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Advances in Obstetrics and Gynecology Research

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Table of Contents

- 1 Knowledge and Acceptability of Water Birth Among Chinese Women in Taian City, Shandong Province**
Wenjing Li, Jeffrey A. Lucero
- 9 A Case Report of Nursing Intervention for a Patient with Uterine Incarceration at 14th Weeks of Gestation Complicated by Acute Urinary Retention**
Chong Yang, Yadan Wang, Yuhong Liu, Longhai Song
- 17 Promotion and Application of Combined Spinal-Epidural Block Analgesia Technique with Ropivacaine and Sufentanil for Labor Analgesia in Ngari Region**
Dolkar Tenzin, Xinlu Wang, Yuqin Lu, Tsedpal Tenzin, Drolma Ngawang, Yan'an Jiang, Yulong Song
- 24 Epidemiological Analysis of Female Menopausal Syndrome and Exploration of Cognitive Levels Regarding Hormone Replacement Therapy**
Xinli Mao, Qian Li, Changhua Zhao, Zixuan Zhang, Sue Feng, Xuxia He, Huirong Yuan, Ruimin He, Huixian Chen, Chunyao Feng
- 32 Analysis of the Clinical Effect of Traditional Chinese Medicine Stimulation Decoction on Promoting Cervical Maturation in the Third Trimester of Pregnancy**
Xi Zhao
- 41 Application Effect of Phloroglucinol Combined with Lamaze Breathing Method and Doula in Promoting Natural Delivery**
Dan Xue

Knowledge and Acceptability of Water Birth Among Chinese Women in Taian City, Shandong Province

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Abstract: *Objective:* This study explored the level of expertise and acceptability of water birth among Chinese women in Taian City, Shandong Province. *Methods:* A descriptive correlational research design was used. One hundred six women of reproductive age (18–35 years old) from a selected community in Taian City were surveyed using a validated Water Birth Knowledge Questionnaire and Water Birth Acceptability Questionnaire, both based on the Theory of Planned Behavior (TPB). Statistical tools such as frequency, percentage, mean, standard deviation, and Spearman's rank correlation coefficient were applied for data analysis. *Results:* Findings revealed that most participants had moderate knowledge of water birth, particularly regarding its benefits, but lacked understanding of the risks and procedural details. Acceptability levels were generally positive, especially in attitude and behavioral intention. A significant correlation ($p < 0.05$) between knowledge and acceptability was found. Educational level and monthly income were significantly associated with higher learning and greater acceptability of water birth. *Conclusion:* Increased knowledge of water birth does not necessarily lead to greater acceptance; it may instead foster more cautious decision-making.

Keywords: Water birth; Knowledge; Acceptability; Theory of Planned Behavior; Maternal health

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1. Introduction

Labor or delivery, a natural and complex process, is a physical and mental test for every woman in labor. Intense and persistent labor pains, which often last for hours or even a dozen hours^[1], overwhelm many women in labor. Although pharmacological analgesia is an effective means, its possible side effects, such as affecting contractions, prolonging labor, and even the need to switch to a cesarean section^[2], have also caused many women to be apprehensive.

Against this background, water birth has emerged as an innovative delivery method and is gradually gaining popularity worldwide. Especially in developed countries, such as the United Kingdom, the United States, and Australia, water birth has been proven effective in reducing pain, shortening the labor process, and promoting emotional bonding between mother and baby^[3]. These countries have established a complete system of water

birth services and actively promoted related research to validate further its safety and effectiveness^[4]. Meanwhile, developing countries actively explore and practice this delivery method.

In China, water birth is also becoming popular, especially in developed cities, and has become an ideal choice for many women^[5]. However, the prevalence in less developed cities remains low due to resource and technological constraints^[6]. Nonetheless, it has been shown that water birth can significantly reduce maternal tension and pain, shorten the duration of labor, and reduce the risk of birth canal tears and postpartum hemorrhage^[7].

Despite the many advantages of water birth, there are some controversies, such as perineal injuries and neonatal health issues^[8]. Nevertheless, meta-analyses have shown that water deliveries reduce total duration, protect perineal integrity, improve quality of delivery and maternal satisfaction, and do not increase neonatal infections compared with conventional deliveries^[9]. However, there is still limited research on water delivery, especially the relative scarcity of high-quality clinical trial data, which limits a comprehensive assessment of its risks and benefits^[10].

Given the growing interest in water birth in China, research on women's awareness and acceptance of it is fundamental. However, current research focuses on specific populations, and research on the general female population in China remains relatively scarce^[11]. Therefore, this study aimed to fill this research gap by including a diverse sample and obtaining more comprehensive and representative data. The researcher also called for more randomized controlled trials and long-term follow-up studies to further validate the safety and efficacy of water delivery.

The researcher has developed a strong interest in water birth because of the witness to the pain and difficulty during labor and delivery. This study aimed to scientifically validate the effectiveness of water birth and provide women with a more humanized and comfortable birthing option, thus promoting the continuous development of medical practice.

2. Materials and methods

2.1. Methods

A descriptive correlational research design was used. One hundred six women of reproductive age (18–35 years old) from a selected community in Taian City were surveyed using a validated Water Birth Knowledge Questionnaire and Water Birth Acceptability Questionnaire, both based on the Theory of Planned Behavior (TPB). Statistical tools such as frequency, percentage, mean, standard deviation, and Spearman's rank correlation coefficient were applied for data analysis.

2.2. Population and sampling

This study was conducted in a representative community-based maternal and child health hospital in Tai'an City, Shandong Province, which has 145 women of childbearing age, and 106 of them were selected as a sample after scientific calculations by Raosoft software to ensure a 5% error, 95% confidence level, and a 5% predicted response rate. This community has a concentration of women of childbearing age and a full range of medical service facilities, providing a rich resource for the study. Subject recruitment followed strict inclusion and exclusion criteria to enhance intrinsic validity. The use of purposive sampling, while improving the efficiency of data collection, requires attention to potential biases such as subjectivity, limited coverage, and non-randomization, which need to be carefully assessed, and measures were taken to ensure the scientific validity and reliability of the study.

In this study, the researcher recruited the participants based on set inclusion criteria:

- (1) Age range: Study participants must be between 18 and 35, which covers most women of childbearing

age. According to data from the National Bureau of Statistics of China in 2024, the average age of first childbearing for women in China is 26.3 years old, with 26–35 years old being the peak age for childbearing. This range covers the group of women who are more willing to give birth and are more concerned about the mode of delivery, which aligns with the characteristics of the study’s target population. According to the Chinese Obstetrics and Gynecology Nursing textbook, the 18–25 years-old group is mainly in the childbirth preparation period, while the 26–35 years-old group is more likely to face childbirth mode choices ^[12]. Therefore, by analyzing age subgroups, this study may reveal differences in women’s perceptions of water birth at different life stages and provide a basis for targeted interventions.

(2) Women of childbearing age: All women of childbearing age can be included in the study.

(3) Consciousness and full capacity: the participant must be conscious and able to express opinions and make choices on their own.

Exclusion criteria: (1) Presence of psychological disorders or illnesses; (2) Presence of serious physical illness; (3) Undergoing or planning to undergo a cesarean section; (4) Suffering from blood-borne transmitted diseases and (5) Serious complications of pregnancy.

2.3. Research instrument

(1) Demographic characteristics

(2) The knowledge questionnaire used in this study was adapted from the questionnaire developed by Bashaikh and improved according to Chinese clinical practice guidelines and expert consensus. The questionnaire contained 24 binary-choice questions systematically.

(3) Acceptance Questionnaire Design: Theoretical basis and scale structure.

2.4. Data analysis

The researcher uses SPSS data analysis methods learned in relevant courses or training. First, descriptive statistics were calculated to summarize participants’ demographic characteristics, such as frequencies and percentages for categorical variables (education level, income range) and means and standard deviations for continuous variables (knowledge scores). Inferential statistics, such as correlation and regression analyses, were then used to explore relationships between variables, such as the relationship between demographic characteristics and knowledge of water birth, and between knowledge of water birth and acceptability. Throughout the analysis process, the researcher followed strict statistical guidelines to ensure the validity and reliability of the results.

3. Results

3.1. Knowledge on water birth

Table 1. Relationship between the participants’ demographic profile and their knowledge on water birth

Characteristic	<i>R</i> -value	<i>P</i> -value	Decision
Age	0.02	0.87	Failed to Reject H0
Educational Level	0.05	0.59	Failed to Reject H0
Monthly Income	-0.05	0.58	Failed to Reject H0

3.1.1 Age

Spearman's correlation showed almost no association between age and knowledge about water birth ($r = 0.02$, $p = 0.87$). This suggests that age did not significantly influence women's knowledge levels. The lack of variability in the age range (majority between 26–35 years old) may explain the nonsignificant result. However, prior research indicates that older women may have deeper childbirth knowledge due to life experience^[13].

3.1.2. Education level

The analysis revealed no significant correlation between education level and knowledge of water birth ($r = 0.05$, $p = 0.59$). Although education is generally considered a predictor of health knowledge, this study suggests that knowledge about water birth may not be systematically transmitted through formal education channels, but instead via media and healthcare providers. Previous studies found that more educated women typically acquire and evaluate childbirth information more effectively^[13]. The nonsignificant result here may be due to the sample's high concentration of university-educated participants (69.81%), limiting variability.

3.1.3. Monthly income

Monthly income showed a weak, nonsignificant negative correlation with knowledge ($r = -0.05$, $p = 0.58$). This indicates that income was not a determinant of women's knowledge about water birth. Information dissemination may be relatively egalitarian, supported by widespread access to the Internet and community outreach. However, a study found a positive relationship between income and childbirth knowledge, as higher-income women often access better medical resources and educational programs^[14]. In this study, the concentration of participants in low-to-middle income groups may have contributed to the nonsignificant result.

3.2. Acceptance on water birth

Table 2. Relationship between the participants' demographic profile and their acceptance on water birth

Characteristic	R value	P value	Decision
Age	0.07	0.49	Failed to Reject H0
Educational level	-0.22	0.02*	Reject H0
Monthly income	0.09	0.34	Failed to Reject H0

Note: p -value ≤ 0.05 – significant, p -value > 0.05 – not significant

3.2.1. Age

- (1) Findings: The correlation between age and the acceptability of water birth was not significant ($r = 0.07$, $p = 0.49$). Acceptance was relatively balanced across age groups, even though most participants were between 26–35 years old. The limited age span (18–35 years) may have weakened age as a differentiating factor.
- (2) Supporting literature: A study found that older women (including those above 35) were slightly more accepting, possibly due to greater experience and proactive comfort-seeking choices^[15]. However, another study reported that age was not a main factor; instead, education and healthcare provider advice played a more important role^[16].
- (3) Summary: Age was not a significant factor influencing acceptance of water birth in this study, likely due

to the narrow age range of participants, although other research suggests older women may show greater acceptance^[2,15].

3.2.2. Educational level

- (1) Findings: There was a significant negative correlation between education level and acceptance of water birth ($r = -0.22$, $p = 0.02$). Higher-educated women were slightly less accepting, possibly due to concerns about safety, access to conflicting medical information, and cultural or provider influences.
- (2) Supporting literature: Zhong et al. (2023) and Sharifipour et al. (2022) reported similar findings, noting that highly educated women tended to question clinical safety and preferred conventional methods^[5,17]. In contrast, Bashaikh et al. (2022) and Li et al. (2023) found that highly educated women in some regions had more knowledge and willingness to accept water birth, especially in areas with abundant medical resources^[9,15].
- (3) Summary: Education showed a significant negative relationship with acceptance, suggesting that higher education may increase caution. However, findings in the literature remain mixed, with some studies showing skepticism while others highlight greater willingness among highly educated women^[5,15,17].

