

Review

The Role of Acupressure in Labor Pain Management: A Comprehensive Analysis of Efficacy and Maternal Outcomes

Meng Zhang^{1,†}, Yu Wang^{1,†}, Huixian Zhou², Siyuan Song^{3,*}, Jie Mu^{1,*}¹Department of Anesthesiology, Sichuan Provincial People's Hospital, School of Medicine, University of Electronic Science and Technology of China, 610072 Chengdu, Sichuan, China²Department of Internal Medicine, Montefiore Medical Center Wakefield Campus, Bronx, NY 10466, USA³Department of Neuroscience, Baylor College of Medicine, Houston, TX 77030, USA*Correspondence: si-yuan.song@bcm.edu (Siyuan Song); 470857893@qq.com (Jie Mu)

†These authors contributed equally.

Academic Editor: George Daskalakis

Submitted: 5 December 2024 Revised: 9 January 2025 Accepted: 15 January 2025 Published: 24 February 2025

Abstract

Objectives: Labor pain management is a critical aspect of maternal care, with methods broadly classified as pharmacological and non-pharmacological. While pharmacological approaches such as epidural anesthesia offer effective pain relief, they may prolong labor and lead to other complications. Acupressure, rooted in traditional Chinese medicine, presents a non-invasive alternative that alleviates anxiety, enhances maternal cooperation, and potentially expedites labor, albeit with limited analgesic efficacy. **Mechanism:** This comprehensive review analyzed studies on the use of acupressure for labor pain management, evaluating its effectiveness, mechanism of action, and impact on maternal and neonatal outcomes. **Findings in brief:** Acupressure was associated with a significant reduction in labor pain, with visual analog scale (VAS) scores decreasing by approximately 2 points compared to control groups. Acupressure also shortened labor duration by an average of 50 and 15 minutes in the first and second stages, respectively, improved maternal satisfaction (85% of women reported greater comfort), and, in some studies, reduced cesarean section rates. Mechanistically, acupressure alleviates pain through the gate control theory, stimulation of endogenous opioid release, and modulation of pain-related brain regions, such as the anterior cingulate cortex and insula. However, the analgesic effects of acupressure were found to be incomplete and reliant on accurate acupoint identification. **Conclusions:** Acupressure is a safe, accessible, and effective complementary method for labor pain management with additional benefits for maternal satisfaction and neonatal outcomes. While not a full substitute for pharmacological analgesia, integrating acupressure into clinical practice could provide a holistic approach to labor care. Future research should focus on standardizing methodologies and exploring their application in diverse populations.

Keywords: labor; acupressure; labor analgesia; maternal outcomes; neonatal outcomes

1. Introduction

Labor pain, a multidimensional experience involving both physical and psychological components, poses significant challenges for maternal and neonatal health. Excessive labor pain can lead to maternal anxiety, stress, and hormonal disruptions that negatively affect uterine contractions, prolong labor, and increase the risk of complications (Fig. 1) such as fetal distress and postpartum hemorrhage [1–4]. Effective pain management is thus a cornerstone of obstetric care, improving both maternal and neonatal outcomes.

In clinical practice, labor pain management methods are broadly categorized into pharmacological and non-pharmacological approaches. Pharmacological interventions, including nitrous oxide inhalation and epidural anesthesia, provide effective pain relief. However, these methods often carry potential side effects, such as prolonged labor, reduced mobility during labor, and increased risk of instrumental deliveries [1–3,5,6]. Non-pharmacological methods, such as acupressure, massage, and hydrotherapy,

have gained increasing attention as safe and holistic alternatives [7,8].

Acupressure, rooted in Traditional Chinese Medicine (TCM), is a non-invasive technique that involves applying pressure to specific acupoints to alleviate pain. According to TCM, acupressure restores the balance of qi (vital energy) and blood circulation, promoting relaxation and reducing pain. Modern studies have further explored the mechanisms of acupressure through scientific frameworks such as the gate control theory and the stimulation of endogenous opioid pathways [9,10]. These findings highlight acupressure as a promising complementary approach to labor analgesia.

This review aims to provide a comprehensive analysis of the efficacy, mechanisms, and maternal and neonatal outcomes of acupressure in labor pain management. By integrating evidence from traditional and modern medical perspectives, this review underscores the potential of acupressure as a valuable addition to obstetric care.



