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The First Affiliated Hospital of Xiamen University, China

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Advances in Obstetrics and Gynecology Research

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Observation of the Effect of Rapid Recovery Surgical Nursing on Postoperative Ovarian Cancer Patients and Its Impact on Pain Levels

Yourui Li*, Lili Jin

Shanghai Jiao Tong University School of Medicine, Suzhou Kowloon Hospital, Suzhou 215000, Jiangsu Province, China

Corresponding author: Yourui Li, 13862410640@139.com

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Abstract: *Objective:* To observe the application effect of rapid recovery surgical nursing in patients with ovarian cancer and its impact on pain levels. *Methods:* Forty cases of ovarian cancer patients admitted from December 2019 to December 2022 were selected as the subjects of this study and divided into two groups using a double-blind method. The number of cases was the same; one group served as the control group, receiving routine care, while the other served as the observation group, receiving rapid recovery surgical care. Postoperative gastrointestinal function recovery indicators, postoperative pain, and postoperative complications between the two groups were compared. *Results:* The first postoperative exhaust, defecation, and out-of-bed activity times of the 20 patients with ovarian cancer in the observation group were shorter than those of the patients in the control group, and the motilin level 48 hours after surgery was higher than that of the patients in the control group ($P < 0.05$). The pain score of the observation group 48 hours after surgery (1.33 ± **0.21 points**) was lower than that of the control group ($P < 0.05$). Additionally, the postoperative complication rate of the observation group was 5.00%, which was lower than that of the control group ($P < 0.05$). *Conclusion:* Providing rapid reovery surgical care for patients with ovarian cancer can help restore postoperative gastrointestinal function, relieve pain, reduce complications, and promote early recovery.

Keywords: Ovarian cancer; Rapid recovery surgical care; Pain levels

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1. Introduction

Ovarian cancer ranks among the three major malignant tumors affecting women. The primary clinical approach to treating ovarian cancer involves surgery in combination with radiotherapy and chemotherapy. However, this treatment regimen often subjects patients to considerable pain and places a heavy physical and mental burden on them, thereby hindering postoperative recovery. In light of evolving medical paradigms, clinical practice has increasingly emphasized the provision of scientific treatment plans and compassionate nursing care to facilitate early patient recovery. Rapid recovery surgical nursing represents a novel nursing model grounded in evidence-based medical practices. By employing scientific nursing techniques during the perioperative period, it aims

to alleviate patients' physical and mental stress responses and expedite their recovery [1,2]. This study aims to evaluate the efficacy of rapid recovery surgical care in patients with ovarian cancer and analyze its impact on pain levels, with a current cohort of 40 patients under observation.

2. Materials and methods

2.1. General information

Forty cases of ovarian cancer patients were screened for inclusion in this study, covering the admission period from December 2019 to December 2022. They were then randomly assigned into two groups using the double-blind method, with each group comprising 20 cases. Statistical analysis of the data from both groups was conducted (**Table 1**), yielding a conclusion that $P > 0.05$.

Table 1. General information (mean ± SD)

Group	Age (years)	Tumor diameter (cm)	Highly differentiated / lowly differentiated	Serous carcinoma/non-serous carcinoma	FIGO stage (IIIC / IV)	Surgical & pathological stage (I / II)
Control group	54.20 ± 8.23	7.26 ± 2.24	9/11	11/9	16/4	9/11
Observation group	54.34 ± 8.15	7.29 ± 2.20	8/12	12/8	17/3	10/10
t / χ^2	0.054	0.043	0.102	0.102	0.173	0.100
P	0.957	0.966	0.749	0.749	0.677	0.752

Inclusion criteria:

(1) Patients diagnosed with ovarian cancer following pathological examination.
(2) Patients meeting the surgical treatment criteria, having been informed about the surgery, and having signed the surgery consent form.
(3) Patients who have not undergone relevant treatment previously.
(4) Patients with a clear medical history and complete information.

Exclusion criteria:

(1) Patients with concurrent serious conditions such as liver and kidney failure.
(2) Patients with bleeding disorders and infectious diseases.
(3) Patients with psychiatric or psychological disorders.
(4) Patients with an expected survival period of less than 6 months.
(5) Patients on long-term use of analgesics.

2.2. Methods

2.2.1. Control group: routine care

Upon admission, the assigned nurse conducts vital sign measurements, assesses the patient's condition, provides standard admission guidance, arranges preoperative examinations, and administers medications as prescribed. Patients initiate fasting 12 hours prior to surgery and cease drinking 4 hours beforehand. Adequate preoperative preparations are made, followed by scheduled surgery. Postoperatively, vital signs are monitored, and patients' conditions are observed. Intravenous fluid volume is maintained at 3–4 L on the day of surgery, then reduced to 2–3 L/day. After bowel movement, patients transition to a semi-liquid diet and begin upper limb movement upon regaining consciousness. Epidural anesthesia and analgesia pumps are provided for pain relief

48 hours post-surgery. Urinary catheters are removed 3 to 5 days post-operation, and patients gradually resume ambulation.

2.2.2. Observation group: rapid recovery surgical care

Pre-operative care: Building upon routine care, health education activities are intensified. One-on-one education is conducted one day prior to surgery, incorporating oral explanations and video materials to detail preoperative preparations, surgical procedures, and related precautions, instilling confidence through numerous successful case examples and promoting patient cooperation. Common postoperative complications and rehabilitation methods are introduced beforehand, emphasizing humanistic care, encouraging patient interaction, utilizing role model effects, and fostering family support to enhance patient well-being. A post-operative rehabilitation exercise manual is provided, highlighting the significance of early post-operative exercise. Fasting and drinking times are shortened to 6 and 2 hours pre-surgery, respectively. The evening before surgery, patients ingest 3 capsules of anabolic nutrient solid drink mixed with 600 mL of water, followed by 2 capsules of anesthesia mixed with 400 mL of water in the subsequent 2 hours.

Post-operative care: Building upon routine care, postoperative fluid replenishment is limited to less than 2 L. Upon awakening, early mobilization is encouraged, beginning with passive bed exercises to facilitate gastrointestinal function recovery, enhance cardiopulmonary function, and prevent thrombotic complications. The following day, patients perform lower limb calf muscle exercises ten times and knee bend exercises five times. During bed rest, ankle pump exercises are instructed, with hourly position changes, simultaneous coughing, and application of local heat to the shoulder blades. Patients are guided to press the incision during coughing to reduce pain and prevent incision dehiscence. Attention diversion methods are employed to alleviate pain. On the first postoperative day, active upper and lower limb exercises, breathing exercises, and periumbilical massages are conducted from 9 a.m. to 12 p.m. and from 3 p.m. to 6 p.m., each repeated three times for five minutes. Two hip lifts for five minutes each and bed-sitting exercises for ten minutes each are also performed twice daily. On the second post-operative day, three periumbilical massages for five minutes each time, one bed-sitting exercise, one bedside-sitting exercise, and one bedside-standing exercise were performed twice daily. The sitting exercises last 10 to 20 minutes, and the standing exercise lasts 5 to 10 minutes. Indoor ambulation with family support is encouraged, with intermittent lying, sitting, and standing exercises for 30 seconds. Early oral stimulation is encouraged with xylitol gum two to three pieces at a time every two hours post-surgery to stimulate saliva secretion and gastrointestinal peristalsis until bowel movement resumes. The head of the bed is elevated at 30° when chewing. Patients commence liquid intake, such as rice soup, 24 hours post-surgery, limited to approximately 100 mL, progressing to semi-liquid foods like porridge after bowel movement, with daily intake gradually increasing to normal levels. Adequate fluid intake is encouraged post-surgery, with blood count review 24 hours post-surgery, and urinary catheter removal if no abnormalities are detected.

2.3. Observation indicators

(1) Comparison of postoperative gastrointestinal function recovery indicators: This includes the time of first flatus, defecation, and mobilization, as well as the motilin level 48 hours post-surgery, measured using enzyme-linked immunosorbent assay (ELISA).

(2) Comparison of pain levels at 6 and 48 hours after surgery: The Visual Analog Scale (VAS) was utilized for assessment [3], with scores ranging from 0 (no pain) to 10 (severe pain).