3.2.3. Monthly income

- (1) Findings: Monthly income showed no significant correlation with acceptance ($r = 0.09$, $p = 0.34$). Income did not appear to influence attitudes, likely because water birth is not yet a mainstream choice, the sample had a concentrated income distribution, and psychosocial factors were more influential.
- (2) Supporting literature: Zhong et al. (2021) and Cha et al. (2019) reported similar findings, noting that income was not a major factor in areas where water birth is not widely available^[10,18]. However, Li et al. (2023) found that higher-income groups in first-tier cities were more likely to choose personalized birth methods, while Carlsson et al. (2020) reported that high-income women in Sweden were more inclined toward natural, autonomous births^[9,19].
- (3) Summary: Income was not a significant predictor of acceptance in this study, consistent with findings in northern China, though evidence from other regions suggests that higher income may promote acceptance where resources and options are more available^[9,10,18,19].

3.3. Knowledge and acceptance of water birth

Table 3. Relationship between the participants' knowledge and acceptance on water birth

R-value	P-value	Decision
-0.14	0.012*	Reject H_0

Note: p -value ≤ 0.05 – significant, p -value > 0.05 – not significant

The study found a weak but significant negative correlation between knowledge and acceptance of water birth ($r = -0.14$, $p = 0.012$). This suggests that higher knowledge levels were associated with lower acceptance, likely because women focused more on risks than benefits, consistent with the Cognitive Threat Effect^[10]. According to the Theory of Planned Behavior, knowledge alone does not enhance willingness if women perceive low control due to inadequate facilities or resources^[20,21]. Similar findings in China and Brazil showed that increased

awareness often heightened concerns about risks in unsupportive healthcare environments^[10,21].

In contrast, studies in contexts with strong healthcare systems and structured education (e.g., Saudi Arabia and Iran) reported positive correlations, where knowledge significantly increased acceptance^[15,17]. These differences suggest that the impact of knowledge depends on the source, quality, and delivery of information, as well as the availability of institutional and medical support. Effective promotion of water birth should therefore combine accurate education, professional guidance, and systemic safety mechanisms to establish a positive “knowledge–trust–behavior” cycle.

4. Discussion

Their socio-demographic factors influence Chinese women’s knowledge and acceptability of water birth. Enhancing public education and targeted health interventions could increase awareness and encourage informed decision-making. These findings highlight the need for integrated water birth services and policy support to provide women with safe and personalized childbirth options.

5. Conclusion

- (1) Regarding research question 1 (demographic characteristics): Women aged 26–35 accounted for 66.04% of the sample, those with university education accounted for 69.81%, and those in the middle- and low-income groups (\$5,000–\$10,000) accounted for 49.06%, which showed a concentration of people in the late childbearing age group, with higher education, and in the middle- and low-income groups. Evidence shows no significant association between age, education level, income, and knowledge of water delivery ($p > 0.05$), suggesting that knowledge popularization should cover the whole population.
- (2) Regarding research question 2 (knowledge level): Participants’ overall knowledge score was 63.21% (moderate cognition), and only the question “Water delivery is suitable for all pregnancies” showed low cognition (45.28% correct). Among the dimensions, risk perception (58.49%) was relatively weak, reflecting inadequate knowledge of key information such as contraindications.
- (3) Regarding research question 3 (acceptability): The overall mean acceptability score of 2.79 (acceptable) was higher for behavioral intention (2.83) than for perceived behavioral control (2.75), indicating that pregnant women had the intention to try the service but had concerns about service accessibility and barriers to practice, despite their willingness to do so. The subjective normative score of 2.78 suggests that there is still room for improvement in supporting significant others, such as family members and doctors.
- (4) Regarding research question 4 (variable association): Age, education, and income were not significantly associated with knowledge level ($p > 0.05$), validating the equalization of knowledge acquisition.
- (5) Regarding research question 5 (variable association): Education level is weakly negatively associated with acceptance ($r = -0.22$, $p = 0.02$), and higher-educated women have lower acceptance due to more sensitive risk perception.
- (6) Regarding research question 6 (variable association): Knowledge was weakly and negatively associated with acceptance ($r = -0.14$, $p = 0.012$), reflecting that knowledge accumulation may reinforce cautionary attitudes rather than directly promote choice.

Evidence would show that age, education, and income failed to predict women’s knowledge of water birth significantly. After learning more, highly educated women may be less accepting due to increased risk awareness.

Ultimately, the more knowledge women have about water birth, the more prudent or conservative they may be, and not necessarily more inclined to choose water birth.

Disclosure statement

The authors declare no conflict of interest.

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A Case Report of Nursing Intervention for a Patient with Uterine Incarceration at 14th Weeks of Gestation Complicated by Acute Urinary Retention

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Abstract: This paper summarizes the management and nursing experience of a rare case involving uterine impaction with acute urinary retention in mid-pregnancy (14th week). Following the failure of conservative treatment, a multidisciplinary team (comprising obstetricians, sonographers, and specialist nurses) collaborated to perform manual reduction under real-time ultrasound guidance, achieving successful resolution. Nursing priorities spanned three phases of manual reduction: pre-, intra-, and post-procedure stages. Comprehensive measures encompassed clinical observation, positioning interventions, bladder management, psychological support, and infection control, yielding favourable maternal and neonatal outcomes. This case underscores that early recognition of entrapment signs and tailored, precision nursing management according to the patient's condition are pivotal for favourable outcomes.

Keywords: Pregnancy; Uterine incarceration; Manual reduction; Nursing

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1. Introduction

The term “uterine incarceration” was first coined by Hunter in 1771 ^[1], describing a pregnancy where the uterus is confined within the pelvic cavity between the symphysis pubis and the sacral promontory ^[2]. Its incidence ranges from 1/3000 to 1/10000 ^[3]. Studies indicate that approximately 77.08% of women have a uterus in an anteverted position, while 22.92% have a retroverted uterus ^[4]. From the 14th week of gestation, the pregnant uterus progressively ascends into the abdominal cavity. Persistence of the uterus within the pelvic cavity beyond 14 weeks of pregnancy warrants consideration of uterine incarceration ^[5], a pathological condition incapable of spontaneous reduction. It is particularly prevalent in pregnant women with a retroverted and retroflexed uterus ^[6]. As gestational age increases, the impacted uterus enlarges and presents with a series

of non-specific symptoms, such as urinary frequency, urgency, urinary retention, abdominal pain, and vaginal bleeding ^[7]. Failure to promptly reduce the impacted uterus may lead to severe complications, including acute renal failure ^[8], bladder rupture ^[9], pulmonary oedema ^[10], miscarriage ^[11], massive haemorrhage during caesarean section ^[12], pulmonary embolism ^[13], and maternal death ^[9]. In December 2024, our department admitted one patient with this condition. Through case study analysis of this patient, the hospital systematically examined the implementation and outcomes of key nursing interventions, including clinical observation, positioning care, bladder management, infection prevention, and psychological support, across three critical phases: pre-manual reduction, during reduction, and post-reduction. This study explores challenges and countermeasures in multidimensional nursing decision-making for patients with uterine impaction. The findings are reported below.

2. Case presentation

Patient, female, aged 33, G3P1. Last menstrual period: 27 August 2024. Presented with a 3+ month pregnancy, urinary difficulty for half a month, and a sensation of incomplete bladder emptying for one day. Admitted to our hospital on 18 December 2024. The patient had undergone one caesarean section in 2013 and a left breast nodule excision in 2017 (details unspecified). Admission diagnoses: (1) Intrauterine pregnancy, 14th week, second gestation; (2) Pregnancy complicated by uterine incarceration; (3) Pregnancy complicated by urinary retention; (4) Scarred uterus; (5) Pregnancy complicated by uterine fibroids. Admission examination: (1) Abdomen flat, soft; (2) Fetal heart rate 142 bpm. Vaginal examination: (1) Married vulva; (2) Unobstructed vagina; (3) Cervix located in the anterior fornix; (4) Cervical canal length 2.5 cm, posteriorly displaced, firm in consistency; (5) Cervix is closed, no tenderness on elevation or movement; (6) Uterus retroverted; (7) No tenderness in parametrial regions. Admission ultrasound findings: (1) Enlarged uterus with visible foetus and foetal movements within the cavity; (2) Myometrial echoes were heterogeneous, with a hypoechoic mass visible subserosal on the anterior wall; (3) The fundus and posterior wall were located deep within the iliac fossae, the cervix positioned above the uterine body, and the posterior fundal wall at the same level as the external cervical; (4) Placenta was located on the posterior wall; (5) Residual urine was present in the bladder.

Conservative management was initiated upon admission. On 20 December 2024, the pelvic ultrasound revealed no improvement in the uterine impaction. Manual reduction was performed that same day under ultrasound guidance, achieving successful repositioning. Post-repositioning, the patient reported no lower abdominal pain, vaginal bleeding, or vaginal discharge. Active pregnancy preservation therapy with allylestrenol tablets was initiated, with close monitoring of foetal heart rate and micturition, alongside prophylactic anti-infective treatment. On the second day post-manual reduction, the patient reported frequent urination, urgency, dysuria, and intermittent blood-streaked urine. Urinalysis indicated a urinary tract infection. A supplementary diagnosis of urinary tract infection during pregnancy was made, and intravenous infusion of cefuroxime sodium 1.5 g Q8h was initiated for antimicrobial therapy. After an 8-day hospital stay, the patient experienced no lower abdominal pain, bleeding, or vaginal discharge. No uterine contractions were palpable, and fetal heart rate and movements remained normal. Symptoms of urinary tract infection resolved, and the patient was discharged in good condition.

3. Nursing

Patients with uterine impaction represent a rare clinical entity. The latest edition of obstetrics and gynaecology

nursing textbooks contains no relevant content, and international guidelines lack specific diagnostic, therapeutic, or nursing protocols for this condition. Clinical descriptions primarily appear in case reports or reviews, with nursing care for this disorder being scarcely documented, and reference experience is limited. There exists no established reference for nursing care during conservative treatment, manual reduction procedures, or post-reduction management. This poses greater challenges for obstetric nursing staff, particularly junior nurses. Consequently, the nursing experience gained from this patient is reported below for professional exchange and reference.

3.1. Pre-reduction care

3.1.1. Psychological care

The expectant mother spoke at a moderate pace with normal volume, expressing herself clearly and fluently. Her expression revealed slight concern, and she reported feeling “nervous and afraid” (anxiety) of moderate intensity. Observation noted a slight furrow of the brow and occasional sighs. Her thinking was coherent; she acknowledged her anxiety and expressed a desire for support. She indicated she would “try to think positively and cooperate with treatment” (positive inclination). Her husband was present and expressed full support. Summary: The patient exhibits moderate situational anxiety with intact insight and strong social support. Healthcare personnel, adopting a warm yet composed demeanour, employed plain language supplemented by visual aids to explain the causes of uterine impaction, conservative management options, and the necessity and safety of manual reduction following treatment failure. This facilitated accurate disease understanding, alleviated tension and fear, bolstered confidence, and secured active treatment cooperation.

3.1.2. Clinical observation

Due to excessive retroversion and retroflexion of the uterus, which becomes impacted within the sacral fossa of the pelvis, cervical displacement elongates the urethra, eliminates the urethrovaginal angle, and compresses the bladder neck. This leads to urinary retention, causing dysuria, and may subsequently result in urinary tract infection, miscarriage, or even uterine rupture. Therefore, vital signs must be closely monitored, including temperature, pulse, respiration, and blood pressure. Particular attention should be paid to observing for abdominal pain, vaginal bleeding, or fluid discharge, promptly identifying any abnormalities, and reporting them to the doctor.