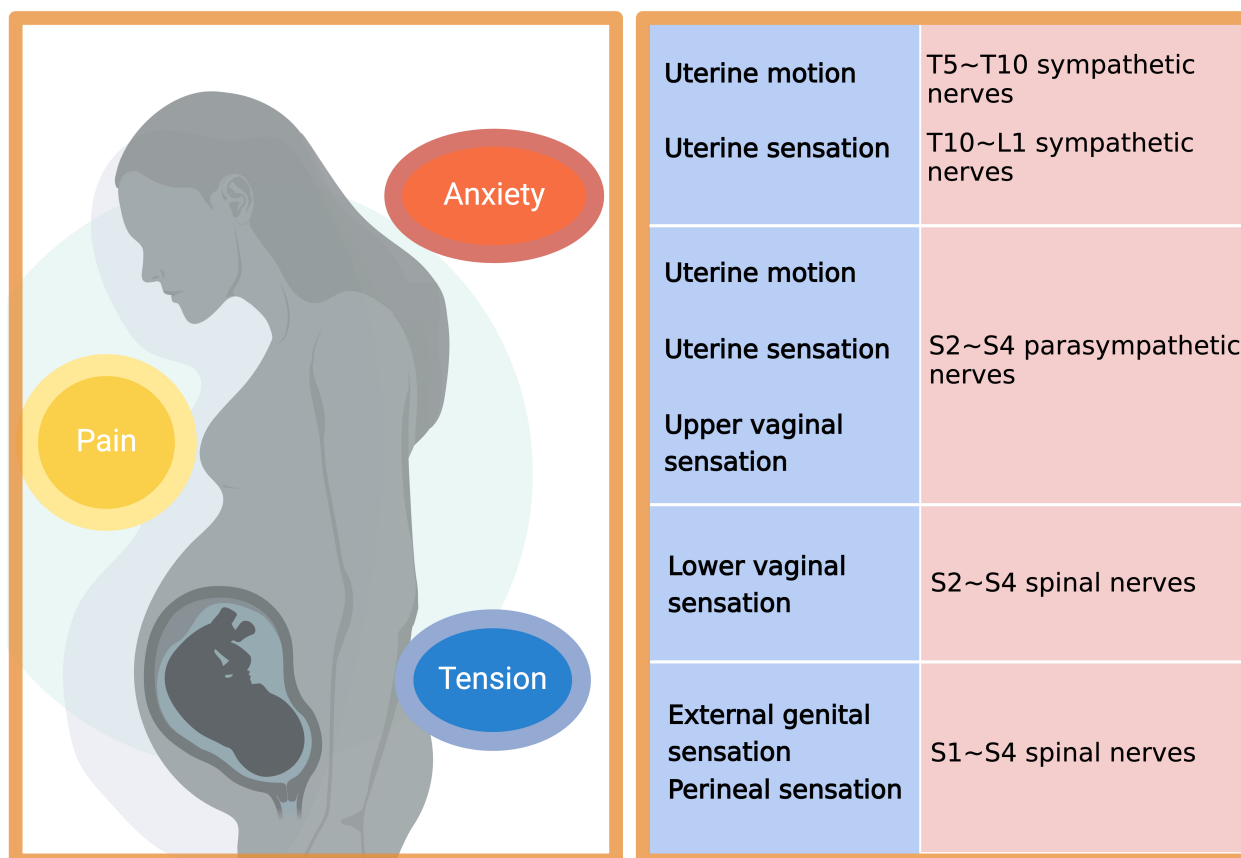


Fig. 1. Neural pathways and psychological factors influencing labor pain. Left: psychological factors contributing to labor pain, including anxiety, pain, and tension, depicted through a conceptual model of a pregnant individual. Right: neural pathways involved in uterine and vaginal motion and sensation during labor, highlighting the contributions of T5–T10 sympathetic nerves, T10–L1 sympathetic nerves, S2–S4 parasympathetic nerves, and S1–S4 spinal nerves. This schematic illustrates the distribution of neural innervation and their role in labor pain sensation and motor function. Reproduced with permission from BioRender, created by Liu Z; published by Clinical and Experimental Obstetrics & Gynecology (CEOG), 2025. Reference: <https://BioRender.com/h39e949>.

2. Methods

This review was conducted to evaluate the efficacy, mechanisms, and outcomes of acupressure in labor pain management, following the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines for systematic reviews. A comprehensive search was performed across PubMed, Embase, Web of Science, and Cochrane Library databases for studies published from January 2000 to December 2023. The following keywords were used: “acupressure”, “labor pain”, “analgesia”, “maternal outcomes”, and “neonatal outcomes”. Boolean operators were applied to ensure comprehensive results (e.g., “acupressure AND labor pain”).

2.1 Inclusion and Exclusion Criteria

The inclusion criteria for this review encompassed studies investigating acupressure as a method for labor pain management, including randomized controlled trials (RCTs), cohort studies, and systematic reviews. Eligible studies reported on maternal or neonatal outcomes and were

limited to articles published in English. Exclusion criteria included studies on acupressure unrelated to labor pain, animal or *in vitro* studies, case reports, editorials, or conference abstracts without primary data, and studies with inadequate methodological quality, such as those with a high risk of bias.

2.2 Study Selection and Rationale

Titles and abstracts were screened by two independent reviewers, followed by full-text evaluations to determine eligibility. Discrepancies were resolved through consensus or consultation with a third reviewer. The rationale for this review is rooted in the growing interest in non-pharmacological approaches to pain management during labor and the need for a comprehensive synthesis of data on acupressure’s effectiveness and safety. This review aims to evaluate acupressure’s role in labor pain management, with a focus on its mechanisms, maternal outcomes, and neonatal benefits.

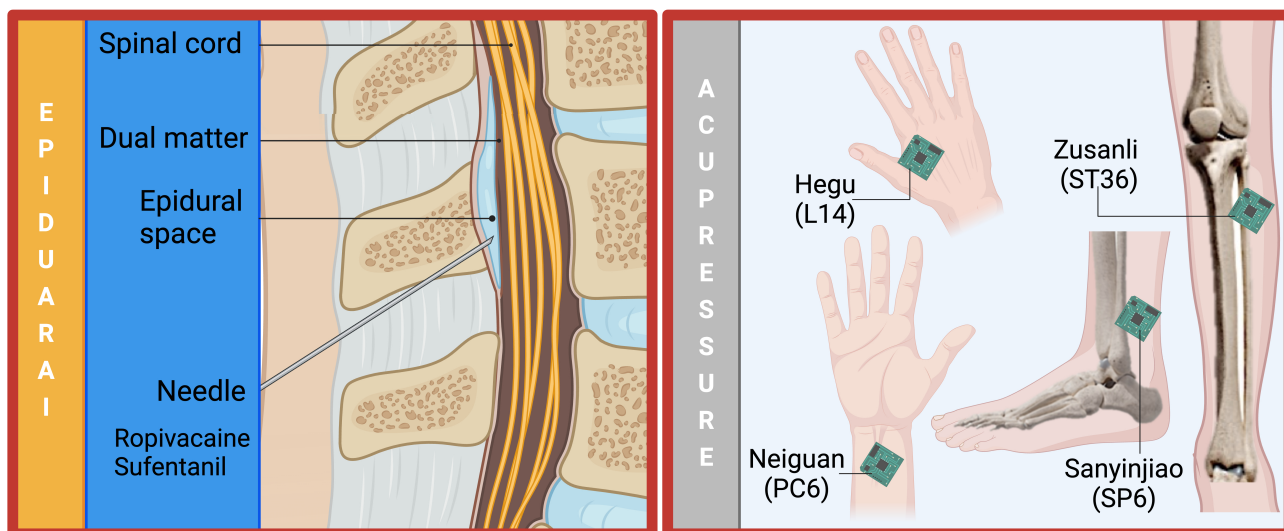


Fig. 2. Techniques for labor pain management: epidural analgesia and acupressure. Left: illustration of epidural analgesia, showing the anatomical positioning of the needle within the epidural space and the administration of Ropivacaine and Sufentanil for pain relief during labor. Right: acupressure points commonly used for labor pain relief, including Hegu (LI4), Neiguan (PC6), Sanyinjiao (SP6), and Zusanli (ST36). The schematic highlights the locations of these acupoints on the body and their accessibility for non-pharmacological pain management. Reproduced with permission from BioRender, created by Liu Z; published by Clinical and Experimental Obstetrics & Gynecology (CEOG), 2025. Reference: <https://BioRender.com/d24x227>. All rights reserved.

2.3 Data Extraction and Analysis

Key data points, including study design, sample size, interventions, outcomes, and main findings, were extracted into a standardized table. A narrative synthesis approach was employed to integrate findings from heterogeneous studies, ensuring a comprehensive and cohesive analysis of the evidence.

3. Comprehensive Overview of Labor Pain Management

Labor pain management strategies are broadly categorized into pharmacological and non-pharmacological methods, each offering distinct advantages and limitations. Understanding these approaches is crucial for optimizing maternal and neonatal outcomes, ensuring safety, and addressing individual preferences during labor.

3.1 Pharmacological Methods

Pharmacological approaches provide effective pain relief but are associated with potential side effects and procedural requirements.

Epidural analgesia [10]: as the gold standard in labor pain management, epidural analgesia offers significant pain relief by blocking pain signals at the spinal level (Fig. 2). However, it may prolong labor, reduce maternal mobility, and increase the risk of instrumental delivery. Other side effects include hypotension and fever.