(3) Comparison of postoperative complications: Common complications such as intestinal obstruction, infection, and abdominal distension were assessed.

2.4. Statistical methods

Data analysis was performed using SPSS version 25.0 statistical software. Categorical data and continuous variables were expressed as [*n* (%)] and mean ± standard deviation (SD), respectively. The χ^2 test was applied for categorical data, and the *t*-test was used for continuous variables. A significance level of $P < 0.05$ was considered statistically significant.

3. Results

3.1. Postoperative gastrointestinal function recovery indicators

As seen from **Table 2**, the first postoperative flatus, defecation, and mobilization of patients with ovarian cancer in the observation group were shorter than those of the patients in the control group. The motilin level 48 hours after surgery was higher than that of the patients in the control group ($P < 0.05$).

Table 2. Postoperative gastrointestinal function recovery indicators (mean ± SD)

Group	Number of subjects (*n*)	First postoperative flatus (h)	First postoperative defecation (h)	First postoperative mobilization (h)	Motilin levels 48 hours after surgery (pg/mL)
Control group	20	43.26 ± 6.24	59.52 ± 12.15	48.27 ± 4.16	175.20 ± 43.31
Observation group	20	36.17 ± 3.30	49.47 ± 5.18	38.15 ± 3.20	229.74 ± 55.05
t	-	4.492	3.403	8.623	3.482
P	-	0.000	0.002	0.000	0.001

3.2. Postoperative pain

Table 3 shows that there was no significant difference in the pain scores of both groups 6 hours after surgery ($P > 0.05$), but lower pain scores in the observation group as compared to the control group 48 hours after surgery ($P < 0.05$).

Table 3. Postoperative pain conditions (mean ± SD, points)

Group	Number of subjects (*n*)	6 hours after surgery	48 hours after surgery
Control group	20	3.01 ± 0.52	1.56 ± 0.27
Observation group	20	2.93 ± 0.41	1.33 ± 0.21
t	-	0.540	3.007
P	-	0.592	0.005

3.3. Postoperative complications

Table 4 reveals that the incidence rate of postoperative complication in the observation group was lower ($P < 0.05$).

Table 4. Postoperative complications [*n* (%)]

Group	Number of subjects (*n*)	Intestinal obstruction	Infection	Abdominal bloating	Hyponatremia	Total
Control group	20	2 (10.00)	1 (5.00)	2 (10.00)	1 (5.00)	6 (30.00)
Observation group	20	0 (0.00)	0 (0.00)	1 (5.00)	0 (0.00)	1 (5.00)
χ^2	-	-	-	-	-	4.329
P	-	-	-	-	-	0.037

4. Discussion

Ovarian cancer, a relatively common malignancy in women, ranks highest in mortality among gynecological malignancies. Surgery, when indicated, should be promptly performed as the thoroughness of the initial surgery impacts postoperative lymph nodes and distant metastases. Surgical procedures, particularly those involving pelvic and abdominal lymph node dissection, inherently pose trauma and may compromise intestinal function, potentially leading to postoperative gastrointestinal dysfunction [4,5]. Furthermore, the use of general anesthesia and anesthetic drugs during surgery can also influence gastrointestinal motility to some extent. Gastrointestinal dysfunction exacerbates pain, diminishes appetite, disturbs sleep, and impedes postoperative recovery [6]. Thus, reinforcing nursing interventions is essential to facilitate patients' faster and better recovery.

Conventional nursing methods, often characterized by outdated perspectives and simplistic approaches, yield only average nursing outcomes. The introduction of rapid recovery surgical nursing to gynecology in 2001 revolutionized nursing practices [7], advocating for scientifically informed and rational nursing measures. In this study, 20 patients in the observation group received rapid recovery surgical care, leading to more favorable postoperative gastrointestinal function indicators. Rapid recovery surgical care promotes early postoperative oral intake, where patients chew gum upon awakening to stimulate gastrointestinal peristalsis, a practice known as "fake eating" [8]. Early consumption of liquid food 24 hours after surgery accelerates bowel movement, supplements nutrients, and aids in maintaining nitrogen balance, thereby mitigating infection risks. Moreover, through structured rehabilitation exercises, patients gradually regain physical strength. Motilin, a gastrointestinal hormone, plays a crucial role in stimulating the secretion of pepsin and the mechanical movement and physiological electromyographic activity of the upper gastrointestinal tract, increasing the blood flow of the gastric mucosa, affecting gastric movement, and stimulating and slowing down gastric emptying [9,10]. Early oral intake under the influence of food stimulates motilin secretion, further accelerating gastrointestinal recovery. Rapid recovery surgical care advocates for early mobilization and prescribes specific exercise regimens, effectively promoting gastrointestinal function restoration, enhancing toxin elimination [11,12], and consequently alleviating pain. Comparison of postoperative pain between groups revealed a lower pain score in the observation group at 48 hours post-surgery, alongside a 5% lower postoperative complication rate. This can be attributed to the early oral intake and mobilization, along with controlled fluid management advocated by rapid recovery surgical care. These measures facilitate gastrointestinal function restoration, improve patients' self-care ability [13], and positively influence their psychological well-being, ultimately reducing pain and preventing complications.

In conclusion, rapid recovery surgical nursing represents a scientifically advanced nursing model that significantly contributes to the postoperative recovery of ovarian cancer patients by enhancing gastrointestinal function, reducing complications, and alleviating pain. Its efficacy in this context is particularly promising.

Disclosure statement

The authors declare no conflict of interest.

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Observation on the Efficacy of Lymphocyte Immunotherapy for Recurrent Biochemical Pregnancy Loss

Qinyan Xu, Qin Han, Feihu Yu, Zhou Xu, Yiya Wang*

Department of Obstetrics and Gynecology, No. 906 Hospital of the Chinese People's Liberation Army Joint Logistics Support Force, Ningbo 315000, Zhejiang Province, China

***Corresponding author:** Yiya Wang, xqy3893@sina.com

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Abstract: *Objective:* To implement a lymphocyte immunotherapy program for women experiencing recurrent biochemical pregnancy loss and explore its clinical effects. *Methods:* The study employed a retrospective design. From January 2015 to January 2016, a total of 100 patients with recurrent biochemical pregnancy loss were enrolled as observation objects. Subsequently, the patients were divided into two groups based on different treatment plans, each comprising 50 cases. The observation group received conventional tocolysis in addition to lymphocyte immunotherapy, while the control group received only conventional tocolysis treatment. Evaluation criteria included pregnancy outcomes, improvements in serum factor levels, and treatment safety, enabling a comparison of the clinical effects of different treatment options. *Results:* In the observation group, the pregnancy success rate was 82.00%, whereas in the control group, it was 48.00% (χ^2 = 12.7033, $P < 0.05$). Following treatment, levels of interferon-γ (IFN-γ) were higher in the observation group than in the control group, while levels of interleukin-8 (IL-8) and regulatory protein (BANTES) were lower in the observation group compared to the control group ($P < 0.05$). The difference in treatment safety between the two groups was negligible ($P > 0.05$). *Conclusion:* The incorporation of lymphocyte immunotherapy for patients with recurrent biochemical pregnancy loss can enhance successful pregnancy rates, demonstrating significant efficacy and warranting further application.

Keywords: Lymphocytes; Immunotherapy; Recurrent biochemical pregnancy loss; Efficacy

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1. Introduction

Recurrent miscarriage, also known as "recurrent pregnancy loss," is a condition characterized by repeated pregnancy losses and is of significant concern in obstetrics and gynecology. The pathological mechanisms underlying this condition are multifaceted and involve various factors such as infection, endocrine abnormalities, and heredity factors. Modern pathological research has elucidated that nearly half of recurrent miscarriages are fundamentally associated with immune factors [1]. Previously, clinical interventions for miscarriage patients primarily centered on tocolytic therapy, with progesterone and other tocolytic drugs

commonly employed to address embryo rejection, enhance the success rate of fertilized egg implantation, reduce uterine smooth muscle activity, and diminish uterine sensitivity, thus fostering a conducive environment for embryo implantation [2].