3.1.3. Positioning care

The patient’s uterus is impacted within the sacral fossa of the pelvis. Conservative management is being administered to observe whether spontaneous uterine reduction may occur. Recent studies indicate that conservative treatment may be attempted as the initial management approach for correcting uterine impaction, irrespective of gestational age ^[14]. Ensure the bed remains stationary with both bed rails raised. Assist the patient into the chest-knee position for 10 minutes per session, three times daily for one week ^[15], utilising uterine gravity to facilitate reduction of the impacted uterus ^[16]. During the chest-knee position, instruct the patient on key points: (1) Maintain core engagement by keeping abdominal and gluteal muscles slightly contracted to protect the lumbar spine, avoiding sagging or excessive arching; (2) Breathe steadily without holding breath; (3) Maintain natural respiration, particularly avoiding rapid breathing when the head is elevated to prevent cerebral congestion; (4) Keep the neck relaxed with the head hanging naturally. During this process, visceral displacement may mildly compress the diaphragm, affecting respiratory depth; Increased blood return to the upper body elevates

central venous pressure (CVP), potentially exacerbating cardiac burden in patients with heart failure. When the head is below cardiac level, intracranial pressure (ICP) and intraocular pressure (IOP) may rise, increasing cerebral congestion. Therefore, we must enhance ward rounds, attend to patients, and prioritize complaints of dizziness or dyspnoea. Closely monitor blood oxygen saturation to prevent hypoxaemia. Simultaneously, educate accompanying family members to immediately notify medical staff should any of these issues arise.

3.1.4. Bladder care

Patients may experience urinary retention, potentially leading to bladder overdistension, bladder wall necrosis, or paradoxical urinary incontinence. Following medical orders, insert an indwelling urinary catheter to drain urine and maintain bladder emptiness, which is crucial for uterine involution. During catheterisation, record urine output, colour (haematuria, pyuria), clarity, and odour, reporting any abnormalities promptly. Should blood clots, flocculent material, or sudden absence of urine be observed, investigate for obstruction, bleeding, or catheter displacement. Inquire about symptoms such as urinary urgency, dysuria, or lower abdominal heaviness, remaining vigilant for urinary tract infection or bladder spasm. Monitor temperature; fever (particularly with chills) warrants consideration of catheter-associated urinary tract infection.

3.1.5. Fetal heart monitoring

Uterine impaction may compromise uterine circulation, posing risks of miscarriage or even uterine rupture. Therefore, closely monitor fetal heart rate, recording every three hours, and observe for maternal complaints such as abdominal pain. Address any abnormalities promptly to ensure fetal safety.

3.1.6. Preoperative preparation

The patient has an indwelling urinary catheter to maintain bladder emptiness. Perform perineal cleansing preparations and assist the patient in completing all other preoperative investigations, such as complete blood count, coagulation function tests, and ultrasound, to comprehensively assess the condition of both mother and fetus.

3.2. Manual reduction

On the third day of hospitalization, the patient's vital signs were normal, laboratory results showed no abnormalities, fetal heart rate was regular, her mood was calm, and she reported no other discomfort. Having been in a breech presentation for two days, the patient and her family requested a repeat ultrasound to assess uterine position relative to the pelvis. The ultrasound indicated the fundus had not descended beyond the pelvic rim. The patient and family then requested manual reduction. Manual reduction is the preferred treatment method ^[17]. A typical manual version involves the practitioner placing the index and middle fingers in the posterior vaginal fornix, or positioning the middle finger in the posterior vaginal fornix while inserting the index finger into the anus. Pressure is then applied in the direction of the patient's head and abdomen to dislodge the fundus of the impacted uterus from the posterior vaginal fornix and out of the pelvis ^[18]. Obstetricians, sonographers, and obstetric nurses are all present. The patient lies supine on the operating table in the lithotomy position. The sonographer positions the probe above the symphysis pubis. The transverse view displays the bladder (already emptied), the uterine body and cervix posteriorly, confirming the direction of uterine prolapse. Under ultrasound guidance, the internal, anterior and posterior uterine walls, and the placental attachment site are identified. The operator donned a sterile gown and

gloves. Following routine vulvovaginal disinfection, sterile drapes were applied. Manual reduction commenced: one hand gently pressed the fundus through the abdominal wall while ultrasound monitored the uterine body's trajectory into the pelvis, confirming clearance of the impaction point. The other hand elevated the cervix via the vaginal posterior fornix, with ultrasound tracking changes in the internal position to ensure gradual restoration of the uterine axis. The obstetric nurse continuously monitored the fetal heart rate throughout the procedure, with no abnormalities observed during reduction. Upon resolution of the impaction, ultrasound revealed the lower uterine segment gradually unfolding from its "folded" state, with the cervical canal and uterine body forming a continuous physiological curve. Colour Doppler Imaging demonstrated enhanced blood flow signals in the uterine arteries and placenta, indicating successful reduction. The patient reported no discomfort and was discharged to her ward for rest.

3.3. Post-manual reduction care

3.3.1. Rest and activity

Recent reports have documented recurrent uterine entrapment ^[13], necessitating vigilance in clinical practice. Following successful reduction, bed rest was prescribed to prevent re-entrapment of the uterus. Activity should be minimized for the first 24 hours post-procedure. Thereafter, activity levels may be gradually increased according to the patient's condition, though strenuous exercise and heavy physical labour must be avoided. Maintaining a chest-knee position is recommended wherever possible. Commonly employed clinical positions include the chest-knee position, supine position with legs elevated and straight, and inverted position ^[16,19]. As this position compresses the thoracic cavity, patients experiencing dizziness or dyspnoea should change position slowly and immediately rest in the lateral decubitus position.

3.3.2. Vital signs monitoring

Following reduction, continue to closely monitor the pregnant woman's vital signs, measuring every 30 minutes to 1 hour. Once stable, gradually extend the monitoring intervals to ensure sustained vital sign stability.

3.3.3. Observation of vaginal condition

Carefully observe for vaginal bleeding or discharge, documenting volume, colour, and consistency. Significant vaginal haemorrhage or worsening abdominal pain may indicate severe complications such as uterine rupture and requires immediate medical notification.

3.3.4. Infection prevention and treatment

Patient presents with complaints of urinary frequency, urgency, and dysuria. Urinalysis and urine sediment analysis results: Leukocyte count: 415.1/ μ L; Leukocytes (high-power field): 74.66/HP; Leukocyte esterase: 3+; Occult blood: 3+; Temperature: 36.5 °C. Consideration given to catheter-related issues. Instruct the patient to drink fluids and urinate frequently. Urinary tract infection cannot be ruled out; order comprehensive urine culture. Given the urine test results, urinary tract infection remains a possibility. Administered Cefuroxime sodium 1.5 g intravenously every 8 hours for prophylactic treatment. Simultaneously requested consultation with the Nephrology Department for further management. Maintain perineal hygiene by washing the external genitalia with warm water twice daily. Change undergarments and sanitary pads frequently.

3.3.5. Urine culture and antibiotic sensitivity

Urine culture showed no sterile growth after two days. Blood cell analysis + C-reactive protein analysis: CRP 24.9 mg/L, haemoglobin 7.24×10^{-9} /L, blood cell count 257×10^9 /L, neutrophils 70.8%. Urinalysis revealed no abnormalities. The patient reported no symptoms of urinary frequency, dysuria, or urgency. Antibiotic treatment was discontinued.

3.3.6. Pregnancy preservation therapy

Fetal heart rate monitored via Doppler three times daily (morning, afternoon, evening). Any abnormal heart rate detected was promptly reported to the physician for symptomatic management. Concurrently, allylestrenol tablets were administered for pregnancy preservation. The medication course typically lasted 2–4 weeks. No adverse reactions were observed in the patient during treatment.

3.3.7. Mid-pregnancy routine ultrasound

Post-repositioning ultrasound review indicated: uterus anteverted, located in the lower abdomen; fetal heart rate 150 beats per minute; placenta posterior wall. Findings: single viable intrauterine fetus, equivalent to 15+ weeks of gestation, with no abnormalities noted.

3.3.8. Emphasis on post-reduction follow-up

Upon discharge, the patient followed the department's WeChat official account and joined a WeChat group with obstetricians for ongoing communication. The responsible nurse conducted a telephone follow-up one week post-discharge with no abnormal findings reported. At the one-month post-discharge antenatal clinic appointment, the patient's fetal heart rate was normal, with no lower abdominal pain, vaginal bleeding, or fluid leakage. A repeat ultrasound scan was normal, and there were no symptoms of urinary tract infection. The patient was advised to attend regular antenatal appointments and seek immediate medical attention if experiencing any discomfort.

4. Summary

The prognosis for retained placenta in pregnancy is largely dependent on the timing of diagnosis, which should be made as early as possible during gestation. Manual reduction is recommended before 20 weeks of gestation, with higher success rates observed particularly before 15 weeks^[20]. Manual reduction remains the treatment of choice, with the vast majority of cases achieving favourable pregnancy outcomes following successful reduction. In patient care, psychological support is prioritized, with enhanced nursing before, during, and after reduction. Dynamic ultrasound monitoring is employed to confirm uterine and fetal status, preventing undetected recurrence. Given the clinical rarity of this condition, this paper reports a single case from our institution. Drawing on published literature, it details relevant nursing interventions. While these measures are described, they inevitably contain shortcomings and require ongoing refinement by nursing colleagues in clinical practice.

Disclosure statement

The author declares no conflict of interest.

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Promotion and Application of Combined Spinal-Epidural Block Analgesia Technique with Ropivacaine and Sufentanil for Labor Analgesia in Ngari Prefecture

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Abstract: *Objective:* To observe the promotion and application of combined spinal-epidural analgesia with ropivacaine and sufentanil in plateau areas. *Methods:* Sixty primiparous women who gave birth in our hospital from March 2023 to March 2025 were selected and randomly divided into a control group (Group A) and an analgesia group (Group B) using the random number method. Group A underwent routine obstetric natural childbirth, while Group B received combined spinal-epidural analgesia. VAS scores, changes in labor duration, postpartum hemorrhage, delivery methods (including instrumental delivery), and neonatal Apgar scores were observed in both groups. *Results:* There was no statistically significant difference in VAS scores between the two groups before analgesia ($P > 0.05$). However, there were statistically significant differences in VAS scores at various time points after analgesia ($P < 0.05$). The first stage of labor in Group B (210 ± 45 min) was shorter than that in Group A (252 ± 44 min), with a statistically significant difference ($P < 0.05$). Similarly, the second (38 ± 11 min vs. 50 ± 14 min) and third (9 ± 4 min vs. 16 ± 5 min) stages of labor were also shorter in Group B compared to Group A, with statistically significant differences ($P < 0.05$). The cesarean section rate was lower in Group B (6.7%) compared to Group A (10.0%), with a statistically significant difference ($P < 0.05$). There were no statistically significant differences in postpartum hemorrhage or neonatal Apgar scores at 1, 5, and 10 minutes after birth between the two groups ($P > 0.05$). *Conclusion:* The combined use of ropivacaine and sufentanil in combined spinal-epidural anesthesia can significantly alleviate the pain experienced by parturients during childbirth in plateau regions, shorten the duration of labor, and have no effect on the neonatal Apgar score. This method is worthy of promotion in plateau regions.