Nitrous oxide [11]: often used as a self-administered inhalational analgesic, nitrous oxide provides moderate

pain relief with minimal systemic effects. It is less effective for severe pain and may cause dizziness, nausea, or mild sedation.

Systemic opioids [12]: medications such as fentanyl or pethidine are used for short-term pain relief. While effective, they can lead to maternal sedation, nausea, and potential neonatal respiratory depression.

3.2 Non-Pharmacological Methods

Non-pharmacological techniques emphasize holistic, patient-centered care, focusing on reducing pain perception, anxiety, and stress. These methods are often used in conjunction with pharmacological interventions or as alternatives in settings where pharmacological options are limited.

Acupressure: this method, rooted in TCM, involves applying pressure to specific acupoints to alleviate pain and promote relaxation (Fig. 2). Studies suggest that acupressure reduces labor pain through the gate control theory, endogenous opioid release, and modulation of pain-related brain regions [6,7,13]. It is safe, non-invasive, and free from systemic side effects, although its efficacy depends on precise acupoint identification [7,13–16].

Massage and hydrotherapy: these techniques reduce muscle tension, promote relaxation, and enhance maternal satisfaction. Massage therapy focuses on stimulating nerve endings to block pain signals [17], while hydrotherapy provides buoyancy and warmth, helping to ease pain and anxiety [18].

Breathing and relaxation techniques [19]: these methods disrupt the “fear-tension-pain” cycle by encourag-

ing rhythmic breathing and relaxation. They are particularly beneficial in promoting maternal control and reducing stress-related complications during labor.

The combination of these strategies allows healthcare providers to tailor pain management approaches to individual needs, optimizing comfort and safety during labor. Acupressure, as a unique non-pharmacological method, integrates well within this framework, offering additional benefits such as simplicity, cost-effectiveness, and cultural alignment for many populations. This review further explores acupressure's mechanisms, efficacy, and outcomes, positioning it as a promising complementary approach to labor pain management.

4. Pathophysiological Changes Induced by Labor Pain

During labor, the body of the parturient responds to pain with a stress reaction. As proposed by the British obstetrician Grantly Dick-Read, the “fear-tension-pain” syndrome plays a significant role in the labor process [20]. Pain and tension during labor can lead to maternal anxiety and agitation, increased adrenaline secretion, uterine contraction disorders, and abnormal labor forces, ultimately resulting in prolonged labor, acid-base imbalance, and a series of complications [2,21].

Pain-induced stress responses during labor can enhance the basal metabolic rate, increase oxygen consumption, elevate catecholamine levels, and reduce placental perfusion, thereby affecting maternal oxygen supply to the fetus. In addition, negative emotions may cause maternal hyperventilation and acid-base imbalance, further impacting fetal oxygenation [15]. Moreover, the stress induced by labor pain can enhance sympathetic nervous system excitability, leading to inhibited uterine contractions and weak uterine force, ultimately prolonging labor. Fetal hypoxia and prolonged labor increase the risk of fetal distress, maternal postpartum hemorrhage, and higher rates of instrumental delivery and cesarean section [22].

5. Mechanism of Acupressure for Labor Pain Relief

The analgesic mechanism of acupressure during labor pain can be explained through the integration of TCM theories and modern medical perspectives.

According to TCM, labor pain results from “blockage or insufficient nourishment”. In TCM, “qi” is often described as a form of vital energy that flows through the body along specific pathways called meridians, which connect different organs and tissues [23]. By applying acupressure to specific points, qi and blood circulation are promoted, meridians are unblocked, and normal physiological functions in the affected areas are restored, ultimately alleviating pain [23,24].

Modern medicine provides complementary explanations for the analgesic effects of acupressure, primarily

through the gate control theory proposed by Melzack and Wall in 1965 [25]. This theory suggests that stimulation of A δ fibers inhibits the transmission of pain signals carried by C fibers at the spinal level, effectively “closing the gate” to pain perception. Furthermore, acupressure has been shown to trigger the release of endogenous opioid substances, such as β -endorphin (β -EP), which bind to opioid receptors, producing systemic analgesic effects [26,27].

Recent advancements in neuroimaging have further elucidated these mechanisms. Functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) studies reveal that stimulation of acupoints like Hegu (LI4) and Sanyinjiao (SP6) activates pain-modulating regions of the brain, including the anterior cingulate cortex, insula, and periaqueductal gray matter [28,29]. These findings provide measurable physiological evidence linking traditional practices to neural mechanisms.

The synergy between TCM and modern medicine highlights a multidimensional mechanism of action. While TCM emphasizes the unblocking of meridians and restoring balance, modern neuroscience validates these effects by demonstrating changes in neural pathways and neurochemical releases. Together, these perspectives underscore acupressure's potential as a non-invasive labor analgesia method, warranting further exploration and clinical application.

6. Basis for Acupoint Selection

The selection of acupoints for labor analgesia (Fig. 2) should primarily focus on promoting qi and blood circulation and pain relief, with the selected acupoints and meridians being directly or indirectly related to labor physiology. The rationale for acupoint selection in TCM and modern medicine includes the following (Table 1).

6.1 Jiaji Points

TCM holds that therapies targeting the Jiaji points can regulate visceral qi and blood, thereby treating pain. Modern medical research has found that appropriate stimulation of the Jiaji points can induce the release of catecholamines from sympathetic nerve terminals, improve local blood circulation, and promote the release of endogenous opioid substances in the body, thereby alleviating pain. Additionally, according to the gate control theory, stimulating the Jiaji points can inhibit the ascending transmission of pain signals. The analgesic mechanism of the Jiaji points also involves effects on proto-oncogenes, free radicals, and cellular signaling pathways [30].

6.2 Sanyinjiao Point

This acupoint has been traditionally used for labor assistance and pain relief in childbirth. As early as 682 anno domini (AD), the Tang dynasty physician Sun Simiao mentioned in “Qianjin Yifang” that Sanyinjiao was effective in treating difficult labor, excessive menstrual bleeding, and

Table 1. Basis for acupoint selection in labor pain relief.