Given the distinctive pathological factors present in patients with recurrent miscarriages, it becomes imperative to pursue symptomatic treatments targeting immune factors to enhance clinical efficacy [3]. This study stemmed from this premise, undertaking a controlled trial wherein a lymphocyte immunotherapy regimen was introduced and its practical value explored in patients with recurrent biochemical pregnancy loss. A total of 100 cases were studied from January 2015 to January 2016.

2. Materials and methods

2.1. General information

This study utilized patients with recurrent biochemical pregnancy loss as observation subjects for a retrospective analysis of relevant data, with 100 cases screened and enrolled from January 2015 to January 2016. Upon enrollment, patients were categorized into groups based on treatment plans: an observation group and a control group, each comprising 50 patients. Various treatment measures were implemented, including conventional tocolysis combined with lymphocyte immunotherapy for the observation group and conventional tocolysis treatment alone for the control group.

In the observation group, the age range was 22 to 42 years, with an average age of 30.24 ± 2.36 years. The distribution of miscarriage frequency was as follows: 26 cases with 2 miscarriages, 8 with 3 miscarriages, and 16 with 4 or more miscarriages. Patients in the control group were aged 22 to 45 years, with an average age of 30.33 ± 2.28 years. The distribution of miscarriage frequency in this group was 20 cases with 2 miscarriages, 12 with 3 miscarriages, and 18 with 4 or more miscarriages.

The collected data were uniformly analyzed, and the results were analyzed using information technology (SPSS 22.0 system). Permission for comparability was obtained, and data was expressed as $P > 0.05$. The research content was compiled, reported, approved by the ethics committee, and filed.

Inclusion criteria:

(1) Patients with complete clinical record data and no missing information.
(2) Patients with a history of spontaneous abortion, with two or more occurrences.
(3) Patients without reproductive tract malformations.
(4) Patients with husbands exhibiting normal sperm quality during physical examination.
(5) Patients with normal/regular menstruation at the time of enrollment.
(6) Patients with normal chromosome screening results.
(7) Patients who were fully informed of the research process, participated voluntarily, and exhibited good compliance.
(8) Patients who provided informed consent and written documentation.

Exclusion criteria:

(1) Patients with endocrine and autoimmune system disorders/abnormalities.
(2) Patients with reproductive system diseases, such as reproductive tract infections, abnormalities, chromosomal abnormalities, etc.
(3) Patients with previous pregnancies or a history of abortion prevention treatment.
(4) Patients with allergies/contraindications to the treatment techniques and drugs involved in the study.
(5) Patients who were unable to fully cooperate in completing the study due to other reasons.

2.2. Methods

Patients in the control group received routine tocolysis treatment along with progesterone (Shanghai General Pharmaceutical Co., Ltd.; National drug approval number: H31021401; specification: 1 mL: 20 mg). The dosage was 20 mg administered via intramuscular injection once daily until the 12th week of pregnancy.

Building upon this regimen, patients in the observation group underwent lymphocyte immunotherapy with the cooperation of their husbands. Venous blood (from the upper limb's elbow) was drawn in a quantity of 20 mL and mixed with an anticoagulant. In a sterile environment, a lymphocyte suspension was prepared by rinsing with physiological saline (0.9%) three times. The lymphocytes were then diluted to maintain a concentration of 2–3 × 10^7/mL and administered to the patient. The injections were administered into the inner buttocks region, with a radial injection technique. Subsequent injections were administered every two weeks following the initial injection, for a total of four injections, continuing until the 12th week of pregnancy.

2.3. Observation indicators

(1) Pregnancy outcome: The follow-up period is set to 12 months, during which the pregnancy outcomes of patients after completing the treatment course are recorded. A successful pregnancy is defined as lasting at least 20 weeks, with prenatal examinations (ultrasound) confirming the presence of a viable fetal heartbeat [4].

(2) Serum factor levels: According to the research design, two detection points are defined to assess the patient's serum factor levels: time one, before treatment (at the last prenatal check-up), and time two, after treatment (at the first follow-up examination). The evaluated factors include interferon-γ (IFN-γ), interferon-8 (IFN-8), and regulatory proteins (BANTES).

(3) Treatment safety: Throughout the study period, the treatment process was monitored by the responsible nurse, who recorded any adverse events, including nausea, vomiting, bleeding, and breast tenderness.

2.4. Statistical analysis

This project employs computer-assisted statistical analysis using SPSS 20.00 software. The software is configured to execute standardized statistical procedures: for categorical data, the chi-squared test method is used and expressed as %, while for continuous data, the *t*-test method is employed and expressed as mean ± standard deviation (SD). Input data are assumed to follow a normal distribution, and if the output yields $P < 0.05$, it indicates significant differences in the analyzed data.

3. Results

3.1. Pregnancy outcome

Table 1 shows that the observation group had a higher successful pregnancy rate and a lower miscarriage rate than the control group ($P < 0.05$).

Table 1. Comparison of pregnancy outcomes [*n* (%)]

Group	Successful pregnancy	Miscarriage
Observation group (*n* = 50)	41 (82.00)	9 (18.00)
Control group (*n* = 50)	24 (48.00)	26 (52.00)
χ^2	12.7033	12.7033
P	0.0003	0.0003

3.2. Serum factor levels

After treatment, the IFN-γ levels in the observation group were lower than those in the control group, while the levels of IL-8 and BANTES in the observation group were higher than those in the control group ($P < 0.05$), as shown in **Table 2**.

Table 2. Assessment of serum factor levels before and after treatment (mean ± SD)

Group	IFN-γ (ng/L)		IL-8 (pg/L)		BANTES (ng/L)	
	Before	After	Before	After	Before	After
Observation group (n = 50)	358.45 ± 58.56	248.42 ± 32.18*	310.24 ± 51.5	589.54 ± 82.27*	220.23 ± 64.1	435.17 ± 54.91*
Control group (n = 50)	354.37 ± 57.74	298.24 ± 35 .86*	307.37 ± 50.55	497.66 ± 74.72*	223.35 ± 63.91	362.04 ± 52.16*
t	0.3508	7.3114	0.2810	5.8458	0.2436	6.8278
P	0.7262	< 0.01	0.7799	< 0.01	0.8080	< 0.01

*Compared with this group before treatment, $P < 0.05$

3.3. Treatment safety

Table 3 shows that there was no statistically significant difference in the total incidence of adverse events between the two groups ($P > 0.05$).

Table 3. Treatment safety assessment [n (%)]

Group	Nausea	Vomiting	Bleeding	Breast tenderness	Overall incidence rate (%)
Observation group (n = 50)	3 (6.00)	3 (6.00)	1(2.00)	2 (4.00)	18.00
Control group (n = 50)	2 (4.00)	2 (4.00)	1 (2.00)	1 (2.00)	12.00
χ^2	-	-	-	-	0.7059
P	-	-	-	-	0.4008

4. Discussion

The causes of recurrent biochemical pregnancy loss are complex and primarily linked to the patient's compromised antigen recognition ability and diminished antigen responsiveness following recurrent miscarriages. Typically, insufficient maternal secretion of blocking antibodies weakens the stimulation of fetal surface antigens and compromises antibody regulation, ultimately resulting in unsuccessful pregnancies. Consequently, immune factors have emerged as a novel therapeutic approach for recurrent biochemical pregnancy loss [5].

Currently, progesterone supplementation is the primary treatment for recurrent biochemical pregnancy loss. Natural progesterone, secreted by the ovarian corpus luteum, promotes the normal implantation of fertilized eggs and possesses immunosuppressive properties, facilitating a reduction in maternal immune response [6]. However, when used alone, its efficacy is limited, particularly in patients with inadequate blocking antibodies. Therefore, clinical recommendations advocate combining progesterone with other immunotherapy techniques to enhance efficacy [7].

Lymphocyte immunotherapy represents a novel approach in obstetrics and gynecology treatment.

Peripheral blood lymphocytes from the paternal lineage are extracted and injected into the mother to stimulate the production of matching blocking antibodies, thereby enhancing the body's immune tolerance, suppressing embryonic immune disorders, and promoting successful pregnancies [8]. Following lymphocyte immune intervention, allogeneic antigen components bind to trophoblasts, acting on surface HLA antigens to block maternal immune cell attacks, thereby maintaining normal pregnancies and increasing successful pregnancy rates [9].