Keywords: Labor analgesia; Ropivacaine; Sufentanil; Combined epidural anesthesia; Plateau areas

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1. Introduction

In the Ngari Prefecture, due to the high altitude and low oxygen concentration, the implementation of analgesia during childbirth requires more consideration of the environment and physiological changes in parturients^[1]. As a drug combination, ropivacaine combined with sufentanil has been widely used in many domestic hospitals and has shown good analgesic effects^[2]. This study aims to verify the feasibility and effectiveness of ropivacaine combined with sufentanil in plateau regions, providing a suitable option for analgesia during childbirth for parturients in these regions.

2. Materials and methods

2.1. General information

Sixty primiparas who gave birth in the obstetrics department of Ngari Prefecture People's Hospital from March 2023 to March 2025 were selected. All parturients were long-term residents of the plateau, had naturally conceived pregnancies, and had an S_pO_2 of approximately 85% on a daily basis. They were classified as ASA grade I–II, with a height range of 150–165cm and a weight range of 50–80kg. All were single pregnancies between 37 and 42 weeks of gestation. There were no contraindications for natural childbirth, and the fetal heartbeat and movement were normal. There were no contraindications for intravertebral anesthesia, coagulation disorders, history of allergy to related anesthetic drugs, history of cesarean section, cognitive impairments, or mental abnormalities. Parturients voluntarily chose analgesia during childbirth and signed an informed consent form. This study was approved by the hospital ethics committee.

2.2. Methods

A total of 60 parturients were randomly divided into two groups: the control group (Group A, $n = 30$) received routine obstetric care with doula-supported labor and verbal comfort. The labor analgesia group (Group B, $n = 30$) underwent combined spinal-epidural analgesia for labor pain relief. The parturients underwent routine intrathecal puncture, and 5 μ g of sufentanil was injected into the subarachnoid space. Then, an epidural catheter was placed 3–4cm towards the cephalic side and fixed. After changing to a supine position, 3 mL of 1% lidocaine hydrochloride injection (Hubei Jinyao Pharmaceutical Co., Ltd., National Medical Approval Number H20133209) was administered as a test dose 30 minutes later. If no adverse reactions occurred, the analgesia pump was connected for patient-controlled epidural analgesia. The pump was stopped after perineal suturing. The epidural pump contained a mixture of 0.45 μ g/mL sufentanil citrate injection (Yichang Renfu Pharmaceutical Co., Ltd., Batch Number AB40400911) and 0.09% ropivacaine hydrochloride injection (Jiangsu Hengrui Medicine Co., Ltd., National Medical Approval Number H20060137) totaling 100 mL, with a background infusion rate of 10 mL/h, PCA of 5 mL, and a lockout time of 15 minutes. If the parturient experienced inadequate analgesia, an additional 5ml of the analgesia pump mixture was administered into the epidural space, which could be repeated up to 2 times as needed. Both groups received nasal cannula oxygen inhalation and monitoring of blood pressure, heart rate, pulse oxygen saturation, and fetal heart rate changes. In case of any fetal abnormalities, immediate conversion to cesarean section was performed to ensure the safety of both the mother and the baby.

2.3. Observation indicators

- (1) Visual Analog Scale (VAS) was used to evaluate the pain relief effect of the parturients. VAS scores were recorded at various time points: T_0 , $T_1 = 15$ min, $T_2 = 30$ min, $T_3 = 60$ min, $T_4 = 2$ h, $T_5 = 3$ h, $T_6 = 4$ h, T_7

= 5 h for both Group A and Group B.

- (2) The durations of the first, second, and third stages of labor were recorded.
- (3) The mode of delivery, presence of vaginal instrumental assistance, emergency conversion to cesarean section, and postpartum hemorrhage volume were documented for both groups.
- (4) Neonatal Apgar score (skin color, heart rate, reflex response to heel stimulation or nasal insertion, muscle tone, respiration): Observe and record the Apgar score of newborns at 1 minute, 5 minutes, and 10 minutes after birth.

2.4. Statistical methods

SPSS 20.0 was used. The ASA classification of general information for the two groups of mothers was analyzed using the Mann-Whitney U test (Wilcoxon rank-sum test), and the remaining general information was analyzed using the t-test. The pain score data satisfied a normal distribution and were analyzed using repeated measures ANOVA, with comparisons made using mean \pm standard deviation (SD). For labor duration data, independent sample t-tests were performed for both intergroup and intragroup comparisons. Count data were expressed as rates (%), and $P < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of general patient characteristics

There were no statistically significant differences in general information such as age, height, weight, gestational week, ASA classification, and cervical dilation between the two groups of mothers ($P > 0.05$, **Table 1**).

Table 1. Comparison of general information between the two groups of mothers

Item	Control group A ($n = 30$)	Labor analgesia group B ($n = 30$)
ASA classification (I/II)	12/18	13/17
Age (years), mean \pm SD	23 \pm 1.1	22 \pm 0.9
Height (cm)	155 \pm 1.3	156 \pm 1.1
Weight (kg)	55 \pm 1.8	56 \pm 2.2
Gestational age (weeks)	37.3 \pm 1.3	37.4 \pm 1.1
Cervical dilation (cm)	3 \pm 1.1	3 \pm 1.0

3.2. Comparison of VAS scores at different time points between the two groups of mothers

There was no statistically significant difference in VAS scores before labor analgesia between the two groups ($P > 0.05$). However, there were statistically significant differences in VAS scores at various time points after labor analgesia between the two groups ($P < 0.05$, see **Table 2**).

Table 2. Comparison of VAS scores at different time points between the two groups of mothers

Time point	Control group A (<i>n</i> = 30)	Labor analgesia group B (<i>n</i> = 30)
	VAS score	VAS score
T ₀ (Before analgesia)	5.4 ± 1.1	5.1 ± 0.9
T ₁ (15 min)	4.4 ± 1.5	1.3 ± 0.5
T ₂ (30 min)	5.5 ± 2.1	1.1 ± 0.6
T ₃ (60 min)	5.9 ± 2.2	1.4 ± 0.3
T ₄ (2 h)	6.4 ± 2.0	2.6 ± 0.6
T ₅ (3 h)	7.4 ± 1.9	2.4 ± 0.1
T ₆ (4 h)	8.4 ± 1.0	2.1 ± 0.3
T ₇ (5 h)	3.6 ± 2.4	1.2 ± 0.6

3.3. Comparison of labor durations between the two groups of mothers

The duration of the first stage of labor in Group B (210 ± 45 minutes) was shorter than that in Group A (252 ± 44 minutes), and the difference was statistically significant ($P < 0.05$). The duration of the second stage of labor in Group B (38 ± 11 minutes) was shorter than that in Group A (50 ± 14 minutes), and the difference was statistically significant ($P < 0.05$). The duration of the third stage of labor in Group B (9 ± 4 minutes) was shorter than that in Group A (16 ± 5 minutes), and the difference was statistically significant ($P < 0.05$, see **Table 3**).

Table 3. Comparison of the durations of the first, second, and third stages of labor between the two groups of mothers

Group	First stage (min)	Second stage (min)	Third stage (min)
Group A (<i>n</i> = 30)	252 ± 44	50 ± 14	16 ± 5
Group B (<i>n</i> = 30)	210 ± 45	38 ± 11	9 ± 4

3.4. Comparison of delivery methods between the two groups of mothers

The natural delivery rate of Group A (90.0%) was lower than that of Group B (93.3%), and the difference was statistically significant ($P < 0.05$). The instrumental delivery rate of Group A (14.8%) was higher than that of Group B (7.1%), and the difference was statistically significant ($P < 0.05$). The cesarean section rate of Group A (10.0%) was higher than that of Group B (6.7%), and the difference was statistically significant ($P < 0.05$, see **Table 4**).

Table 4. Comparison of delivery methods between the two groups of mothers (example, %)

Group	Spontaneous vaginal delivery	Instrument-assisted delivery	Cesarean section
Group A (<i>n</i> = 30)	27 (90.0)	4 (14.8)	3 (10.0)
Group B (<i>n</i> = 30)	28 (93.3)	2 (7.1)	2 (6.7)

3.5. Comparison of neonatal Apgar scores and postpartum hemorrhage between the two groups

There was no statistically significant difference in the Apgar scores of newborns at 1 minute, 5 minutes, and

10 minutes after birth between the two groups ($P > 0.05$); there was no statistically significant difference in the comparison of postpartum hemorrhage ($P > 0.05$, **Table 5**). It suggests that labor analgesia does not lower the neonatal Apgar score and does not increase the amount of postpartum hemorrhage.

Table 5. Comparison of neonatal Apgar scores and postpartum hemorrhage between the two groups

Group	1 min (Score, Median, IQR)	5 min (Score, Median, IQR)	10 min (Score, Median, IQR)	Blood loss (mL)
Group A ($n = 30$)	10 (10, 10)	10 (10, 10)	10 (10, 10)	331 ± 28
Group B ($n = 30$)	10 (10, 10)	10 (10, 10)	10 (10, 10)	326 ± 19

4. Discussion

The innovation of this study lies in the introduction of the labor analgesia regimen combining ropivacaine and sufentanil for the first time in the Ngari Prefecture. Due to its unique geographical environment and climatic conditions, this region has a high altitude of 4300 meters and a thin oxygen concentration, with a normal oxygen saturation of only about 85%, posing special challenges to the implementation of medical technology^[1]. Many domestic hospitals are conducting labor analgesia, and the analgesic drugs and anesthesia operation techniques are very mature. Combined spinal-epidural block labor analgesia can be applied in the early stage of labor^[3], which can shorten the labor process and reduce the cesarean section rate, and has no adverse effects on mothers and newborns. It has become one of the ideal methods of labor analgesia at present^[4-6]. Most of these studies are concentrated in plain areas, and there is still a lack of in-depth research on the application effects in special environments, such as plateau hypoxic areas.

There was no statistically significant difference in general information between the two groups of mothers. Regarding VAS scores, mothers in the labor analgesia group who received ropivacaine combined with sufentanil had significantly lower VAS scores compared to the control group^[7]. Mothers in the labor analgesia group generally reported a significant reduction in pain levels, and effectively alleviated discomfort and fear during the delivery process^[9].

From the perspective of labor duration, mothers in the labor analgesia group had significantly shorter labor durations compared to the control group^[6,8]. This may be related to the reduced pain experienced by mothers in the labor analgesia group during delivery, enabling them to more effectively cooperate with medical staff during childbirth. The shortened labor duration not only reduces the mother's pain but also lowers the risks associated with the delivery process.

Regarding the mode of delivery, the rate of spontaneous vaginal births was significantly higher in the labor analgesia group compared to the control group^[6]. This may be associated with the reduced pain experienced by mothers after receiving ropivacaine combined with sufentanil, making the delivery process smoother. Simultaneously, this suggests that this analgesic method can reduce the rate of cesarean sections and improve the safety of childbirth.

In this study, Apgar scores were also assessed for newborns in both groups. The results showed no significant difference in Apgar scores between the labor analgesia group and the control group, with all scores falling within the normal range^[10]. This indicates that ropivacaine combined with sufentanil has no significant impact on the safety of newborns.

Through a comprehensive evaluation of analgesic effects, this study found that ropivacaine combined with

sufentanil exhibits significant analgesic efficacy in labor analgesia at high altitudes. It can shorten labor duration, increase the rate of spontaneous vaginal births, and has no significant impact on the safety of newborns. These findings provide new insights and methods for the development of labor analgesia techniques in high-altitude regions, and have important clinical significance and application value.

5. Conclusion

In conclusion, the combined spinal-epidural anesthesia utilizing ropivacaine and sufentanil demonstrates significant efficacy for childbirth in plateau regions. This regimen not only provides effective analgesia and shortens labor duration but also maintains neonatal safety as evidenced by stable Apgar scores. Therefore, its clinical adoption is highly recommended in these settings.