Acupoint	Location	Mechanism	Effect
Jiaji (EX-B2)	Along both sides of the spine, between thoracic and lumbar vertebrae.	Regulates qi and blood of internal organs.	Improves blood circulation and promotes endogenous opioid release.
Sanyinjiao (SP6)	Inner side of the lower leg, 10 cm above the medial ankle.	Enhances qi and blood flow, relieves pain.	Boosts β -endorphin release and activates the endogenous pain relief system.
Ashi Point	Located at the site of pain (variable location).	Based on pain sensitivity.	Reduces inflammation and alleviates pain by enhancing metabolism.
Changqiang (GV1)	At the base of the spine, between the coccyx and anus.	Regulates the lower jiao and qi circulation.	Shortens labor by increasing contraction strength and intra-abdominal pressure.
Hegu (LI4)	Between the thumb and index finger, at the highest muscle point.	Increases pain threshold and relaxes muscles.	Facilitates cervical dilation and reduces pain sensitivity.
Neiguan (PC6)	Inner forearm, 6.7 cm above the wrist crease.	Stimulates vagus nerve and enhances motility.	Improves gastrointestinal function and reduces nausea.
Qihai (CV6) & Guanyuan (CV4)	Lower abdomen: Qihai 5 cm and Guanyuan 3 cun below the navel.	Promotes qi and blood circulation.	Enhances uterine blood flow and supports postpartum recovery.
Zusanli (ST36)	Outer lower leg, 10 cm below the kneecap.	Regulates bladder qi transformation.	Alleviates postpartum urinary retention and reduces bladder swelling.

fetal malposition. In 1601, the Ming dynasty physician Yang Jizhou described in “Zhenjiu Dacheng” the technique of needling Hegu and draining Sanyinjiao to treat dystocia. Modern research suggests that stimulating Sanyinjiao increases the release of β -endorphin in the blood, excites the periaqueductal gray matter in the midbrain, and activates the endogenous analgesia system [31–35]. This activation inhibits the pain-sensing function of the ascending spinothalamic tract in labor and, through descending pathways, releases endorphins in the spinal cord. Endorphins bind to their receptors, inhibiting the transmission of pain signals and ultimately producing an analgesic effect [27,36,37].

6.3 Ahshi Points

During labor analgesia, Ahshi points are identified based on the principle “wherever there is pain, that is the acupoint”. Healthcare providers can locate Ahshi points during labor by pressing on areas indicated by the parturient as painful, with the goal of eliciting sensations of soreness, numbness, distension, or heaviness. TCM explains the analgesic effect of stimulating Ahshi points as follows: when a pathological condition occurs, relevant body areas experience qi and blood stagnation, leading to localized and temporary accumulation, which is referred to as the “Ahshi phenomenon”. Once the pathological condition is resolved, the temporary accumulation of qi and blood dis-

sipates, and the Ahshi phenomenon disappears. Modern medicine suggests that the analgesic effect of stimulating Ahshi points is related to neurobiology. Stimulation generates nerve impulses that are transmitted to the brain’s higher central systems, prompting the brain to adjust and release various neurotransmitters. These adjustments enhance immunity, reduce inflammation, promote metabolism, and effectively relieve pain. Numerous studies have reported and confirmed the efficacy of Ahshi point stimulation for pain relief [38,39].

6.4 Changqiang Point

Located at the midpoint of the line connecting the coccyx and anus, Changqiang is the principal Luo-connecting point of the Du Meridian. It is believed to regulate the lower jiao, relieve pain, and calm the spirit while promoting the unblocking of meridians [40]. Contraction of the abdominal and diaphragm muscles is essential for the second stage of labor to expel the fetus. Pressing on Changqiang increases the sensation of defecation, which reflexively enhances the contraction of the abdominal and diaphragm muscles, compelling the parturient to bear down effectively, thereby facilitating fetal descent and shortening the second stage of labor. This ultimately improves the natural delivery rate and maternal satisfaction [40,41].

6.5 Hegu Point

Hegu, the source point of the Large Intestine Meridian, is well-known for its analgesic properties. Stimulating Hegu can significantly increase pain thresholds, reduce pain sensitivity, relax muscles, and facilitate cervical dilation. The application of pressure to Hegu has been shown to decrease perineal laceration rates and reduce the need for episiotomy during delivery [42,43].

In addition to traditional explanations, modern clinical trials confirm that stimulating Hegu increases the release of β -endorphins and enhances parasympathetic activity, correlating with reduced pain perception during labor [13].

6.6 Neiguan Point

Neiguan is a commonly used acupoint on the Pericardium Meridian. Stimulation of Neiguan can excite the vagus nerve, act on motilin neurons in the enteric nervous system, promote motilin production, accelerate gastrointestinal peristalsis, and regulate water and electrolyte transport in the gastrointestinal tract. Additionally, needling Neiguan can reduce gastrin secretion, inhibit gastric acid production, and relieve gastric spasm. The active ingredients in ginger, such as gingerol and zingiberene, can protect the gastric mucosa, enhance gastrointestinal motility, and regulate digestive function, thereby effectively improving intestinal function [44–46].

6.7 Qihai and Guanyuan Points

Qihai is believed to generate yang energy, while Guanyuan is thought to treat postpartum blood stasis [47]. The benign stimulation of these acupoints can regulate qi, relieve pain, promote blood circulation, and eliminate stasis. The Dai Meridian is known for regulating menstruation, promoting health, and addressing gynecological conditions related to menstruation, pregnancy, and postpartum recovery. According to TCM, postpartum hemorrhage is categorized under “blood stasis internal obstruction” or “retained placenta”, with the pathogenesis involving qi deficiency and blood stasis. The considerable depletion of qi and blood during labor leads to a state of deficiency and stasis [47,48]. Postpartum uterine contraction pain, referred to as “childbed pain” in TCM, is attributed to either deficiency or excess. In cases of deficiency, it is caused by blood deficiency, leading to a lack of nourishment in the uterus, weak qi, and slow blood circulation. In cases of excess, it is caused by blood stasis due to insufficient blood movement and the invasion of cold pathogens, resulting in qi stagnation and pain. Both conditions share the same pathogenesis, thus the treatment principle focuses on nourishing qi and blood, promoting circulation, and relieving pain [49,50]. Techniques such as pressing, pushing, kneading, and rubbing can stimulate these relevant acupoints, unblock meridians, regulate qi and blood, and balance yin and yang, thereby promoting the recovery of organ and uterine function. In TCM, “blood stasis” refers to a condition

where blood flow is slowed or obstructed, often leading to pain or dysfunction. Acupressure is believed to alleviate this by promoting circulation and resolving stagnation.

6.8 Zusanli Point

In TCM, postpartum urinary retention is classified under “dysuria” or “retention of urine”, with the pathogenesis involving impaired bladder qi transformation [51]. Stimulating Zusanli can unblock the qi and blood of the three yin meridians of the leg, facilitating bladder qi transformation and promoting urination. Acupressure on this point can alleviate symptoms of postpartum urinary retention by reducing bladder and urethral mucosal swelling, relaxing the bladder and urethral sphincters, and improving overall urinary function [52].

7. Application of Trans-Cutaneous Acupressure in Labor Analgesia

7.1 Impact of Acupressure on Labor-Induced Hyperventilation and Catecholamine Release

Labor pain can trigger hyperventilation and catecholamine release, which may adversely affect parturients with pre-existing heart disease or preeclampsia, leading to fetal hypoxia. Furthermore, labor pain can contribute to postpartum depression and post-traumatic stress disorder. A systematic review by Mirzaee F *et al.* [53] examined the effects of acupressure on labor analgesia and anxiety during childbirth. The study found that in conditions of stress and anxiety, adrenaline and noradrenaline secretion increases, which in turn reduces uteroplacental blood flow during fetal hypoxia. Noradrenaline, through its action on α -adrenergic receptors, can lead to uterine contraction abnormalities and slowed labor progression. The application of ice to the Hegu acupoint was shown to reduce pain and anxiety in parturients during labor. Anxiety may lead to severe muscle tension, resulting in oxygen deprivation in both the brain and muscles, which increases tension, fatigue, and sensitivity to pain, further exacerbating the labor pain experienced by the parturient.