In patients with recurrent pregnancy loss, elevated IFN-γ levels and heightened responses in dendritic cells promote natural killer cell toxicity, impacting embryonic trophoblasts and vascularization. Serum IL-8 impedes cellular immunity activation, hinders the immune process of T lymphocytes, and strengthens the immune tolerance of maternal cells, while BANTES manifests lymphocyte immune balance, blocking immune responses and reducing antigen-stimulation-induced rejection [10]. Lymphocyte immunotherapy effectively enhances immune responses and maintains lymphocyte immune balance, yielding favorable outcomes [11].

Furthermore, lymphocyte immunotherapy is highly safe, as it does not necessitate additional medications or adversely affect physiological functions. It does not increase toxicity or side effects, making it well-received by patients [12].

In a study by Yang *et al.* [13], active immunotherapy was implemented for patients with recurrent miscarriage, yielding a pregnancy success rate of 83.30%. Without active immunotherapy, the pregnancy success rate was 44.00%, with a statistically significant difference. This underscores the positive impact of immunotherapy on patients with recurrent miscarriage, consistent with the findings of this study.

In summary, the introduction of lymphocyte immunotherapy technology for patients with recurrent biochemical pregnancy loss significantly improves pregnancy success rates, regulates serum-related factor levels, and ensures treatment safety. Its substantial value warrants clinical practice and application.

Disclosure statement

The authors declare no conflict of interest.

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Effects of Gestational Diabetes Mellitus on Offspring's Neurobehavioral Development: A Retrospective Cohort Study

Jiali Sun[1,3], Bo Huang[1], Hainan Qiu[2], Chunmei Li[2], Xiaohui Lu[2], Yuqi Jin[2], Fengdong Wang[2]*

[1]School of Public Health, Guilin Medical University, Guilin 541199, Guangxi Zhuang Autonomous Region, China
[2]Chengde Maternal and Child Health Care Hospital, Chengde 067000, Hebei Province, China
[3]Weichang Maternal and Child Health Care Hospital, Chengde 068450, Hebei Province, China

***Corresponding author:** Fengdong Wang, cdsfybjy5059@163.com

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Abstract: *Objective:* To evaluate the association between gestational diabetes mellitus (GDM) and offspring neurobehavioral development. *Methods:* A total of 280 infants born to mothers with or without GDM were recruited, and their neurobehavioral development was assessed using the Children's Neuropsychological and Behavioral Scale (CNBS). *Results:* Infants born to mothers with GDM exhibited significantly lower development quotient (DQ) scores at the 1st, 3rd, 6th, 8th, and 12th months after birth. *Conclusion:* GDM may adversely affect offspring neurobehavioral development, with this effect persisting despite interventions implemented during pregnancy.

Keywords: Gestational diabetes mellitus; Development quotient

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1. Introduction

Gestational diabetes mellitus (GDM) is a prevalent complication of pregnancy characterized by abnormal glucose tolerance first detected or occurring during gestation [1]. The incidence of GDM has surged in recent decades, attributed to lifestyle changes and the increasing prevalence of overweight individuals. Apart from elevating the risks of other pregnancy complications and adverse birth outcomes, GDM's potential impact on offspring neurodevelopment has drawn attention. However, existing data on this matter are not entirely consistent. Therefore, further elucidating the effects of GDM on offspring neurobehavioral development is warranted.

2. Methods

A total of 140 subjects (mothers with GDM or normal glucose tolerance and their newborns) met the following criteria: (1) maternal age between 18 and 40 years; (2) delivery occurring between 37 and 41 weeks of gestation; (3) singleton birth. Subjects were excluded if they had: (1) type I or II diabetes mellitus before pregnancy; (2) GDM requiring medication or insulin treatment; (3) severe acute or chronic infectious diseases

or any other pregnancy complications.

GDM was diagnosed by medical professionals at the hospital using a one-step strategy of a 75-g oral glucose tolerance test (OGTT) conducted at 24–28 weeks of gestation, following the Classification and Diagnosis of Diabetes issued by the American Diabetes Association (ADA) in 2016. Upon diagnosis of GDM, interventions were implemented according to the Clinical Management Guidelines for Obstetrician–Gynecologists. Children's Neuropsychological and Behavioral Scale (CNBS) scores as well as maternal and neonatal information were collected from hospital records.

The data were summarized as mean ± standard deviation (SD) and percentages, depending on the nature of the variables involved, and analyzed using SPSS 20.0. A significance level of $P < 0.05$ was considered statistically significant.

3. Results

The characteristics of the participants showed that the GDM women had significantly older maternal ages and a higher BMI compared with their controls (**Table 1**).

Table 1. Characteristics of study populations

	Control (n = 140)	GDM (n = 140)	t/χ^2	P
Maternal				
Age (years, mean ± SD)	28.69 ± 4.50	30.07 ± 4.92	0.28	0.015
Pregnancy BMI (kg/m^2, mean ± SD)	27.86 ± 3.45	29.59 ± 4.10	3.82	< 0.001
Gestational age (weeks, mean ± SD)	38.79 ± 0.88	38.71 ± 0.95	-0.79	0.433
Parity [n (%)]				
1	78 (55.7)	85 (60.7)	0.72	0.467
2	62 (44.3)	55 (39.3)		
Nationality [n (%)]				
Han	95 (67.9)	89 (63.6)	7.2	0.056
Manchu	36 (25.7)	45 (32.1)		
Mongol	9 (6.4)	3 (2.1)		
Others	0 (0.0)	3 (2.1)		
Newborn				
Gender [n (%)]				
Boy	73 (52.1)	82 (58.6)	1.17	0.336
Girl	67 (47.9)	58 (41.4)		
Birth weight (kg, mean ± SD)	3.37 ± 0.47	3.39 ± 0.47	0.28	0.781
Birth height (cm, mean ± SD)	50.89 ± 1.49	50.69 ± 1.60	-1.08	0.281

Abbreviation: GDM, gestational diabetes mellitus; SD, standard deviation; n, the number of samples.

The development quotient (DQ) scores of the GDM children were significantly lower than that of the controls in the 1st (95.14 ± 5.93 vs. 97.14 ± 6.73, $P = 0.009$), 3rd (89.81 ± 6.34 vs. 94.34 ± 6.50, $P = 0.001$), 6th (94.79 ± 5.63 vs. 97.12 ± 6.31, $P = 0.001$), 8th (96.95 ± 3.07 vs. 97.72 ± 3.05, $P = 0.037$), and 12th months (97.96 ± 2.80 vs. 98.92 ± 3.03, $P = 0.007$) after birth.

4. Discussion

This study investigated the impact of GDM on offspring neurobehavioral development by assessing DQ scores. The findings revealed that children born to mothers with GDM exhibited significantly reduced DQ scores from the 1st to the 12th month, despite interventions such as modified diets and physical activities implemented upon GDM diagnosis.

Previous research has indicated that elevated glucose levels can hinder the transfer of essential fatty acids like arachidonic acid (ARA) and docosahexaenoic acid (DHA) from maternal circulation to fetuses, potentially affecting offspring's cognitive function [2]. Additionally, GDM women often experience placental vascular diseases, leading to thickening of the placental vascular wall and narrowing of the vascular lumen. This condition may induce fetal intrauterine ischemia and anoxia [3,4], thereby contributing to developmental retardation in the fetal brain [5,6].

The study's strengths include the utilization of DQ scores to assess neurobehavioral development up to the 12th month, as well as the exclusion of GDM patients with other complications requiring medication or insulin treatment, thus minimizing confounding factors in fetal and infant development.

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Disclosure statement

The authors declare no conflict of interest.