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Disclosure statement

The authors declare no conflict of interest.

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Epidemiological Analysis of Female Menopausal Syndrome and Exploration of Cognitive Levels Regarding Hormone Replacement Therapy

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Abstract: *Objective:* To investigate and statistically analyze the prevalence of female menopausal syndrome, while assessing their understanding of hormone replacement therapy (HRT). *Methods:* A total of 3,200 women who visited Huangpu District Maternal and Child Health Hospital in Guangzhou from October 2021 to June 2023 were selected as the subjects of this survey. Data on their basic information, disease symptoms, and understanding of HRT were collected through questionnaires. *Results:* Out of the 3,200 questionnaires distributed, the top three symptoms reported were hot flashes, insomnia, and joint pain, which occurred significantly more frequently than other symptoms ($P < 0.05$). Regarding HRT awareness, only 11.47% of the women were relatively familiar with it, primarily sourcing their knowledge from the internet, followed by information from family, friends, and colleagues, and then from health lectures and other promotional materials. Among the menopausal symptoms, 183 women had moderate Kupperman scores, and 116 had severe scores, accounting for 5.51% and 3.49% of the total surveyed, respectively. *Conclusion:* The majority of women demonstrated a significant lack of understanding regarding HRT. Enhanced education and awareness campaigns, professional medical consultations, personalized treatment plans, and the correction of past misconceptions can empower more menopausal women to make informed health choices tailored to their needs, thereby improving their quality of life. Monitoring patients' hormone levels can provide a basis for intervention and evaluating treatment effectiveness. The relatively low proportion of women with severe symptoms is a primary reason why menopausal symptoms are often overlooked by women.

Keywords: Perimenopausal syndrome; Perimenopause; Hormone therapy; Women's health

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1. Introduction

Female menopausal syndrome, now more commonly referred to as “perimenopausal syndrome,” encompasses a range of physiological and psychological symptoms that women experience during perimenopause and

postmenopause due to fluctuations or reductions in sex hormones. Common symptoms of the disease include hot flashes, night sweats, and insomnia. However, many women also encounter memory decline, difficulty concentrating, and slowed thinking during menopause, primarily due to the impact of estrogen fluctuations and declines on brain regions responsible for memory and cognitive function ^[1]. Importantly, in most cases, these symptoms do not indicate the onset of dementia but rather represent a common and usually reversible physiological phenomenon during the menopausal transition. Surveys have revealed that inadequate awareness of the disease (specifically menopausal syndrome and related health risks) among menopausal women is a key factor contributing to delayed treatment, poor treatment adherence, and ultimately, compromised quality of life and long-term health. The most direct consequence is insufficient awareness among women regarding the necessity of treatment, leading to either no medical consultation or delayed medical attention, resulting in prolonged unnecessary suffering and a diminished quality of life. In particular, inadequate awareness and misinformation about hormone replacement therapy (HRT) pose significant barriers. Due to the one-sided interpretation and dissemination of some controversial past studies, many women and some non-specialist doctors have equated HRT with “carcinogenic,” indirectly causing most women to reject the most effective treatment option and, instead, turn to alternatives with uncertain efficacy or potential harm, wasting money while posing health risks ^[2]. Therefore, understanding the symptoms of perimenopausal syndrome and enhancing awareness of HRT are crucial for improving postmenopausal quality of life and elevating the quality of medical services for women during perimenopause ^[3]. Based on this, the present study was conducted in Huangpu District, Guangzhou, from October 2021 to June 2023. Using a cluster random sampling method, 3,200 voluntarily participating women were surveyed to investigate the incidence of menopausal syndrome and awareness of hormone replacement therapy, providing a basis for interventions in female menopausal syndrome.

2. Materials and methods

2.1. Overview

From October 2021 to June 2023, in accordance with the principle of cluster random sampling, a certain number of women aged between 40 and 60 with household registration in Huangpu District, Guangzhou, or having resided in Huangpu District for over one year were selected as the research subjects from each community across the district, based on population proportion. The inclusion criteria were as follows: (1) Having household registration in Huangpu District, Guangzhou, or having resided in the district for over one year; (2) Being aged between 40 and 60; (3) Possessing a uterus and at least one ovary; (4) Being informed of the research content and voluntarily participating in the survey. The exclusion criteria included: (1) Menopause resulting from surgical removal of both ovaries; (2) Severe endocrine disorders, such as uncontrolled hyperthyroidism or hypothyroidism; (3) Recent use of hormonal medications, such as hormone replacement therapy or hormonal contraceptives; (4) Presence of severe mental illnesses, including major depression, bipolar disorder, schizophrenia, etc.

2.2. Methods

This survey was conducted using a self-designed questionnaire based on relevant literature, administered in a self-filled format. Any questions were clarified by researchers. The survey covered basic information such as occupation, education level, medical insurance, and disease symptoms, as well as participants’ awareness and use of hormone replacement therapy.

2.3. Statistical analysis

This study employed the SPSS 22.0 statistical software package for analysis. Measurement data were presented as mean \pm standard deviation (SD), with inter-group comparisons conducted using the *t*-test. Count data were expressed as [n(%)], and inter-group comparisons were performed using the chi-square test (χ^2 test). A *P*-value less than 0.05 was considered statistically significant.

3. Results

3.1. Basic information of participants

All 3,200 participants completed the questionnaire. The majority of participants were workers (32.31%), with a high school or technical secondary school education being the most common, accounting for 42.09%. Most of them had medical insurance coverage through their employer (39.59%) (**Table 1**).

Table 1. Basic information

Category	n	Percentage (%)
Occupation		
Worker	1034	32.31
Homemaker	765	23.91
Administrative/Managerial Staff	573	17.91
Professional/Technical Staff	327	10.22
Service Industry Personnel	324	10.13
Military/Police Personnel	141	4.41
Other	36	1.13
Education Level		
High School or Technical Secondary School	1347	42.09
Junior High School	627	19.59
College	578	18.06
Bachelor's Degree or Above	372	11.63
Primary School	276	8.63
Type of Health Insurance		
Employee Health Insurance	1267	39.59
Resident Health Insurance	843	26.34
Public Health Coverage	678	21.19
Commercial Health Insurance	342	10.69
Out-of-Pocket	70	2.19

3.2. Incidence of menopausal syndrome symptoms

The most common menopausal syndrome symptoms reported by participants were hot flashes and sweating, insomnia, joint pain, and emotional lability, with prevalence rates of 66.78%, 62.41%, 59.59%, and 56.22%, respectively. These rates were significantly higher than those for other symptoms (fatigue 45.84%, vaginal dryness

43.41%, palpitations 17.59%, dizziness 16.00%, urinary tract infections 13.50%, paresthesia 7.66%), with $P < 0.05$. Other symptoms included fatigue, vaginal dryness, palpitations, and dizziness (**Table 2**).

Table 2. Incidence of menopausal syndrome symptoms

Symptom	n	Percentage (%)
Hot Flashes/Sweating	2137	66.78
Insomnia	1997	62.41
Joint Pain	1907	59.59
Mood Swings/Irritability	1799	56.22
Fatigue	1467	45.84
Vaginal Dryness	1389	43.41
Palpitations	563	17.59
Dizziness	512	16.00
Urinary Tract Infection	432	13.50
Paresthesia (Abnormal Sensations)	245	7.66

3.3. Awareness of hormone replacement therapy

Among the participants, 60.88% were unaware of HRT, 11.47% were very familiar with it, and 15.84% had heard of it. Additionally, 11.81% had used HRT (**Table 3**).

Table 3. Awareness of hormone replacement therapy

Category	Number of people	Percentage (%)
Unaware of HRT	1948	60.88
Have Heard of HRT	507	15.84
Currently Using HRT	378	11.81
Very Familiar with HRT	367	11.47

3.4. Sources of information on hormone replacement therapy

The internet (57.31%) was the primary source of information on HRT for participants, followed by family/friends/colleagues (17.88%), health lectures (15.38%), and informational brochures (13.34%) (**Table 4**).

Table 4. Sources of information on hormone replacement therapy

Information source	Number of people	Percentage (%)
Internet	1834	57.31
Family, Friends, Colleagues	572	17.88
Health Lectures	492	15.38
Pamphlets / Brochures	427	13.34
Healthcare Professionals	398	12.44
Other	390	12.19
Publicity Boards / Bulletin Boards	382	11.94
Radio / Television	128	4.00

3.5. Comparison of serum sex hormone levels between two groups

The hormone levels (follicle-stimulating hormone [FSH], luteinizing hormone [LH], and estradiol [E2]) of subjects with moderate or higher Kupperman scores were tested. There were 183 subjects with moderate scores and 116 with severe scores, accounting for 5.51% and 3.49% of the total surveyed population, respectively ($\chi^2 = 4986.60$, $P < 0.001$). The FSH and LH levels in the severe group were significantly higher than those in the moderate group ($P < 0.05$), while the E2 level in the severe group was significantly lower than that in the moderate group ($P < 0.05$) (Table 5).

Table 5. Comparison of serum sex hormone levels between the two groups (Mean \pm SD)

Group	n	FSH (mIU/mL)	LH (mIU/mL)	E2 (pmol/L)
Moderate group	183	16.78 \pm 3.45	19.43 \pm 2.83	40.43 \pm 5.22
Severe group	116	20.43 \pm 3.43	22.24 \pm 2.84	32.43 \pm 5.24
<i>t</i> -value		9.12	8.23	12.89
<i>P</i> -value		< 0.05	< 0.05	< 0.05

4. Discussion

Menopausal syndrome is not a “disease” but a natural physiological transition stage, primarily caused by ovarian dysfunction and a decline in estrogen levels. Additionally, the dramatic hormonal changes are a core factor. Estrogen plays a crucial role in the female body, affecting not only the reproductive system but also physiological processes such as body temperature regulation, mood, and sleep. Therefore, when estrogen levels fluctuate and decline, the hypothalamus in the brain, responsible for body temperature regulation, becomes disordered, leading to sudden hot flashes, sweating (night sweats), and nocturnal sweating. In terms of cardiovascular system effects, as estrogen has a protective effect on blood vessels, maintaining their elasticity and health, its reduction increases the risk of cardiovascular disease in women. Regarding the skeletal system, estrogen helps bones store calcium, and its decline leads to rapid bone loss, increasing the risk of osteoporosis. For the urogenital system, normally, estrogen levels maintain the thickness and elasticity of the vaginal wall and urinary tract health. Once reduced, it can lead to vaginal dryness, painful intercourse, frequent urination, and urgency. Regarding the skin and hair, estrogen is responsible for promoting collagen production, so its reduction can lead to dry skin, wrinkles, and dry, brittle hair that is prone to falling out^[4].

The findings of this survey indicate that the majority of participants were engaged in manual labor (32.31%), followed by housewives (23.91%). In terms of educational attainment, a relatively high proportion of participants had completed high school or secondary vocational school (42.09%), followed by those with junior high school education (19.59%) and junior college education (18.06%). Regarding personal medical insurance, employee medical insurance was the most common (39.59%), followed by resident medical insurance (26.34%) and public medical care (21.19%). These findings suggest that the occurrence of perimenopausal syndrome may be related to occupational environments, and the relatively weak disease awareness among participants may be associated with their educational levels. Current research and observations indicate that factors such as occupational environments and educational levels indirectly influence the perceived severity, reporting rates, and effective management of perimenopausal syndrome by affecting women’s stress levels, health literacy, healthcare-seeking behaviors, and economic resources, rather than directly altering its biological incidence^[5]. Women with higher educational levels

typically possess stronger abilities to acquire, understand, and apply health information. They are more likely to proactively learn about menopause-related knowledge in advance, have reasonable psychological expectations, correctly identify physical symptoms as part of a normal physiological process, and actively seek scientific and effective medical assistance rather than enduring symptoms or seeking unproven remedies ^[6]. In contrast, women with lower educational levels may have insufficient awareness of menopause, making them more prone to misunderstandings, feelings of shame, and helplessness. They may choose to passively endure symptoms or regard menopausal and perimenopausal symptoms as natural physiological phenomena, thereby neglecting these symptoms ^[7].