7.2 Effects of Acupressure on Neonatal Development

Acupressure has been shown to have beneficial effects on neonatal development by increasing placental blood flow and preventing fetal distress. Wan and Li [54] and Mollart *et al.* [55] conducted systematic reviews on three acupoints commonly used for labor analgesia—Sanyinjiao, Hegu, and Zusanli—as well as on acupoints frequently used in cases of difficult labor and prolonged labor—Sanyinjiao, Hegu, Neiguan, and Zusanli. When labor is slow, and uterine contractions are weak or cervical dilation is slow, stimulation of these acupoints can help regulate contractions and restore the balance of labor progression. Studies by Hjelmstedt *et al.* [56] and Lyngso *et al.* [57] confirmed that transcutaneous acupressure can reduce labor pain, aid in cervical softening, and facilitate cervical dilation. Levett

et al. [58] and Chaillet *et al.* [59] reported on the effects of acupressure on labor outcomes, showing that parturients in the acupressure group had higher satisfaction with pain relief and a lower probability of transitioning from vaginal delivery to cesarean section. Additionally, acupressure significantly increased oxytocin release, enhanced maternal strength, and reduced the incidence of difficult labor, thereby decreasing the occurrence of neonatal asphyxia.

7.3 Acupressure's Role in Reducing Labor Stress and Improving Maternal Outcomes

Pain and tension during labor can cause maternal anxiety and agitation, increase adrenaline secretion, and result in uterine contraction disorders and abnormal labor forces, leading to prolonged labor, acid-base imbalance, and a range of complications. Pain-induced stress responses during labor can enhance basal metabolic rate and oxygen consumption [60,61]. Smith *et al.* [13] conducted a systematic review of randomized controlled trials on the use of acupressure for labor analgesia, evaluating its effects on labor pain. The results showed that parturients who received acupressure experienced significant pain relief, with Visual Analog Scale (VAS) scores reduced by approximately 2 points compared to controls. Additionally, the first stage of labor was shortened by an average of 50 minutes, and the second stage by 15 minutes in women who received acupressure [56]. Maternal satisfaction scores also improved significantly, with 85% of women reporting greater comfort during delivery. To date, no adverse events have been clearly reported, indicating that acupressure is an effective and safe method for managing labor pain [60]. In the project "Flexible wearable device based on information management of labor analgesia", we achieved the success rate of 85% in predicting natural delivery.

8. Controversies Surrounding the Use of Transcutaneous Acupressure for Labor Analgesia

Although most studies support acupressure as an effective tool for labor pain management, there are some controversies in the literature [19,62]. The main points of contention include: (1) some researchers believe that the analgesic effect of acupressure in labor is relatively weak, leading to incomplete pain relief; (2) other studies suggest that acupressure has no statistically significant impact on the rate of cesarean sections or neonatal outcomes; (3) acupressure requires experienced clinicians to accurately identify and stimulate the correct acupoints with appropriate pressure, and some studies relying on mechanical devices may provide weaker evidence.

Acupressure, rooted in TCM, is gaining recognition as a non-invasive and culturally acceptable option for labor pain management. Studies suggest that women appreciate its simplicity, safety, and potential to foster a sense of control during labor [63,64]. A survey conducted by Smith *et*

al. [13] reported that 75% of women who used acupressure during labor expressed satisfaction and willingness to use it in future deliveries. However, barriers to widespread acceptance include limited awareness, lack of trained practitioners, and skepticism about its efficacy in some healthcare settings.

When compared to other non-pharmacological methods, such as hydrotherapy, massage, and relaxation techniques, acupressure offers distinct advantages while presenting certain limitations. It is a non-invasive technique that is safe for both the mother and fetus and can be performed without the need for specialized equipment, making it accessible in a variety of settings. Acupressure has been shown to provide measurable reductions in pain intensity, such as a 2-point reduction in VAS scores, and to shorten labor duration, enhancing maternal satisfaction and cooperation during labor. However, its efficacy heavily depends on accurate identification of acupoints, which requires specialized training, and the skill level of the practitioner [13,65]. While its pain-relief effectiveness is moderate compared to pharmacological methods, some studies report inconsistent findings regarding cesarean section rates and neonatal outcomes, highlighting the need for further research [66–68]. Despite these limitations, acupressure remains a valuable addition to non-pharmacological approaches to labor pain management, offering unique benefits in specific contexts.

Hydrotherapy offers relaxation but lacks direct analgesic effects [69], while massage requires continuous physical effort from a caregiver. Acupressure's portable and practical nature makes it a particularly attractive option in resource-limited settings.

9. Conclusions

Childbirth is a natural physiological process, but the intense pain associated with labor can lead to substantial physical and psychological stress for the parturient, negatively influencing maternal and neonatal outcomes. Effective pain management should be a priority for clinical care providers to ensure a safe and satisfying childbirth experience.

This review underscores acupressure as a promising, non-invasive method for labor pain management, offering significant benefits such as pain reduction, shorter labor duration, reduced anxiety, and improved maternal satisfaction—all while maintaining a favorable safety profile. Compared to other non-pharmacological methods, acupressure stands out for its simplicity, accessibility, and alignment with holistic care principles. However, its efficacy is dependent on accurate acupoint selection and proper application techniques, emphasizing the need for trained practitioners and standardized protocols.

Despite its advantages, acupressure is not a complete substitute for pharmacological analgesia. Future research should address its current limitations by standardizing methodologies, exploring its efficacy across diverse

populations, and investigating its integration into multi-modal pain management strategies. Large-scale, multicenter trials and interdisciplinary collaborations are essential to validate its therapeutic potential and ensure widespread acceptance.

Furthermore, advanced studies incorporating objective measures such as neuroimaging, hormonal biomarkers, and long-term maternal and neonatal follow-ups will deepen our understanding of acupressure's mechanisms and outcomes. With these advancements, acupressure could play a pivotal role in enhancing patient-centered care, bridging traditional and modern medical practices, and improving the overall quality of obstetric care.

Author Contributions

MZ and YW equally contributed to the study's design, article collection, and analysis. HZ conducted the literature review and provided insights on acupoint selection. SS refined the study design and revised the manuscript. JM participated in the interpretation of data, contributed to the refinement of the study design, and provided critical feedback on the manuscript. All authors contributed to editorial changes in the manuscript. All authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Not applicable.

