate postoperative patient-controlled analgesia with butorphanol among post-cesarean section mothers was 78.9% (183/232), potentially influenced by negative psychological states or low self-efficacy. The clinical application of this medication should account for individual differences, combining psychological interventions with dose optimization to establish a multidimensional pain management model. This study was a single-center investigation and did not evaluate chronic pain.

Zhang, X. Y. (2025) also proposed interventions based on traditional Chinese medicine principles, including auricular pressure point therapy, emotional regulation, lactation promotion, pain management, and dietary adjustments. These multifaceted approaches aim to alleviate pain symptoms and reduce postoperative discomfort. The VAS pain score in the study group was 1.01 ± 0.26 , significantly lower than that in the control group (1.68 ± 0.78 ; $P < 0.05$). However, the mechanism underlying pain improvement in this study was not quantified, and operational differences may

affect consistency.

In a comparative study of 112 mothers, the combination of ERAS (Enhanced Recovery After Surgery) and 4P pain management (personalized, predictive, preventive, and participatory) resulted in significantly lower postoperative pain scores compared to the standard care group. It also improved postoperative depressive symptoms and enhanced breastfeeding outcomes. However, this study was conducted at a single institution, had a limited geographic sample, and lacked long-term follow-up. The study indicates that improved pain control reduces postoperative anxiety and depression, thereby diminishing the psychological amplification of pain perception (Xu, Y., & Hu, C. Y., 2025).

Wu, Q. Y. (2025) emphasizes comprehensive perioperative nursing management in the operating room, encompassing preoperative education and psychological counseling, intraoperative emotional reassurance and vital sign monitoring, and postoperative dietary guidance and rehabilitation activities. This approach features broad intervention scope and multidimensional content. Pan, G. M. (2025) places greater emphasis on pain management and psychological adjustment. This approach involves establishing specialized pain management teams, implementing preoperative pain education and psychological interventions, utilizing music therapy and distraction techniques during surgery, and employing postoperative pain monitoring, PCA adjustments, massage therapy, and music/video interventions. The interventions are more specialized, with the core focus being pain and psychological adjustment. Multiple studies have confirmed that acupoint massage combined with music therapy helps reduce the incidence and severity of traction pain following cesarean section (Zeng, F. Y., 2025; Hui, L. Y., & Chen, Y., 2022; Shan, R., 2025).

Nie, H. Z. (2020) demonstrated in a refined nursing care study that postoperative pain scores in the control group averaged approximately 4.44 ± 0.55 , while those in the intervention group averaged approximately 3.10 ± 0.12 , indicating that the intervention significantly reduced pain. Refined nursing care demonstrated positive effects across multiple indicators, including reduced pain, shorter time to first flatus, decreased incision infection rates, and improved breastfeeding initiation (Nie, H. Z., 2020; Zhang, Q. M., 2022).

Comprehensive nursing interventions such as refined nursing, comfort nursing, and enhanced recovery after surgery demonstrate significant advantages over routine care. These approaches effectively reduce postoperative pain following cesarean section, promote functional recovery, and decrease complications (Nie, H. Z., 2020; Zhang, Q. M., 2022; Zhou, J., Zhang, B. Y., & Zhou, Y. Y., 2025; Ding, J. M., 2021; Luo, Y. H., et al., 2023; Yu, W. J., et al., 2023; Li, C., et al., 2019).

However, due to limitations such as insufficient homogeneity, single-center design, and small sample size, et al., its external generalizability requires further validation. Future studies should employ rigorous designs, expand multicenter samples, incorporate preoperative psychological assessments, strengthen long-term follow-up,

standardize intervention protocols, quantify pain mechanism indicators, enhance perioperative interventions, and further develop multidimensional psychophysiological-sociological pain management models. This will facilitate the establishment of evidence-based nursing pathways that are both generalizable and replicable.

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