The most direct and fundamental causes of emotional fluctuations and psychological disorders in perimenopausal women are the dramatic fluctuations and decline in hormones, primarily involving three types. Taking estrogen as an example, it promotes the synthesis and function of neurotransmitters in the brain that regulate emotions ^[8]. When estrogen levels suddenly fluctuate and eventually decline, the levels of these neurotransmitters also become imbalanced, directly leading to depression, irritability, anxiety, and anhedonia. Additionally, decreased estrogen levels make the hypothalamic-pituitary-adrenal (HPA) axis more susceptible to activation, resulting in a heightened and more intense bodily response to stress. This affects thermoregulation, leading to hot flashes and night sweats, particularly at night, which severely disrupt sleep patterns ^[9,10]. The survey results reveal that the most prevalent symptoms of menopausal syndrome among participants were hot flashes and sweating (66.78%), insomnia (62.41%), joint pain (59.59%), and emotional lability (56.22%), with these symptoms showing a significantly higher prevalence than others ($P < 0.05$). Hormone replacement therapy (HRT), currently an effective treatment for menopausal syndrome, works by supplementing hormones that the body no longer produces in sufficient quantities. It is primarily used to treat symptoms caused by decreased levels of estrogen, progesterone, or testosterone, effectively alleviating short- to medium-term symptoms and offering some degree of long-term health risk prevention ^[11].

However, statistical data indicate that the majority of menopausal women are unaware of or lack understanding of HRT. This may stem from inherent misconceptions about hormones; many people immediately associate hormones with obesity, moon face, or banned substances used by athletes, failing to distinguish between these hormones and the naturally secreted estrogen and progesterone in the human body, leading to strong psychological aversion ^[12,13]. This viewpoint was further validated in our study, with data showing that 60.88% of participants were unaware of HRT, 15.84% had heard of it, 11.47% were very familiar with it, and 11.81% had used it. The internet emerged as the primary source of information on hormone replacement therapy. Clearly, addressing this situation requires concerted efforts from multiple stakeholders: the media should provide more scientifically accurate popular science content, the medical community should update guidelines and enhance training for healthcare professionals, and society should encourage open discussions on menopausal health. Ultimately, this will empower every woman to make the most informed health choices based on adequate information.

The study results also indicate that the levels of FSH and LH in the severe group were significantly higher than those in the moderate group ($P < 0.05$), while the E2 level was significantly lower ($P < 0.05$). This suggests a correlation between symptoms and hormone levels, and that measuring patients' hormone levels can provide a basis for intervention and evaluating treatment effectiveness ^[14]. The incidence rates also showed statistical significance between the moderate and severe groups, indicating significant variations in the severity of menopausal syndrome, with a relatively low proportion of severe cases. This is a primary reason why women tend

to overlook menopausal symptoms.

5. Conclusion

In general, menopause is not just about short-term symptoms; it represents a pivotal turning point in women's health. A lack of awareness in any aspect can lead women to overlook these potential risks. Additionally, the overall understanding of Hormone Replacement Therapy (HRT) among menopausal women still needs improvement, with widespread issues of low awareness, low utilization rates, and low acceptance due to misconceptions and concerns. By enhancing health education, providing professional medical consultations, implementing individualized treatment plans, and correcting past misconceptions, we can assist more menopausal women in making informed health choices tailored to their needs, thereby improving their quality of life.

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Disclosure statement

The authors declare no conflict of interest.

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Analysis of the Clinical Effect of Traditional Chinese Medicine Stimulation Decoction on Promoting Cervical Maturation in the Third Trimester of Pregnancy

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Abstract: *Objective:* To explore the clinical effect of traditional Chinese medicine stimulation decoction in promoting cervical maturation in the third trimester of pregnancy, in order to enhance the safety and success rate of delivery. *Methods:* A retrospective analysis was conducted on the clinical data of 500 pregnant women in the third trimester who received the intervention of traditional Chinese medicine stimulation decoction from June 2022 to June 2025. The cervical maturity score (Bishop score) and the mode of delivery were used as effect indicators and compared with the control group that did not receive the stimulation decoction. *Results:* The Bishop score of the intervention group significantly increased (7.8 ± 1.2 , 5.3 ± 1.1 in the control group, $P < 0.01$), the vaginal delivery rate was higher than that of the control group (78% vs. 65%, $P < 0.05$), and the average delivery time was shortened to 6.2 ± 1.4 hours (8.5 ± 1.6 hours in the control group, $P < 0.01$). *Conclusion:* The traditional Chinese medicine stimulation decoction has a good effect on promoting cervical maturation in the third trimester of pregnancy, which is helpful to reduce the rate of cesarean section and increase the rate of vaginal delivery.

Keywords: Traditional Chinese Medicine Promoting Decoction; Late pregnancy; Cervix maturity; Natural childbirth; Cesarean section rate

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1. Introduction

Reducing the proportion of cesarean sections and enhancing natural productivity are the key topics in obstetric research at present, involving the maturation management of the cervix in late pregnancy. Cervical maturity is a key factor affecting the smooth progress of delivery and the safety of both the mother and the baby. The role that traditional Chinese medicine plays in adjusting physical conditions and accelerating the process of childbirth is

receiving increasing attention from more people ^[1]. In the current academic research, most of the focus is on the use of Western medicine to influence the maturation of the cervix, while there are relatively few literatures that conduct in-depth discussions on the role of traditional Chinese medicine in this regard ^[2]. Promoting cervical maturation with traditional Chinese medicine decoction may offer a milder and more effective approach for parturients, thereby enhancing the safety of childbirth and the proportion of natural childbirth, and opening up new avenues for clinical childbirth management ^[3].

2. Materials and methods

2.1. Research object

In the obstetrics department of a certain hospital, from June 2022 to June 2025, 500 women in the third trimester of pregnancy were included in the analysis. The selected research subjects were all singleton pregnant women over 37 weeks of gestation, ensuring that there were no cases with clear contraindications for delivery such as placenta previa, abnormal fetal position, or severe pregnancy complications. The admitted patient has undergone a cervical maturity test, and no immediate delivery is required. The basic characteristics of pregnant women, such as age, gestational weeks, and previous obstetric history, all met the inclusion criteria of the study and ensured comparability at the baseline level ^[4].

2.2. Inclusion and exclusion criteria

The inclusion criteria include: (1) For the gestation of a single embryo, if the pregnancy has reached 37 weeks or more, it falls under this type of pregnancy situation; (2) A preliminary assessment of cervical maturity, if it is lower than the Bishop scoring standard by five points; (3) The vagina is the expected passage for delivery, and delivery is the expected vaginal process.

Exclusion criteria include: (1) contraindications for delivery such as placenta previa and abnormal fetal position; (2) Severe pregnancy complications such as gestational hypertension syndrome and gestational diabetes, etc.; (3) Has a history of cesarean section or other uterine surgeries in the past; (4) Pregnant women who are allergic to or have a history of adverse reactions to traditional Chinese medicine components. After strict screening, 500 pregnant women who met the research conditions were finally determined.

2.3. Research ethics and informed consent of patients

This research has been officially approved by the Medical Institution Ethics Review Committee and has strictly adhered to the relevant regulations of medical ethics throughout the entire process. Before the study was initiated, all participants had signed an informed consent document, which clearly defined the intention, procedures, potential risks and benefits of the study. Privacy protection and autonomous participation rights of all subjects were strictly safeguarded by the research collective.

2.4. Research design

This study was a retrospective comparative analysis. Through two group designs, namely the induction drink intervention group and the control group, it explored the effects of the traditional Chinese medicine induction drink on cervical maturity and delivery methods in the third trimester of pregnancy. All participating pregnant women were randomly divided into two groups according to the order of admission, with 250 cases in each group ^[5]. The stimulation drink intervention group received a standard dose of the traditional Chinese medicine stimulation

drink, while the control group was observed according to conventional prenatal management.

2.5. Grouping: The stimulation drink intervention group and the control group

In the comparative analysis, the basic prenatal data of the two groups of subjects, namely those who received the intervention and those who did not, showed similarities after the induction drinking ^[6]. The experimental group treated with the traditional Chinese medicine “induction drinking” was contrasted with the control group that only received standard prenatal care and monitoring. The two groups were analyzed and compared respectively on indicators such as Bishop score, mode of delivery and delivery time before and after treatment to evaluate the intervention effect of the traditional Chinese medicine inducing decoction ^[7].

2.6. Sample size determination

Based on the previous relevant research data and the standard deviation estimation of the Bishop score, to ensure sufficient statistical significance levels for comparisons between groups, a two-sided test was used, with the power set at 0.80 and the significance level $\alpha = 0.05$. Ultimately, it was determined that at least 250 subjects were needed in each group, totaling 500 cases ^[8].

2.7. Intervention methods

2.7.1. The ingredients, dosage, and administration method of the traditional Chinese medicine decoction for promoting growth

Components, Dosage and Administration Method of the Traditional Chinese Medicine “Fertilizing Drink” Granule Form. This study administered “Fertilizing Drink” in the form of granules (herb type: granule formula). The specific formula and dosage are as follows: Each dose contains 3 g of white peony (Tianjiang Granules - National Procurement), 5 g of roasted (Tianjiang Granules - National Procurement), 5 g of large belly bark (Tianjiang Granules - National Standard), 5 g of wine-processed Angelica sinensis (Tianjiang Granules - National Procurement), and 5 g of Chuanxiong (Tianjiang Granules - National Procurement). Administration method: Twice a day (bid, once in the morning and once in the evening), take with warm water half an hour after meals; Administration period: Continuously take 5 doses (a total of 5 days), during which the drug dosage remains fixed and no adjustments are made.

2.7.2. Monitoring and observation during the medication period

During the medication period, the medical team closely observed the physiological responses of the pregnant woman, including heart rate, blood pressure, body temperature, fetal heart rate monitoring, frequency and intensity of uterine contractions, and other indicators. The bishop score is conducted every two days to monitor the progress of cervical maturity. Pregnant women are closely observed to determine if adverse reactions such as nausea and abdominal pain occur. Once any abnormality is detected, corresponding measures must be taken promptly and drug treatment should be stopped if necessary. Under standardized prenatal tracking management, the control group did not receive any drug treatment.

2.8. Effect evaluation indicators

2.8.1. Cervical maturity (Bishop score)

The assessment of cervical maturity is conducted using the bishop scoring mechanism. This mechanism comprehensively evaluates five key parameters: the degree of cervical dilation, length, position of the protruding

part of the fetus, softening state and direction, and constructs a 13-point evaluation system. Before delivery, the state of the cervix of all patients is evaluated. The higher the cervical score, the higher the maturity. Thus, the possibility of natural childbirth is greater. Before and after the intervention, the effect of the examined beverage on the induction of labor was evaluated by comparing the changes in Bishop scores of the two groups^[9].

2.8.2. Mode of delivery (vaginal delivery, cesarean section)

This study analyzed the significant differences in the proportion of vaginal delivery and cesarean section between pregnant women who received the intervention of the induction drink and those who did not, to evaluate the effect of the induction drink in promoting delivery.