Acknowledgment

The authors would like to thank the anesthesia preparation department of Sichuan Provincial People's Hospital for their support and guidance.

Funding

This study was supported by the Sichuan Science and Technology Program (Grant No: 2023YFS0193), MedicoEngineering Cooperation Funds from University of Electronic Science and Technology of China (No. ZYGX2021YGLH221), Sichuan Provincial People's Hospital Young Talent Fund (No. 2022QN07).

Conflict of Interest

The authors declare no conflict of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at <https://doi.org/10.31083/CEOG33517>.

References

- [1] Amiri P, Mirghafourvand M, Esmaeilpour K, Kamalifard M, Ivanbagha R. The effect of distraction techniques on pain and stress during labor: a randomized controlled clinical trial. BMC

- Pregnancy and Childbirth. 2019; 19: 534. <https://doi.org/10.1186/s12884-019-2683-y>
- [2] Manizheh P, Leila P. Perceived environmental stressors and pain perception during labor among primiparous and multiparous women. Journal of Reproduction & Infertility. 2009; 10: 217–223.
- [3] Tan HS, Agarhesh T, Tan CW, Sultana R, Chen HY, Chua TE, *et al.* Perceived stress during labor and its association with depressive symptomatology, anxiety, and pain catastrophizing. Scientific Reports. 2021; 11: 17005. <https://doi.org/10.1038/s41598-021-96620-0>
- [4] Lobel M. Conceptualizations, measurement, and effects of prenatal maternal stress on birth outcomes. Journal of Behavioral Medicine. 1994; 17: 225–272. <https://doi.org/10.1007/bf01857952>
- [5] Czech I, Fuchs P, Fuchs A, Lorek M, Tobolska-Lorek D, Drosdzol-Cop A, *et al.* Pharmacological and Non-Pharmacological Methods of Labour Pain Relief-Establishment of Effectiveness and Comparison. International Journal of Environmental Research and Public Health. 2018; 15: 2792. <https://doi.org/10.3390/ijerph15122792>
- [6] Jones L, Othman M, Dowswell T, Alfirevic Z, Gates S, Newburn M, *et al.* Pain management for women in labour: an overview of systematic reviews. The Cochrane Database of Systematic Reviews. 2012; 2012: CD009234. <https://doi.org/10.1002/14651858.CD009234.pub2>
- [7] Shi Y, Wu W. Multimodal non-invasive non-pharmacological therapies for chronic pain: mechanisms and progress. BMC Medicine. 2023; 21: 372. <https://doi.org/10.1186/s12916-023-03076-2>
- [8] Nori W, Kassim MAK, Helmi ZR, Pantazi AC, Brezeanu D, Brezeanu AM, *et al.* Non-Pharmacological Pain Management in Labor: A Systematic Review. Journal of Clinical Medicine. 2023; 12: 7203. <https://doi.org/10.3390/jcm12237203>
- [9] Zhu H. Acupoints Initiate the Healing Process. Medical Acupuncture. 2014; 26: 264–270. <https://doi.org/10.1089/acu.2014.1057>
- [10] Kim W, Kim SK, Min BI. Mechanisms of electroacupuncture-induced analgesia on neuropathic pain in animal model. Evidence-based Complementary and Alternative Medicine: eCAM. 2013; 2013: 436913. <https://doi.org/10.1155/2013/436913>
- [11] Gao LL, Yu JQ, Liu Q, Gao HX, Dai YL, Zhang JJ, *et al.* Analgesic Effect of Nitrous Oxide/Oxygen Mixture for Traumatic Pain in the Emergency Department: A Randomized, Double-Blind Study. The Journal of Emergency Medicine. 2019; 57: 444–452. <https://doi.org/10.1016/j.jemermed.2019.06.026>
- [12] Smith LA, Burns E, Cuthbert A. Parenteral opioids for maternal pain management in labour. The Cochrane Database of Systematic Reviews. 2018; 6: CD007396. <https://doi.org/10.1002/14651858.CD007396.pub3>
- [13] Smith CA, Collins CT, Levett KM, Armour M, Dahlen HG, Tan AL, *et al.* Acupuncture or acupressure for pain management during labour. The Cochrane Database of Systematic Reviews. 2020; 2: CD009232. <https://doi.org/10.1002/14651858.CD009232.pub2>
- [14] Gonenc IM, Terzioğlu F. Effects of Massage and Acupressure on Relieving Labor Pain, Reducing Labor Time, and Increasing Delivery Satisfaction. The Journal of Nursing Research: JNR. 2020; 28: e68. <https://doi.org/10.1097/jnr.0000000000000344>
- [15] He Y, Guo X, May BH, Zhang AL, Liu Y, Lu C, *et al.* Clinical Evidence for Association of Acupuncture and Acupressure With Improved Cancer Pain: A Systematic Review and Meta-Analysis. JAMA Oncology. 2020; 6: 271–278. <https://doi.org/10.1001/jamaoncol.2019.5233>
- [16] Li HL, Zhang Y, Zhou JW. Acupuncture for radicular pain: a review of analgesic mechanism. Frontiers in Molecular Neu-