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Analysis of the Role of the Comprehensive Guided Labor Nursing Intervention in Improving Maternal Adverse Emotions

Guanghua Xu[1]*, Shijia Chen[2]

[1]Lianyungang Maternal and Child Health Hospital, Lianyungang 222000, Jiangsu Province, China
[2]Lianyungang Dongxin Farm Hospital, Lianyungang 222248, Jiangsu Province, China

***Corresponding author:** Guanghua Xu, XGH18036626381@163.com

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Abstract: *Objective:* To analyze the application value of the comprehensive guided labor nursing model in improving maternal negative emotions. *Methods:* Eighty cases of mothers admitted to the hospital from June 2022 to June 2023 were sampled and randomly grouped, with comprehensive guided labor nursing intervention included in Group A and conventional care included in Group B. Emotion scores, labor and delivery, pregnancy outcomes, and nursing satisfaction were compared. *Results:* Maternal self-rating anxiety (SAS) and depression (SDS) scale scores were lower in Group A than in Group B ($P < 0.05$). Maternal visual analog scores (VAS) and postpartum hemorrhage were lower in Group A than in Group B ($P < 0.05$). Additionally, the duration of each stage of labor was shorter than in Group B ($P < 0.05$). The incidence of adverse pregnancy outcomes was lower in Group A than in Group B, and the rate of spontaneous deliveries was higher in Group A compared to Group B ($P < 0.05$). Furthermore, nursing care satisfaction was higher in Group A than in Group B ($P < 0.05$). Overall, Group A had a higher rate of maternal nursing satisfaction than Group B ($P < 0.05$). *Conclusion:* Comprehensive guided labor nursing can shorten the duration of labor, reduce postpartum hemorrhage, and decrease the rate of adverse pregnancy outcomes, thereby contributing to the improvement of maternal mood. This approach proves to be efficient and feasible in clinical practice.

Keywords: Comprehensive guided labor; Midwifery care; Maternal; Adverse emotions.

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1. Introduction

The process of pregnancy and childbirth is extremely complex, encompassing the period of gestation exceeding 28 weeks, involving the initiation of labor in the mother's body, along with various factors such as the size of the fetus, amniotic fluid, and gestational weeks. During this phase, mothers may experience fear and nervousness, compounded by the exertion of delivery. These factors can prolong labor and increase the risk of fetal distress and cesarean section [1]. Consequently, interventions in delivery care play a crucial role in safeguarding maternal health during childbirth. While conventional obstetric care models can alleviate maternal discomfort to some extent, they often fail to stabilize maternal emotions. In some cases, improper care practices may even diminish obstetric care

satisfaction, highlighting the need for improvement in modern obstetric care approaches [2].

Comprehensive guided labor nursing, as a contemporary obstetric care model, embodies the principle of "people-oriented" service. This model has been shown to shorten labor duration, reduce postoperative hemorrhage, and decrease the incidence of neonatal asphyxia and adverse childbirth events [3]. This study examined the efficacy of comprehensive guided labor nursing through an analysis of 80 cases of women admitted to the hospital between June 2022 to June 2023. The aim is to evaluate the value of comprehensive guided labor nursing intervention.

2. Materials and methods

2.1. Data

A total of 80 cases of pregnant women admitted to the hospital from June 2022 to June 2023 were enrolled in this study and randomly grouped into group A (comprehensive guided labor nursing) and group B (routine care). **Table 1** shows the baseline data ($P > 0.05$).

Table 1. Analysis of maternal baseline data

Group	*n*	Age (years)		Gestation period (weeks)		Number of births (times)	
		Range	Average	Range	Average	Range	Average
Group A	40	24–38	29.73 ± 1.81	29–39	35.14 ± 1.25	1–3	1.64 ± 0.58
Group B	40	24–39	29.71 ± 1.79	29–40	35.19 ± 1.23	1–3	1.62 ± 0.61
χ^2 / t	-	0.0497		0.1803		0.1503	
P	-	0.9605		0.8574		0.8809	

2.2. Inclusion and exclusion criteria

Inclusion criteria included patients with ultrasound indicating that the fetus is in a cephalic position; patients with informed consent, and patients with no abnormalities in maternal organ function.

Exclusion criteria included patients with severe pregnancy complications, patients with abnormal organ function, and patients with ultrasound suggests that the fetus is in a non-cephalic position.

2.3. Methods

2.3.1. Group A: comprehensive guided labor nursing

(1) Nursing care during the waiting period:

- Routine intervention – Experienced midwives, selected and certified by the department, maintain daily disinfection of the waiting room, ensuring a warm and comfortable environment for mothers. They assist mothers in positioning comfortably upon entering the delivery room, provide detailed explanations of the labor process and each stage's characteristics, and demonstrate procedures to enhance communication and cooperation. Emergency drugs and midwifery equipment are prepared for labor safety.
- Psychological intervention – Continuous monitoring of maternal vital signs for abnormalities, immediate reporting to physicians if any, guidance for family members to prepare nutritious and easily digestible food for the mother, and instructions for correct breathing techniques.

(2) Nursing care during labor:

- First stage of labor – Monitoring contractions, educating mothers about pain management and

contractions, distracting mothers from pain through deep conversations, guiding breathing adjustments, providing back massages for pain relief, and encouraging energy conservation.

- Second stage of labor – Monitoring abdominal pressure and encouraging prolonged breath-holding during contractions to alleviate discomfort.
- Third stage of labor – Monitoring delivery of the placenta, ensuring rest, and recording vaginal bleeding volume. Encouraging mother-infant bonding, facilitating newborn touch, and minimizing breastfeeding duration.

(3) Postpartum care:

- Two-hour postpartum waiting room stays with explanations of its importance, education on newborn feeding and care, breastfeeding guidance, assessment of maternal mood fluctuations, communication enhancement, and use of music for emotional calming.
- Six-hour postpartum breast massage to stimulate milk discharge and uterine fundal massage to prevent postpartum complications.

(4) Discharge nursing:

- Provision of home nursing program information, guidance on infant feeding and complementary food introduction schedules, and monitoring maternal food intake and body mass fluctuations.

2.3.2. Group B: routine care

(1) Basic information recording and verbal explanation of precautions and related knowledge before delivery, addressing maternal concerns, and mood management.

(2) Targeted care initiation at 3 cm uterine dilation, focusing on hemorrhage prevention. Preparedness for cesarean section in cases of inability to deliver naturally. Assessment of post-delivery hemorrhage situations.

2.4. Observation indicators

(1) Adverse emotions: Scores from Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS) are recorded. There is a positive correlation between maternal anxiety and depression.

(2) Delivery situation: Visual Analog Scale (VAS), postpartum hemorrhage, and time indicators of each labor process are recorded.

(3) Adverse pregnancy outcomes: Neonatal asphyxia, fetal distress, postpartum hemorrhage, and spontaneous delivery are recorded.

(4) Satisfaction: A self-made midwifery satisfaction scale was used to assess maternal satisfaction.

2.5. Statistical analysis

Data were processed using SPSS 21.0. Count data were expressed as % and the χ^2 test was used. Measurement data were expressed as mean ± standard deviation (SD) and the *t*-test was used. There was a statistically significant difference when $P < 0.05$.

3. Results

3.1. Maternal adverse mood scores

After the intervention, SAS and SDS scores were lower in group A than in group B ($P < 0.05$), as described in **Table 2**.

Table 2. Comparison of maternal adverse mood scores (score, mean ± SD)

Group	SAS		SDS	
	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Group A (n = 40)	52.36 ± 2.84	34.28 ± 1.25	53.61 ± 2.79	33.17 ± 1.31
Group B (n = 40)	52.41 ± 2.82	43.66 ± 1.79	53.59 ± 2.77	42.83 ± 2.69
t	0.0790	27.1724	0.0322	20.4194
P	0.9372	0.0000	0.9744	0.0000

3.2. Labor and delivery

Table 3 shows that Group A had a lower VAS score, lower postpartum hemorrhage, and shorter duration of each labor stage than Group B ($P < 0.05$).

Table 3. Comparison of deliveries (mean ± SD)

Group	VAS score (points)	Postpartum hemorrhage (mL)	Duration of the first stage of labor (min)	Duration of the second stage of labor (min)	Duration of the third stage of labor (min)
Group A (n = 40)	3.28 ± 0.82	151.36 ± 4.25	356.41 ± 21.36	41.82 ± 3.28	6.87 ± 1.05
Group B (n = 40)	6.41 ± 1.36	207.43 ± 5.16	461.37 ± 21.49	60.76 ± 4.16	7.91 ± 1.32
t	12.4653	53.0475	21.9087	22.6118	3.8997
P	0.0000	0.0000	0.0000	0.0000	0.0002

3.3. Pregnancy outcomes

Group A had a lower incidence of adverse pregnancy outcomes and a higher rate of spontaneous delivery than Group B ($P < 0.05$), as shown in **Table 4**.