2.8.3. Time of delivery

The time from the active period to the birth of the newborn is defined as the delivery time. The delivery process of the two groups of parturients was recorded in time and compared with their average duration, aiming to evaluate whether a certain drug can effectively reduce the delivery time, increase the comfort of the parturient, and alleviate the stress response during delivery.

2.9. Statistical analysis

2.9.1. Data processing methods

All data were processed using SPSS statistical software. Measurement data were expressed as mean \pm standard deviation (SD), and count data were expressed as rates or constituent ratios. The t-test was used to compare the differences between the two groups of measurement data, and the χ^2 test was used to compare the count data. The significance level was set at $P < 0.05$.

2.9.2. Statistical methods and test criteria

To ensure the reliability of the results, a two-sided test was used for statistical analysis. All results with a P value of less than 0.05 were considered statistically significant. A comparative analysis was conducted on the differences in Bishop score, mode of delivery and delivery time between the stimulation drink intervention group and the control group to confirm the effect of the traditional Chinese medicine stimulation drink in promoting cervical maturation in the late stage of pregnancy^[10].

3. Results

3.1. Demographic characteristics and baseline data

Among the 500 pregnant women in the third trimester of pregnancy in this study, there were 250 cases in the stimulation drink intervention group and 250 cases in the control group. There was no statistically significant difference between the two groups in terms of demographic characteristics such as age, gestational weeks, weight, and previous obstetric history ($P > 0.05$), ensuring the balance of the baseline level (**Table 1**).

3.2. Basic demographic data of the groups

Table 1. Basic demographic data of the groups

Indicator	Cuishengyin intervention group (n = 250)	Control group (n = 250)	P-value
Age (years)	30.2 ± 3.4	30.1 ± 3.5	> 0.05
Gestational age (weeks)	39.0 ± 1.1	39.2 ± 1.0	> 0.05
Weight (kg)	68.5 ± 5.3	68.3 ± 5.4	> 0.05
History of previous births	1.1 ± 0.7	1.0 ± 0.8	> 0.05

3.3. Analysis of cervical maturity score

The bishop scores of pregnant women in the intervention and control groups showed no significant difference before the intervention ($P > 0.05$). After intervention with Cuishengyin, the Bishop score in the intervention group significantly increased. The average score was 7.8 ± 1.2 , significantly higher than the control group's 5.3 ± 1.1 ($P < 0.01$) (Table 2).

Table 2. Analysis of Cervical Maturity (Bishop) Score

Score item	Before Cuishengyin	After Cuishengyin (Intervention Group)	Control group	P-value (Intergroup comparison after intervention)
Bishop score	4.2 ± 1.0	7.8 ± 1.2	5.3 ± 1.1	< 0.01

3.4. Comparison of delivery modes

Analysis of delivery modes showed that the vaginal delivery rate in the Cuishengyin intervention group was significantly higher than that in the control group (78% vs. 65%, $P < 0.05$), while the cesarean delivery rate was significantly lower than that in the control group (22% vs. 35%, $P < 0.05$). The delivery process was smoother in the intervention group, with the probability of spontaneous vaginal delivery significantly increased (Table 3).

Table 3. Comparison of delivery modes

Delivery mode	Cuishengyin intervention group (n = 250)	Control group (n = 250)	P-value
Vaginal delivery (%)	78	65	<0.05
Cesarean delivery (%)	22	35	<0.05

3.5. Comparison of delivery duration

Regarding delivery duration, the time from the active phase to the end of delivery was significantly shorter in the Cuishengyin intervention group. The average delivery time was 6.2 ± 1.4 hours, compared to 8.5 ± 1.6 hours in the control group ($P < 0.01$). This result indicates that Cuishengyin intervention helps shorten delivery time and improve the efficiency of labor progression (Table 4).

Table 4. Comparison of delivery duration

Indicator	Cuishengyin intervention group (n = 250)	Control group (n = 250)	P-value
Average delivery time (hours)	6.2 ± 1.4	8.5 ± 1.6	< 0.01

3.6. Adverse reactions and safety

Monitoring of adverse reactions during medication showed that pregnant women in the Cuishengyin intervention group experienced mild adverse reactions such as abdominal distension and nausea, with an incidence rate of 10%. No such adverse reactions were observed in the control group. All adverse reaction symptoms were mild, and no severe adverse events occurred (Table 5).

Table 5. Adverse reactions and safety

Adverse reaction type	Cuishengyin intervention group (n = 250)	Control group (n = 250)
Mild abdominal distension (%)	5	0
Nausea (%)	5	0
Severe adverse events (%)	0	0

The above results indicate that the traditional Chinese medicine Cuishengyin is effective and safe for application in late pregnancy. It helps improve cervical maturity, promote spontaneous vaginal delivery, and shorten delivery time.

4. Discussion

4.1. Analysis of the mechanism of action of Traditional Chinese Medicine Promoting Decoction

The main mechanism of action is to promote the maturation of the cervix by promoting blood circulation and removing blood stasis, unblocking meridians and enhancing uterine contractions of the traditional Chinese medicine decoction. For instance, herbal ingredients such as Ligusticum chuanxiong and Angelica sinensis have the effects of regulating qi and blood as well as promoting blood circulation. These medicinal materials help the softening and dilation process of the cervix by increasing the blood flow to the uterus. When Ligusticum chuanxiong is combined with safflower, it can significantly promote local blood circulation, optimize cervical blood flow, and thereby enhance the flexibility of cervical tissue. Angelica sinensis has the effect of promoting blood replenishment and blood circulation and has a positive impact on the maturation process of the uterus and cervix. Drugs may promote the production of cervical collagenase by adjusting the hormonal balance in the human body, causing the cervical tissue to become looser, thereby facilitating the preparation for childbirth.

4.2. Comparison of research results with existing literature

This experiment concluded that the use of traditional Chinese medicine stimulation decoction can significantly improve the bishop score, reduce the rate of cesarean section, increase the rate of vaginal delivery, and has no significant adverse reactions. The safety and efficacy of using traditional Chinese medicine for promoting pregnancy decoction in the late stage of pregnancy have been confirmed by domestic research. It can effectively promote the maturation of the cervix and shorten the duration of labor. In the international academic community, although research on the role of traditional Chinese medicine in promoting cervical maturation is still insufficient, existing studies have pointed out that several natural plant components may have potential effects on enhancing cervical maturation and promoting the process of childbirth [11]. The data from this study further verified the positive role of the traditional Chinese medicine decoction for promoting childbirth in improving the success rate

of delivery and supplemented the domestic literature support on the intervention of traditional Chinese medicine in cervical maturation.

4.3. Comparative analysis of relevant studies in China and other countries

Domestic scholars have gradually explored the application of traditional Chinese medicine decoction in the field of herbal medicine and observed its efficacy during the delivery process. They have found that this drink is expected to significantly reduce the number of cesarean section cases and accelerate the process of natural childbirth. In overseas regions, Western medicines such as oxytocin and prostaglandins are usually chosen for the treatment of cervical maturation, while the use of traditional Chinese medicine is relatively rare ^[12]. The results of this study provide further data support for the clinical application of the traditional Chinese medicine decoction for promoting childbirth, which is conducive to promoting its wide application in childbirth management. It also reflects that the depth and breadth of domestic research on promoting cervical maturation with traditional Chinese medicine still need to be enhanced to gain more international recognition.

4.4. Limitations of the research

The limitations of this study include: 500 samples of women in the third trimester of pregnancy were collected in this study, which is insufficient in terms of sample size. This may impose certain constraints on the general adaptability of the experimental conclusions. The limitation of this study lies in that it briefly examined the immediate impact of the delivery process but did not track the long-term effects, such as postpartum health conditions ^[13]. In the final assessment of delivery in this study, only the bishop score and the mode of delivery were used as key parameters, and other physiological and psychological variables that might affect the delivery process were not comprehensively considered. Future exploration is expected to incorporate larger-scale datasets, longer-term tracking, and introduce more evaluation criteria to comprehensively enhance the depth of research ^[14].

4.5. Suggestions for clinical application

When applying the traditional Chinese medicine decoction for promoting growth in clinical practice, it is necessary to carefully select the appropriate patient group. For pregnant women, before undergoing traditional Chinese medicine treatment, it is necessary to verify that they have no history of contraindications for childbirth or allergies to traditional Chinese medicine ^[15]. This can effectively reduce the possible risks during the treatment process. For pregnant women in the late stage of pregnancy whose cervix is not fully mature, if vaginal delivery is expected, it is recommended that they receive medical monitoring while using medication, to timely observe the uterine contractions of the pregnant woman and the fetal heart rate. For pregnant women who have undergone cesarean section or uterine surgery, extra caution should be exercised when using relevant medical measures ^[16]. During the medication process, the physiological condition of pregnant women must be strictly monitored. If adverse reactions such as nausea and abdominal distension occur, corresponding measures must be taken promptly for intervention.

5. Conclusion

In conclusion, the study demonstrates that the traditional Chinese medicine stimulation decoction is an effective intervention for promoting cervical ripening in the third trimester. Its application holds significant clinical promise for reducing cesarean section rates and enhancing the likelihood of successful vaginal delivery.

Disclosure statement

The author declares no conflict of interest.

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Application Effect of Phloroglucinol Combined with Lamaze Breathing Method and Doula in Promoting Natural Delivery

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Abstract: *Objective:* To explore the application effect of phloroglucinol combined with the Lamaze breathing method and doula in promoting natural delivery. *Methods:* From April 2022 to April 2024, 110 full-term singleton cephalic presentation natural delivery parturients were randomly divided into 2 groups, with 55 cases in each group. The control group received the Lamaze breathing method and doula delivery, while the observation group received phloroglucinol-assisted delivery in addition to the above methods. The duration of labor, pain degree, postpartum bleeding volume, and maternal and infant outcomes were compared between the two groups. *Results:* The duration of the first, second, third, and total labor in the observation group was shorter than that in the control group, and the pain degree during labor was less than that in the control group. The postpartum 2-hour bleeding volume and postpartum 24-hour bleeding volume in the observation group were less than those in the control group ($P < 0.05$). The cesarean section rate, soft birth canal injury rate, postpartum bleeding rate, and urinary retention rate in the observation group were 3.64%, 5.45%, 1.82%, and 5.45% respectively, which were lower than those in the control group (18.18%, 20.00%, 14.55%, and 18.18%) ($P < 0.05$); there was no statistical significance in the comparison of intrauterine distress and neonatal asphyxia between the two groups ($P > 0.05$). *Conclusion:* Implementing phloroglucinol combined with the Lamaze breathing method and doula delivery in natural delivery can shorten the labor duration, reduce labor pain, reduce postpartum bleeding volume and related complications, and have no effect on the newborn, with high safety, and is worthy of promotion.

Keywords: Natural delivery; Phloroglucinol; Lamaze breathing method; Doula delivery; Labor duration; Pain degree

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1. Introduction

In recent years, the rate of cesarean section has remained high in China. Although the country has vigorously advocated natural childbirth, many pregnant women still choose cesarean section due to various factors. This not only leaves scars but also leads to excessive postpartum bleeding, slow recovery, and an increased risk of

complications. Therefore, reliable measures need to be taken to promote natural childbirth as much as possible ^[1]. Many pregnant women have natural childbirth indications, but they are forced to undergo cesarean section due to their poor tolerance to pain during the early stage of labor, strong stress responses, and negative emotions, which increase the difficulty of delivery. Therefore, the control of labor pain needs to be emphasized ^[2]. The conventional methods of using Lamaze breathing and doula-assisted childbirth to alleviate labor pain and promote the smooth progress of labor are still insufficient, and the pain relief effect is limited ^[3]. Indirubin, as a drug for relieving acute pain, effectively relieves muscle and smooth muscle spasms, but its effectiveness in natural childbirth when applied needs further research ^[4]. Therefore, this study explores the application effect of indirubin combined with Lamaze breathing and doula in promoting natural childbirth. 100 cases of natural delivery mothers admitted to the hospital from April 2022 to April 2024 were selected for the study as follows.