- rosience. 2024; 17: 1332876. <https://doi.org/10.3389/fnmol.2024.1332876>
- [17] Adams R, White B, Beckett C. The effects of massage therapy on pain management in the acute care setting. *International Journal Of Therapeutic Massage & Bodywork*. 2010; 3: 4–11.
- [18] Mooventhana A, Nivethitha L. Scientific evidence-based effects of hydrotherapy on various systems of the body. *North American Journal of Medical Sciences*. 2014; 6: 199–209. <https://doi.org/10.4103/1947-2714.132935>
- [19] Smith CA, Levett KM, Collins CT, Armour M, Dahlen HG, Suganuma M. Relaxation techniques for pain management in labour. *The Cochrane Database of Systematic Reviews*. 2018; 3: CD009514. <https://doi.org/10.1002/14651858.CD009514.pub2>
- [20] Childbirth Without Fear: The Principles and Practice of Natural Childbirth. *Journal of the American Medical Association*. 1944; 125: 817–817. <https://doi.org/10.1001/jama.1944.02850290057029>
- [21] Brownridge P. The nature and consequences of childbirth pain. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*. 1995; 59 Suppl: S9–S15. [https://doi.org/10.1016/0028-2243\(95\)02058-z](https://doi.org/10.1016/0028-2243(95)02058-z)
- [22] Orbach-Zinger S, Heesen M, Grigoriadis S, Heesen P, Halpern S. A systematic review of the association between postpartum depression and neuraxial labor analgesia. *International Journal of Obstetric Anesthesia*. 2021; 45: 142–149. <https://doi.org/http://doi.org/10.1016/j.ijoa.2020.10.004>
- [23] Matos LC, Machado JP, Monteiro FJ, Greten HJ. Understanding Traditional Chinese Medicine Therapeutics: An Overview of the Basics and Clinical Applications. *Healthcare (Basel)*. 2021; 9: 257. <https://doi.org/10.3390/healthcare9030257>
- [24] Mehta P, Dhapte V, Kadam S, Dhapte V. Contemporary acupuncture therapy: Adroit cure for painless recovery of therapeutic ailments. *Journal of Traditional and Complementary Medicine*. 2017; 7: 251–263. <https://doi.org/10.1016/j.jtme.2016.06.004>
- [25] Melzack R, Wall PD. Pain mechanisms: a new theory. *Science*. 1965; 150: 971–979. <https://doi.org/10.1126/science.150.3699.971>
- [26] Skrabanek P. Acupuncture and endorphins. *Lancet*. 1984; 1: 220. [https://doi.org/10.1016/s0140-6736\(84\)92137-8](https://doi.org/10.1016/s0140-6736(84)92137-8)
- [27] Han JS. Acupuncture and endorphins. *Neuroscience Letters*. 2004; 361: 258–261. <https://doi.org/10.1016/j.neulet.2003.12.019>
- [28] Wu MT, Sheen JM, Chuang KH, Yang P, Chin SL, Tsai CY, *et al.* Neuronal specificity of acupuncture response: a fMRI study with electroacupuncture. *Neuroimage*. 2002; 16: 1028–1037. <https://doi.org/10.1006/nimg.2002.1145>
- [29] Zhang W, Luo F, Qi Y, Wang Y, Chang J, Woodward DJ, *et al.* Modulation of pain signal processing by electric acupoint stimulation: an electroencephalogram study. *Beijing Da Xue Xue Bao Yi Xue Ban = Journal of Peking University. Health sciences*. 2003; 35: 236–240.
- [30] Chen Y, Wu W, Yao Y, Yang Y, Zhao Q, Qiu L. Transcutaneous electric acupoint stimulation at Jiaji points reduce abdominal pain after colonoscopy: a randomized controlled trial. *International Journal of Clinical and Experimental Medicine*. 2015; 8: 5972–5977.
- [31] Ren XX, Guo MW, Zhao YF, Ding XY, Li CH, Ji B, *et al.* Effects of electroacupuncture on pain reactions, expression of spinal kappa-opioid receptor and contents of enkephalin and beta-endorphin in periaqueductal gray of midbrain in dysmenorrhea model rats. *Zhen Ci Yan Jiu = Acupuncture Research*. 2012; 37: 1–7.
- [32] Chung IM, Kim YS, Sung YH, Kim SE, Ko IG, Shin MS, *et al.* Effects of acupuncture on abdominal leak point pressure and c-Fos expression in the brain of rats with stress urinary incontinence. *Neuroscience Letters*. 2008; 439: 18–23. <https://doi.org/10.1016/j.neulet.2008.04.100>
- [33] Tu CH, Lee YC, Chen YY, Chen CM, Lu WC, Chen YH, *et al.* Acupuncture Treatment Associated with Functional Connectivity Changes in Primary Dysmenorrhea: A Resting State fMRI Study. *Journal of Clinical Medicine*. 2021; 10: 4731. <https://doi.org/10.3390/jcm10204731>
- [34] Lin JG, Kotha P, Chen YH. Understandings of acupuncture application and mechanisms. *American Journal of Translational Research*. 2022; 14: 1469–1481.
- [35] Zhang Q, Zhou M, Huo M, Si Y, Zhang Y, Fang Y, *et al.* Mechanisms of acupuncture-electroacupuncture on inflammatory pain. *Molecular Pain*. 2023; 19: 17448069231202882. <https://doi.org/10.1177/17448069231202882>
- [36] Evans MH. The mechanism of the vagal bradycardia evoked by diencephalic stimulation in the rabbit. *Journal of the Autonomic Nervous System*. 1986; 16: 239–248. [https://doi.org/10.1016/0165-1838\(86\)90031-7](https://doi.org/10.1016/0165-1838(86)90031-7)
- [37] Han JS. Acupuncture: neuropeptide release produced by electrical stimulation of different frequencies. *Trends in Neurosciences*. 2003; 26: 17–22. [https://doi.org/10.1016/s0166-2236\(02\)00006-1](https://doi.org/10.1016/s0166-2236(02)00006-1)
- [38] Choi EM, Jiang F, Longhurst JC. Point specificity in acupuncture. *Chinese Medicine*. 2012; 7: 4. <https://doi.org/10.1186/1749-8546-7-4>
- [39] Lee S, Lee IS, Chae Y. Similarities between Ashi acupoints and myofascial trigger points: Exploring the relationship between body surface treatment points. *Frontiers in Neuroscience*. 2022; 16: 947884. <https://doi.org/10.3389/fnins.2022.947884>
- [40] Deadman P, Al-Khafaji M, Baker K. A manual of acupuncture. Review. *Journal of Chinese Medicine Publications*. 2015.
- [41] Guglielminotti J, Landau R, Daw J, Friedman AM, Chihuri S, Li G. Use of Labor Neuraxial Analgesia for Vaginal Delivery and Severe Maternal Morbidity. *JAMA Network Open*. 2022; 5: e220137–e220137. <https://doi.org/10.1001/jamanetworkopen.2022.0137>
- [42] Direkvand-Moghadam A, Khosravi A. Effect of acupressure on post-operative nausea and vomiting in cesarean section: a randomised controlled trial. *Journal of Clinical and Diagnostic Research: JCDR*. 2013; 7: 2247–2249. <https://doi.org/10.7860/jcdr/2013/5702.3485>
- [43] Habib AS, Itchon-Ramos N, Phillips-Bute BG, Gan TJ. Transcutaneous acupoint electrical stimulation with the ReliefBand for the prevention of nausea and vomiting during and after cesarean delivery under spinal anesthesia. *Anesthesia and Analgesia*. 2006; 102: 581–584. <https://doi.org/10.1213/01.an.e.0000189217.19600.5c>
- [44] Zhao W, Li J, Wang N, Wang Z, Zhang M, Zhang H, *et al.* Effect of dexmedetomidine on postoperative nausea and vomiting in patients under general anaesthesia: an updated meta-analysis of randomised controlled trials. *BMJ Open*. 2023; 13: e067102. <https://doi.org/10.1136/bmjopen-2022-067102>
- [45] Ho CM, Hseu SS, Tsai SK, Lee TY. Effect of P-6 acupressure on prevention of nausea and vomiting after epidural morphine for post-cesarean section pain relief. *Acta Anaesthesiologica Scandinavica*. 1996; 40: 372–375. <https://doi.org/10.1111/j.1399-6576.1996.tb04448.x>
- [46] Harmon D, Ryan M, Kelly A, Bowen M. Acupressure and prevention of nausea and vomiting during and after spinal anaesthesia for caesarean section. *British Journal of Anaesthesia*. 2000; 84: 463–467. <https://doi.org/10.1093/oxfordjournals.bja.a013471>
- [47] Zhu Y, Wang F, Zhou J, Gu S, Gong L, Lin Y, *et al.* Effect of Acupoint Hot Compress on Postpartum Urinary Retention After Vaginal Delivery: A Randomized Clinical Trial. *JAMA Network Open*. 2022; 5: e2213261. <https://doi.org/10.1001/jamane>