Table 4. Comparison of pregnancy outcomes [n (%)]

Group	Neonatal asphyxia	Fetal distress	Postpartum hemorrhage	Adverse pregnancy rate	Spontaneous delivery rate
Group A (n = 40)	0 (0.00)	1 (2.50)	1 (2.50)	2 (5.00)	36 (90.00)
Group B (n = 40)	1 (2.50)	5 (12.50)	3 (7.50)	9 (22.50)	27 (67.50)
χ^2	-	-	-	5.1647	6.0504
P	-	-	-	0.0237	0.0139

3.4. Nursing care satisfaction

Table 5 shows that the maternity care satisfaction was higher in group A than in group B ($P < 0.05$).

Table 5. Comparison of satisfaction with care [n (%)]

Group	Satisfied	Generally satisfied	Dissatisfied	Satisfaction
Group A (n = 40)	31 (77.50)	8 (20.00)	1 (2.50)	39 (97.50)
Group B (n = 40)	25 (62.50)	9 (22.50)	6 (15.00)	34 (85.00)
χ^2	-	-	-	3.9139
P	-	-	-	0.0479

4. Discussion

In the current landscape of rapid medical technological advancements, the rate of cesarean sections has steadily risen. However, despite these advancements, the risks associated with cesarean delivery, such as postpartum hemorrhage, anesthesia complications, and postoperative infections, remain significant. Moreover, the severe postoperative pain following cesarean section can impede maternal mobility. Additionally, cesarean deliveries bypass the natural birth canal, increasing the likelihood of neonatal respiratory complications [4]. It is within this context that comprehensive guided labor and delivery care has emerged.

Comprehensive guided labor and delivery care, tailored to the psychological state of the mother, assesses both maternal mental health and physiological health. Through prenatal education, labor and delivery guidance, and postpartum communication programs, this approach aims to enhance maternal understanding, alleviate labor-related fears and anxieties, and encourage cooperation with medical staff [5]. Furthermore, continuous monitoring of maternal vital signs and risk assessments, along with early mother-infant bonding and breastfeeding support, contribute to maternal well-being and emotional stability [6].

The analysis in this study revealed that Group A, receiving comprehensive guided labor and delivery nursing, exhibited significantly lower SAS (34.28 ± 1.25) and SDS (33.17 ± 1.31) scores compared to Group B ($P < 0.05$), indicating a pacifying effect on maternal anxiety and depression. The intervention's success can be attributed to various factors, including personalized nursing care through labor stages. During the first stage, limb arrangement for comfort, dietary guidance for maternal strength, and enhanced communication with family members are implemented. In the second stage, breath-holding techniques and verbal encouragement were utilized to boost maternal confidence. In the third stage, facilitating early mother-infant interaction and promoting breastfeeding fostered a sense of closeness and maternal empowerment [7]. Another data set showed that Group A's VAS score (3.28 ± 0.82), postpartum hemorrhage (151.36 ± 4.25 mL), and the duration of each labor stage (first, 356.41 ± 21.36 min; second, 41.82 ± 3.28 min; third, 6.87 ± 1.05) were significantly better than those in Group B ($P < 0.05$). This suggests that continuous maternal escort, vital sign monitoring, and uninterrupted support contributed to maternal security and confidence, resulting in shortened labor durations [8].

Comprehensive guided labor nursing also provided technical guidance to alleviate contraction pain, enhancing maternal labor progression and reducing cesarean section rates. Moreover, it minimized the risks of edema, infection, and perineal tearing, reflecting modern high-quality obstetric care standards [9]. Notably, Group A demonstrated a lower incidence of adverse pregnancy outcomes (5.00% vs. 22.50%) and a higher rate of spontaneous deliveries (90.00% vs. 67.50%), with $P < 0.05$. Maternal satisfaction was significantly higher in Group A (97.50%) compared to Group B (85.00%), further highlighting the intervention's efficacy. This can be attributed to the following advantages: (1) Comprehensive guided labor nursing, provided by professional midwives, ensures continuous and holistic care for mothers, thereby guaranteeing the continuity and integrity of midwifery services and maintaining the quality of care. (2) Professional midwives play a pivotal role in calming mothers, offering childbirth guidance, and boosting maternal confidence. By alleviating maternal tension and anxiety, they enhance maternal comfort, encouraging cooperation during delivery and facilitating the labor process. (3) Comprehensive guided labor nursing involves the timely detection and treatment of maternal abnormalities. This proactive approach can stimulate uterine contractions, thus reducing the risk of postpartum hemorrhage and other complications, ultimately ensuring the safety of both mothers and infants. (4) Guided music midwifery intervention throughout the labor process effectively relaxes the mother's body and mind. This relaxation aids in diverting the mother's attention from pain and contributes to a reduction in vasoconstrictive substances in maternal blood. Consequently, this intervention helps maintain uterine blood supply, balances uterine acidity, and mitigates the risks of neonatal asphyxia and fetal distress [10].

In summary, comprehensive guided assisted delivery nursing interventions effectively mitigate maternal distress, reduce labor pain, and minimize postpartum complications. These interventions contribute to improved labor and delivery outcomes, advocating for their widespread adoption in obstetric care.

Disclosure statement

The authors declare no conflict of interest.

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Attitudes Towards Family Planning of Women in the Early Postpartum Period and Effecting Factors – A Secondary Publication

Zeliha Turan, Fatma Koruk*

Harran University, Faculty of Health Sciences, Department of Nursing, Şanlıurfa, Turkey.

***Corresponding author:** Fatma Koruk, fgozukara18@gmail.com

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Abstract: *Objective:* To determine the attitudes of women in the early postpartum period towards family planning and the factors affecting them. *Method:* The sample of the cross-sectional study consisted of 243 women in the postpartum clinics of a public hospital. Data for the study were collected between June and July 2022. *Results:* The average age of women was 28.17 ± 5.42 years, and the average number of children was 3.51 ± 0.89. In addition, 46.5% of women were illiterate and 73.7% want children again. The mean score of the women's family planning attitude scale was 90.8 ± 8.10. The family planning attitude scale average scores of women with higher education levels, living in the city center, and having their pregnancy follow-up done in a private hospital were higher. It was determined that the mean score of the scale was lower for women with a higher age at their own age, spouse's age, age at marriage and first gestational age, and women who want to have children again ($P < 0.05$). *Conclusion:* The research showed that women's attitudes towards family planning in the early postpartum period were positive, but not at the desired level.

Keywords: Postpartum period; Women; Family planning; Attitude

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1. Introduction

In developing countries, maternal and infant mortality rates remain high due to high fertility, risky pregnancies, and complicated childbirths. The World Health Organization (WHO) reports that 810 women die every day, and 295,000 women die annually due to pregnancy and childbirth. In 2017, it was stated that the maternal mortality rate in developing countries remained high at 462 per one hundred thousand live births, while it decreased to 11 per one hundred thousand live births in developed countries [1]. In Turkey, according to the Ministry of Health's data for 2018, the maternal mortality rate is slightly higher than in developed countries at 13.6 per one hundred thousand live births [2].

To reduce maternal mortality, it is a priority to provide continuous and quality family planning (FP), antenatal care, safe delivery, and postnatal care services to all women in need. However, an estimated 214 million women of reproductive age worldwide have unmet family planning needs. Furthermore, the use of

modern FP methods is not at the desired level in many parts of the world. According to the latest estimates, the usage of modern FP methods among married women aged 15–49 in developing countries increased from 55.0% to 57.1% between 2000 and 2019 [3]. The situation is no different in Turkey. According to the Turkey Demographic and Health Survey (TDHS) 2018 data, only 49% of married women currently use modern FP methods. Additionally, the unmet need for family planning, which was 6% in the 2013 TDHS, doubled to 12% in the 2018 results [4]. Several factors influence the use of FP methods, including lack of access to methods, limited method choice, inadequate service quality, fear of side effects, societal expectations, and negative influences of religion and culture [3,5,6]. The effective delivery of FP services requires identifying the factors that influence the use of FP methods.