2. Materials and methods

2.1. General information

From April 2022 to April 2024, 110 cases of full-term singleton cephalic presentation natural delivery mothers were randomly divided into 2 groups, with 55 cases in each group.

Inclusion criteria: The mothers were married, with a full-term singleton cephalic presentation after examination, with an estimated fetal weight of less than 4000 g; normal female pelvis, with a head-pelvis score of more than 7 points, normal physiological indicators, and meeting the natural childbirth indications; the mothers voluntarily signed an informed consent form.

Exclusion criteria: Abnormal fetal position, cephalopelvic disproportion, and abnormal fetal conditions; mothers with a history of cesarean section and postpartum hemorrhage; mothers with important organ functional diseases such as the kidney, heart, liver, etc.; pregnant women with coagulation disorders; mothers with mental disorders or cognitive impairments.

The control group was aged 20–37 years old, with an average age of (27.16 ± 3.45) years old, gestational age of 37–41 weeks, with an average gestational age of (39.05 ± 0.84) weeks, weight of 60 kg–76 kg, with an average weight of (69.02 ± 5.18) kg, with 35 primiparas and 20 multiparas; the observation group was aged 21–37 years old, with an average age of (27.32 ± 3.57) years old, gestational age of 37–41 weeks, with an average gestational age of (39.12 ± 0.86) weeks, weight of 60 kg–75 kg, with an average weight of (69.22 ± 5.08) kg, with 33 primiparas and 22 multiparas; there was no statistically significant difference in the basic data between the two groups ($P > 0.05$), and they could be compared for the study.

2.2. Methods

2.2.1. Control group

The Lamaze breathing method and doula-assisted delivery were adopted. The specific procedures were as follows:

- (1) Pre-delivery guidance: The doula provided continuous accompaniment throughout the process, patiently explained the importance of natural childbirth, informed about appropriate midwifery techniques, breathing techniques of Lamaze, and other methods, and provided emotional comfort and positive encouragement to enhance the puerpera's confidence in natural childbirth. The puerpera was guided to have proper pre-delivery nutrition and maintain sufficient physical strength.
- (2) First stage of labor: During the latent phase, the puerpera was instructed to breathe correctly. After contractions, the puerpera was guided to take deep breaths and exhale slowly at a slow rhythm. After

the contractions ended, the puerpera resumed the normal breathing rhythm. In the active acceleration stage, the puerpera was instructed to accelerate the breathing rhythm. After contractions, the puerpera opened their mouth to breathe, adjusting the breathing rate according to the frequency of contractions, and resumed deep breathing when the contractions slowed down. In the active deceleration stage, the puerpera maintained shallow breathing until the contractions ended.

- (3) Doula-assisted delivery: When the cervical opening reached 3 cm, the delivery pain doula device was placed appropriately, the current intensity was adjusted to a mild muscle tremor, and the discomfort was inquired about until the cervical opening was fully dilated.
- (4) Second stage of labor: After entering the second stage of labor, the puerpera began to forcefully inhale and hold their breath for 20–30 seconds, then pushed downward. This cycle was repeated until 2/3 of the fetal head was delivered. During the contractions, the puerpera took rapid, panting breaths, and held their breath and exerted force during the intervals between contractions. After the successful delivery of the fetus, maternal-infant contact and breastfeeding were completed as soon as possible.

2.2.2. Observation group

On the basis of the above Lamaze breathing method and doula-assisted delivery, indigo carmine (Nanjing Hengsheng Pharmaceutical Co. Ltd., National Drug Approval Number H20046766, specification: 4 mL: 40 mg) was used as an auxiliary method for delivery. When the cervical opening reached 3 cm, 40 mg of indigo carmine was intravenously injected, and 40 mg was injected again during the active stage.

2.3. Observation indicators

2.3.1. Comparison of labor parameters and outcomes between groups

Compare the first stage of labor, second stage of labor, third stage of labor, total labor duration, degree of labor pain, 2-hour postpartum bleeding volume, 24-hour postpartum bleeding volume between the two groups; The degree of pain was evaluated using the Visual Analogue Scale (VAS), ranging from 0 (no pain) to 10 (extreme pain); The bleeding volume = (wet weight of the blood collection dressing - dry weight of the blood collection dressing before) / 1.05.

2.3.2. Comparison of maternal and fetal outcomes between the two groups

Compare the maternal outcomes of the two groups, including cesarean section, soft birth canal injury, postpartum bleeding, and urinary retention. The fetal outcome was intrauterine distress, neonatal asphyxia, etc.

2.4. Statistical analysis

Data were processed using SPSS 24.0. Quantitative data were analyzed using a *t*-test, and were expressed as mean \pm standard deviation (SD). Count data were analyzed using chi-square test, and were expressed as [*n* (%)]. *P* < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of labor duration, labor pain, and postpartum bleeding volume between the two groups

As shown in **Table 1**, the first stage of labor, the second stage of labor, the third stage of labor, total labor duration,

degree of labor pain, 2-hour postpartum bleeding volume, and 24-hour postpartum bleeding volume in the observation group were all lower than those in the control group ($P < 0.05$).

Table 1. Comparison of labor duration, pain during delivery, and postpartum blood loss between the two groups (mean \pm SD)

Group	Number of cases	First stage of labor (minutes)	Second stage of labor (minutes)	Third stage of labor (minutes)	Total labor duration (minutes)	Labor pain degree during delivery	Postpartum 2-hour bleeding volume (mL)	Postpartum 24-hour bleeding volume (mL)
Observation group	55	472.56 \pm 52.63	60.43 \pm 8.08	6.33 \pm 1.35	540.63 \pm 140.58	5.43 \pm 1.22	135.25 \pm 40.48	244.96 \pm 50.65
Control group	55	544.28 \pm 84.18	78.19 \pm 12.29	12.52 \pm 2.83	640.18 \pm 170.43	8.22 \pm 1.81	203.19 \pm 55.27	330.29 \pm 75.86
<i>t</i>	--	5.357	8.954	14.640	3.341	9.479	7.354	6.937
<i>P</i>	--	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001

3.2. Comparison of maternal and infant outcomes

As shown in **Table 2**, the cesarean section rate, soft birth canal injury rate, postpartum hemorrhage rate, and urinary retention rate of the observation group were 3.64%, 5.45%, 1.82%, and 5.45% respectively, which were lower than those of the control group (18.18%, 20.00%, 14.55%, and 18.18%) ($P < 0.05$); there was no statistically significant difference in the comparison of intrauterine distress and neonatal asphyxia between the two groups ($P > 0.05$).

Table 2. Comparison of maternal and infant outcomes [n (%)]

Group	Number of cases	Caesarean section	Soft birth canal injury	postpartum hemorrhage	Uroschesis	Intrusive pressure within the womb	Neonatal asphyxia
Observation group	55	2 (3.64)	3 (5.45)	1 (1.82)	3 (5.45)	1 (1.82)	0 (0.00)
Control group	55	10 (18.18)	11 (20.00)	8 (14.55)	10 (18.18)	4 (7.27)	2 (2.64)
χ^2	--	5.986	5.238	4.356	4.274	0.838	0.509
<i>P</i>	--	0.014	0.022	0.036	0.038	0.359	0.475

4. Discussion

Natural childbirth for mothers is a normal physiological phenomenon. During the childbirth process, the uterus contracts to facilitate the descent of the fetus and its delivery through the vagina. Moreover, natural childbirth helps the baby's lungs and brain develop, and is beneficial for the mother's postpartum recovery^[5]. However, mothers may experience severe pain due to contractions, perineal expansion, and pelvic deformation, which prevent them from continuing with natural childbirth. They may choose cesarean section instead, increasing the risks of postpartum bleeding and urinary retention, and this is not conducive to postpartum recovery^[6]. To enable mothers to have a natural childbirth in a relatively comfortable state, reliable measures such as the Lamaze breathing method and doula-assisted childbirth should be adopted to alleviate the degree of pain during childbirth. However,

the analgesic effect is limited, so other methods should be further employed for pain relief. The results of this study show that the duration of labor, pain level, and postpartum bleeding volume in the observation group are lower than those in the control group, suggesting that the combination of phloroglucinol^[7], Lamaze breathing method, and doula-assisted childbirth can accelerate the labor process, reduce the degree of pain during childbirth, facilitate the mother's smooth delivery, promote postpartum recovery, and reduce the amount of postpartum bleeding^[8]. This is consistent with the results of Peng^[9]. The Lamaze breathing method, as a commonly used method for pain relief and assistance during natural childbirth, can adjust the correct breathing method according to the progress of labor, divert the mother's attention, improve pain tolerance, promote coordinated uterine contractions, facilitate cervical dilation, reduce physical exertion, and facilitate fetal delivery^[10].

Doula-assisted childbirth utilizes non-pharmacological methods of labor pain relief, adjusting the current intensity and mobilizing the pain-blocking substance enkephalin to block the transmission pathway of pain information in the central nervous system, thereby achieving analgesic effects. Phloroglucinol can effectively alleviate the degree of pain during the childbirth process. After injection, it can act on the smooth muscles of the gastrointestinal tract and reproductive organs^[11], relieve the spasm and contraction of the smooth muscles, and reduce the degree of pain during the childbirth process^[12]. After the mother receives the injection, the pain level can be significantly reduced, the muscles can be relaxed, and she can exert force correctly under the guidance of the midwife, promoting fetal delivery, shortening the labor process, and reducing the amount of bleeding^[13]. The number of cesarean sections, soft birth canal injuries, postpartum bleeding, and urinary retention in the observation group is lower than that in the control group, suggesting that the combination of phloroglucinol, Lamaze breathing method, and doula-assisted childbirth is beneficial for natural childbirth of mothers, reduces related complications, and the drugs have no effect on the newborn. This is consistent with the results of Li^[14]. Phloroglucinol, the Lamaze breathing method, and doula-assisted childbirth act through different mechanisms to alleviate the degree of pain during childbirth, facilitate the smooth delivery of the fetus, avoid cesarean section, and reduce related complications. Moreover, the reasonable control of the dosage of phloroglucinol will not affect the health of the newborn^[15].

5. Conclusion

In conclusion, the application of phloroglucinol, the Lamaze breathing method, and doula-assisted childbirth in natural childbirth can shorten the labor process, alleviate the degree of pain during childbirth, protect the safety of both the mother and the baby, and have no effect on the newborn. It is worthy of promotion.

Disclosure statement

The author declares no conflict of interest.

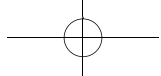
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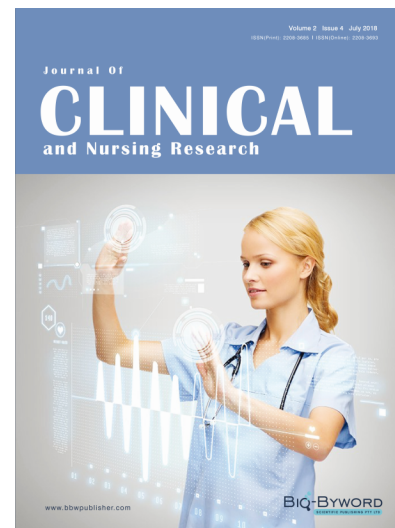
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