- [48] Lee H, Choi TY, Myung CS, Lee MS. Herbal medicine Shaofu Zhuyu decoction for primary dysmenorrhea: a systematic review protocol. *Systematic Reviews*. 2016; 5: 9. <https://doi.org/10.1186/s13643-016-0185-9>
- [49] Simavli S, Kaygusuz I, Gumus I, Usluogullari B, Yildirim M, Kafali H. Effect of music therapy during vaginal delivery on postpartum pain relief and mental health. *Journal of Affective Disorders*. 2014; 156: 194–199. <https://doi.org/10.1016/j.jad.2013.12.027>
- [50] Zhao X, Liu B, Zhang Q, Wang H, Tian Y, Wang F. Moxibustion for uterine contraction pain: A protocol for systematic review and meta-analysis. *Medicine*. 2022; 101: e32195. <https://doi.org/10.1097/md.00000000000032195>
- [51] Guo F, Wei L, Zhang J, Zhang X. Acupoint massage, acupoint sticking combined with moxibustion for postpartum urinary retention: a randomized controlled trial. *Zhongguo Zhen Jiu = Chinese Acupuncture & Moxibustion*. 2024; 44: 803–806. <https://doi.org/10.13703/j.0255-2930.20230603-k0001> (In Chinese)
- [52] Lauterbach R, Ferrer Sokolovski C, Rozenberg J, Weissman A. Acupuncture for the treatment of post-partum urinary retention. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*. 2018; 223: 35–38. <https://doi.org/10.1016/j.ejogrb.2018.01.029>
- [53] Mirzaee F, Hasaroeih FE, Mirzaee M, Ghazanfarpour M. Comparing the effect of acupressure with or without ice in LI-4 point on labour pain and anxiety levels during labour: a randomised controlled trial. *Journal of Obstetrics and Gynaecology : the Journal of the Institute of Obstetrics and Gynaecology*. 2021; 41: 395–400. <https://doi.org/10.1080/01443615.2020.1747412>
- [54] Wan Y, Li D. Clinical observation of analgesia in delivery treated with acupoint pressure therapy. *Zhongguo Zhen Jiu = Chinese Acupuncture & Moxibustion*. 2016; 36: 1243–1246. <https://doi.org/10.13703/j.0255-2930.2016.12.005> (In Chinese)
- [55] Mollart L, Skinner V, Foureur M. A feasibility randomised controlled trial of acupressure to assist spontaneous labour for primigravid women experiencing a post-date pregnancy. *Midwifery*. 2016; 36: 21–27. <https://doi.org/10.1016/j.midw.2016.02.020>
- [56] Hjelmstedt A, Shenoy ST, Stener-Victorin E, Lekander M, Bhat M, Balakumaran L, *et al.* Acupressure to reduce labor pain: a randomized controlled trial. *Acta Obstetrica et Gynecologica Scandinavica*. 2010; 89: 1453–1459. <https://doi.org/10.3109/00016349.2010.514323>
- [57] Lyngso CE, Lorentzen IP, Lauszus F. Use of acupuncture for labour augmentation. *Ugeskr for Laeger*. 2010; 172: 289–293.
- [58] Levett KM, Smith CA, Bensoussan A, Dahlen HG. Complementary therapies for labour and birth study: a randomised controlled trial of antenatal integrative medicine for pain management in labour. *BMJ Open*. 2016; 6: e010691. <https://doi.org/10.1136/bmjopen-2015-010691>
- [59] Chaillet N, Belaid L, Crochetiere C, Roy L, Gagne GP, Moutquin JM, *et al.* Nonpharmacologic approaches for pain management during labor compared with usual care: a meta-analysis. *Birth*. 2014; 41: 122–137. <https://doi.org/10.1111/birt.12103>
- [60] Chen YW, Wang HH. The effectiveness of acupressure on relieving pain: a systematic review. *Pain Management Nursing : Official Journal of the American Society of Pain Management Nurses*. 2014; 15: 539–550. <https://doi.org/10.1016/j.pmn.2012.12.005>
- [61] Arendt KW, Tessmer-Tuck JA. Nonpharmacologic labor analgesia. *Clinics in Perinatology*. 2013; 40: 351–371. <https://doi.org/10.1016/j.clp.2013.05.007>
- [62] Bonapace J, Gagne GP, Chaillet N, Gagnon R, Hebert E, Buckley S. No. 355-Physiologic Basis of Pain in Labour and Delivery: An Evidence-Based Approach to its Management. *Journal of Obstetrics and Gynaecology Canada*. 2018; 40: 227–245. <https://doi.org/10.1016/j.jogc.2017.08.003>
- [63] Karlstrom A, Nystedt A, Hildingsson I. The meaning of a very positive birth experience: focus groups discussions with women. *BMC Pregnancy and Childbirth*. 2015; 15: 251. <https://doi.org/10.1186/s12884-015-0683-0>
- [64] Lunda P, Minnie CS, Benade P. Women's experiences of continuous support during childbirth: a meta-synthesis. *BMC Pregnancy and Childbirth*. 2018; 18: 167. <https://doi.org/10.1186/s12884-018-1755-8>
- [65] Raana HN, Fan XN. The effect of acupressure on pain reduction during first stage of labour: A systematic review and meta-analysis. *Complementary Therapies in Clinical Practice*. 2020; 39: 101126. <https://doi.org/10.1016/j.ctcp.2020.101126>
- [66] Czarny HN, Forde B, DeFranco EA, Hall ES, Rossi RM. Association between mode of delivery and infant survival at 22 and 23 weeks of gestation. *American Journal of Obstetrics & Gynecology MFM*. 2021; 3: 100340. <https://doi.org/10.1016/j.ajogmf.2021.100340>
- [67] Nelson HD, Darney BG, Ahrens K, Burgess A, Jungbauer RM, Cantor A, *et al.* Associations of Unintended Pregnancy With Maternal and Infant Health Outcomes: A Systematic Review and Meta-analysis. *JAMA*. 2022; 328: 1714–1729. <https://doi.org/10.1001/jama.2022.19097>
- [68] Shen J, Shi M. Association between decision-to-delivery time and neonatal outcomes: a systematic review and meta-analysis. *BMC Pregnancy and Childbirth*. 2024; 24: 410. <https://doi.org/10.1186/s12884-024-06603-y>
- [69] Stark MA, Miller MG. Barriers to the use of hydrotherapy in labor. *Journal of Obstetric, Gynecologic, and Neonatal Nursing : JOGNN*. 2009; 38: 667–675. <https://doi.org/10.1111/j.1552-6909.2009.01065.x>