The postpartum period is a good opportunity for conscious family planning and providing services to individuals in this regard. This period is noted as a time when women have a high desire to use FP methods [7]. Due to the variation in fertility and resumption of sexual activity after childbirth among individuals, FP counseling is recommended not at the postpartum six-week check-up but rather during the antenatal period or before postpartum discharge, or as soon as possible [8-10]. Thus, women must decide on the FP method they will use before being discharged from the hospital to prevent unplanned or unwanted pregnancies.

Especially in the culture of the Eastern regions of Turkey, having children holds great importance for the continuation of the lineage. According to the 2021 data from the Turkish Statistical Institute, Şanlıurfa, where the research was conducted, is a province with the highest fertility rate (total fertility rate of 3.81) and high maternal-infant mortality rates [11]. In a region with high fertility, conducting studies on factors that affect the access to and provision of family planning services and planning appropriate interventions will significantly contribute to the protection of maternal and infant health.

This study aims to determine the attitudes of women towards family planning in the early postpartum period and the factors influencing them in the province with the highest fertility rate in Turkey.

2. Materials and methods

2.1. Study type

The research is of cross-sectional type.

2.2. Location and date of conducting the research

The research was conducted in the postpartum clinics of an education and research hospital located in the city center of Şanlıurfa between June and July 2022. The reason for selecting this hospital as the research site is that it is the hospital where the highest number of deliveries is performed annually in Şanlıurfa, and it serves individuals from all socio-economic backgrounds. According to hospital data, the total number of deliveries in this hospital in 2021 was recorded as 26,714.

2.3. Population and sample of the research

The population of the research consisted of women hospitalized in postpartum clinics. To calculate the sample size, a pilot study was conducted with 30 women hospitalized in these clinics, and based on the results of the pilot study, the standard deviation of attitude scores obtained was 11.91, the margin of error was 1.5, and the required sample size at a 95% confidence level was calculated to be 243.

Inclusion criteria for the sample:

(1) Being 18 years of age or older,

(2) Being able to communicate in Turkish,

(3) Not having any psychiatric illness,
(4) Having given birth vaginally or by cesarean section,
(5) Volunteering to participate in the research.

2.4. Data collection

The data of the research were collected using a Data Collection Form prepared by reviewing the literature [12-16], and the Postpartum Family Planning Attitude Scale through face-to-face interviews. The interviews were conducted within the first 24 hours postpartum. A suitable environment was provided for women to comfortably answer questions, and the interviews were conducted outside of visiting hours. Each interview lasted approximately 15–20 minutes.

2.5. Personal information form

It consists of a total of 29 questions, including 13 questions about the socio-demographic characteristics of women (age, income status, place of residence, educational level, employment status, presence of social security, family type, etc.); 12 questions about pregnancy and childbirth-related characteristics (age at first pregnancy, number of pregnancies, number of living children, whether prenatal care was received, mode of previous pregnancy termination, etc.); and four questions about family planning-related characteristics.

2.6. Postpartum Family Planning Attitude Scale (PFPAS)

The scale, developed by Varol *et al*. [17], consists of six sub-dimensions (Items 1-3 "Perceived Risk"; Items 4-6 "Perceived Severity"; Items 7-10 "Perceived Benefits"; Items 11-18 "Perceived Barriers"; Items 19-23 "Cue to Action"; Items 24-27 "Self-Efficacy") and a total of 27 items. The scale items include statements measuring attitudes towards birth spacing, contraceptive methods, access to services, and external factors influencing FP attitude. Sixteen of the items in the scale (items 2, 3, 4, 5, 7, 8, 9, 10, 20, 21, 22, 23, 24, 25, 26, 27) are positive, and eleven items (items 1, 6, 11, 12, 13, 14, 15, 16, 17, 18, 19) are negative expressions. Negative statements in the scale were reverse-coded. The Likert-type scale items are rated from 1 to 5. In positive statements, the rating scale is as follows: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree; while in negative statements, the scale is: 5 = strongly disagree, 4 = disagree, 3 = undecided, 2 = agree, and 1 = strongly agree. The minimum score that can be obtained from the scale is 27, and the maximum score is 135. As the score obtained from the scale increases, the positive attitude towards FP also increases. It has been stated that the scale explains 57.2% of the total variance and has a Cronbach's α coefficient of 0.878 in the explanatory factor analysis of PFPAS. In this study, the Cronbach's α coefficient of the scale is 0.750.

2.7. Ethical aspect of the research

To conduct the research, written permission for scale usage was obtained from the authors of the scale, from the hospital where the research was conducted, from the university's ethics committee (dated 09.05.2022 and numbered HRU/22.09.26), and from the provincial health directorate. All stages of the research were conducted in accordance with the principles of the Helsinki Declaration, and informed consent was obtained from the women participating in the research.

2.8. Data analysis

The data obtained in the research were analyzed by the researchers using the SPSS for Windows 20.0 statistical package program. In the evaluation of the data, percentage, mean, standard deviation from descriptive statistics; *t*-test for comparison of two groups (participant's and spouse's employment status, economic status, family

type, desire for another child, mode of delivery, appropriateness of child's gender expectation, place where prenatal care was received); one-way analysis of variance (ANOVA) for comparison of three or more groups (participant's and spouse's educational status, language spoken most at home, place of residence); Pearson correlation analysis for relationships between dependent-independent variables in groups conforming to normal distribution for ordinal data (participant's and spouse's age, age at marriage, total years of marriage, age at first pregnancy); and Spearman's correlation analysis for ordinal data not conforming to normal distribution (total number of pregnancies, number of living children, number of male children, number of female children, number of unplanned/unwanted pregnancies, number of miscarriages) were used. The findings were interpreted at a significance level of $P < 0.05$ with a 95% confidence interval. The dependent variable of the research is the total score obtained from PFPAS by women. The independent variables of the research are the socio-demographic and obstetric characteristics of women, and the characteristics related to family planning.

3. Results

The average age of women is 28.17 ± 5.42 years. 62.1% of women have not completed any level of education, and 78.6% of them use a language other than Turkish at home (48.6% Arabic, 30.0% Kurdish). 96.7% of women do not work, but all of them (100.0%) have social security. 92.2% of women perceive their income level as "moderate". 46.9% of women live in the city center, and 23.5% live in extended families. The average age of women's spouses is 31.38 ± 5.85 years. 9.5% of spouses have not completed any level of education, while 72.4% have completed only primary education. 94.7% of spouses work in a job that generates income.

The average age at first marriage for women is 20.0 ± 2.8 years, and the average total duration of marriage is 8.1 ± 5.3 years. The average age at first pregnancy for women is 20.6 ± 2.9 years, and the average total number of pregnancies is 4.2 ± 2.4. The average number of living children for women is 3.5 ± 1.8, with an average of 1.6 ± 1.2 daughters and 1.9 ± 1.2 sons. 73.7% of women want to have more children. 20.2% of women have experienced at least one unplanned pregnancy, and 40.7% have experienced at least one miscarriage. All women (100.0%) received prenatal care during their last pregnancy, and 53.5% gave birth by cesarean section. Regarding the gender of the last child, 52.7% of women have a male child, and 11.9% stated that the gender of their child did not match their expectations.

81.1% of women have never received FP counseling before. Among those who received counseling (18.9%), all of them (100.0%) reported receiving it from nurses. None of the women received FP counseling during their last pregnancy. 56.4% of women used FP methods before pregnancy. Withdrawal (32.5%) and oral contraceptives (11.9%) were the most commonly used methods. 86.8% of women plan to use FP methods again after childbirth, with the most preferred methods being IUD (18.5%), oral contraceptives (14.8%), and withdrawal (14.8%). 31.7% of women have not yet decided which method to use. Reasons cited by women who do not intend to use any FP method after childbirth (13.2%) include wanting more children (9.9%) and believing that breastfeeding prevents pregnancy (1.6%).

The average score of women on the PFPAS is 90.8 ± 8.10. The average PFPAS score is higher for women with higher education levels and those living in the city center, and this difference is statistically significant ($P < 0.05$). However, there is no statistically significant difference in the PFPAS score of women regarding their spouse's education level, the language spoken most at home, their own and their spouse's employment status, economic status, and family type ($P > 0.05$; **Table 1**).

Table 1. Distribution of some socio-demographic characteristics of women according to PFPAS score

Socio-demographic characteristics	Mean scale score		
	Mean ± S.D.	**Statistical analysis**	***P***
Education status			
Illiterate	88.84 ± 7.48		
Literate	91.60 ± 9.71	4.973[a]	0.002
Primary education**	93.05 ± 7.78		
Secondary education	93.28 ± 4.34		
Spouse education status			
Illiterate	90.00 ± 4.24		
Literate	86.90 ± 7.97		
Primary education	90.61 ± 7.96	3.622[a]	0.007
Secondary education	94.72 ± 7.39		
University and above	89.28 ± 10.16		
Most spoken language at home			
Turkish**	96.40 ± 6.84		
Kurdish	95.32 ± 5.85	15.788[a]	0.000
Arabic	88.13 ± 7.26		
Place of residence			
City center**	93.09 ± 6.78		
District	89.66 ± 7.55	8.975[a]	0.000
Village	88.42 ± 9.35		
Employment status			
Yes	92.12 ± 8.21	0.442[b]	0.659
No	90.83 ± 8.11		
Economic situation			
Middle	90.96 ± 7.98	-0.597[b]	0.551
Bad	89.77 ± 9.68		
Family type			
Nuclear family	91.08 ± 7.73	0.727[b]	0.468
Extended family	90.19 ± 9.23		
Spouse employment status			
Yes	90.93 ± 8.12	0.470[b]	0.638
No	89.84 ± 7.93		
Total	90.80 ± 8.10		

* row percentage, ** group making a difference, [a] ANOVA test, [b] *t*-test

The PFPAS score of women who received prenatal care at a private hospital is higher compared to those who received care at other institutions, and this difference is statistically significant ($P < 0.05$). However, there is no statistically significant difference in the PFPAS score of women regarding their desire to have more children, mode

of last childbirth, and the correspondence of the child's gender to expectations ($P > 0.05$; **Table 2**).

Table 2. Distribution of some obstetric characteristics of women according to PFPAS score

Obstetric features	Mean scale score		
	Mean ± S.D.	***t***	***P***
Wanting a child again			
Yes	90.15 ± 7.71	-2.356	0.019
No	92.90 ± 8.85		
Place of pregnancy follow-up-ASM			
Yes	90.96 ± 8.05	0.953	0.342
No	88.00 ± 9.74		
Place of pregnancy follow-up – State hospital			
Yes	90.87 ± 8.10		
No	0.00 ± 0.00		
Place of pregnancy follow-up – Private hospital			
Yes	92.75 ± 8.63	3.472	0.001
No	89.21 ± 7.24		
Place of pregnancy follow-up – University hospital			
Yes	94.50 ± 9.19	0.634	0.527
No	90.84 ± 8.10		
Previous mode of delivery			
Normal	90.17 ± 7.72	-1.256	0.210
Cesarean section	91.48 ± 8.39		
Conformity of the child's gender to expectations			
Yes	90.51 ± 7.89	-1.904	0.058
No	93.55 ± 9.23		
Total	90.8 ± 8.10		

* row percentage, ** group making a difference

There is a low-level negative relationship between women's age, total years of marriage, age at first pregnancy, number of living children, number of unplanned/unwanted pregnancies, miscarriages, and the PFPAS score ($P > 0.01$). However, there is no statistically significant difference in the PFPAS score regarding the spouse's age, age at marriage, and total number of pregnancies ($P > 0.05$; **Table 3**).

Table 3. Correlation of some demographic and obstetric characteristics of women with PFPAS scores

Demographic and obstetric characteristics	Scale score		
	n	**r**	***P***
Age	243	-0.143	0.126
Age of spouse	243	-0.100	0.119
Age at marriage	243	-0.132	0.040

Table 3 (Continue)

Demographic and obstetric characteristics	Scale score		
	n	**r**	***P***
Total years of marriage	243	-0.062	0.333
Age at first pregnancy	243	-0.176	0.006
	n	**rho**	***P***
Total number of pregnancies	243	-0.019	0.767
Number of living children	243	-0.017	0.792
Girl	243	-0.089	0.166
Male	243	0.047	0.462
Number of unplanned/unintended pregnancies	243	0.122	0.057
Number of miscarriages	243	-0.122	0.058
Scale total	243	1	

4. Discussion

In this study, conducted to investigate the attitudes towards family planning and influencing factors of women in the early postpartum period in Şanlıurfa, where fertility rates are highest in Turkey, it was determined that women have low levels of education and the majority do not work. About half of the women live in the city center, while approximately a quarter continue the tradition of extended families in rural areas. Considering that socio-demographic and cultural characteristics are significant factors affecting access to and utilization of health services, it can be said that the population studied is a disadvantaged group.

In the study, it was found that the age at first marriage and first pregnancy for women is lower than the Turkish average [4]. In Turkey, marriage marks the beginning of a socially accepted period for childbirth. Therefore, the age at first marriage is an important factor in the onset of fertility. Women who marry at an early age tend to become pregnant earlier, remain at risk of pregnancy for a longer period, and generally have more births. Consistent with this information, the average total number of pregnancies and living children for women is higher than the Turkish average [4]. The majority of women intend to have more children. Additionally, the majority have never received FP counseling before, and their pre-pregnancy FP usage levels are lower than the Turkish average. The high incidence of early marriage, early pregnancy, and non-use of FP methods among women leads to a high number of children as well as adverse pregnancy outcomes, as expected. Indeed, the incidence of unplanned pregnancies and spontaneous abortions among women is quite high compared to the Turkish average [4]. These findings are important as they indicate that the studied population, considering its socio-demographic and obstetric characteristics, is at high risk of unplanned pregnancies and may need FP counseling services.

In the study, it was found that the average PFPAS score of women (90.8 ± 8.10) is higher than the scale score average. Accordingly, it can be said that women exhibit a positive attitude towards FP. Although no study using a measurement tool specific to the postpartum period could be found in the literature, there are many studies evaluating FP attitudes in women in general, and in these studies, the scores women receive from the Family Planning Attitude Scale (FPAS) vary greatly. These scores; were reported as 130.72 ± 26.10 in study by Tezel *et al*. [5], 117.632 ± 11.12 in the study by Eryılmaz and Ege [12], and 81.30 ± 17.34 in the study by Egelioğlu Cetişli *et al*. [14]. This situation may be related to the fact that the studies were conducted with women

from different regions and different sample groups in our country. When studies conducted in the regions where the research was conducted are examined, it is seen that the FPAS scores of women are similar to the PFPAS score obtained from this study [18,19].

In the study, it was found that the average PFPAS score of women with higher education levels is higher. Similarly, in studies where FP attitudes are evaluated with the FPAS score in the literature, it is stated that the average score of women with higher education levels is higher [15,20-23]. Education level is one of the main social determinants affecting both the attitudes and behaviors related to birth control in the postpartum period and generally in women. The increase in education level is an important factor that facilitates women's access to information and their use of that information, empowering them to control their fertility.

In the study, it was found that the average PFPAS score of women who speak Turkish most at home is higher than those who speak Arabic and Kurdish. Language proficiency is an important tool for accessing and utilizing information. Indeed, it is noted in the literature that the language used can be a barrier to accessing healthcare both before and after childbirth, which can also negatively affect FP utilization [24,25].

In the study, it was found that women living in the city center have a higher average PFPAS score. This may be due to easier access to healthcare services and information for women living in urban areas. Indeed, it is stated in the literature that the place of residence is a factor affecting access to and utilization of healthcare services [26,27].

In the study, it was found that women who received prenatal care at a private hospital had a higher average PFPAS score. It is thought that this result may be related to the likelihood that women receiving services from private hospitals have a higher socioeconomic status.

In the study, it was observed that as women's age, total years of marriage, age at first pregnancy, number of living children, unplanned pregnancies, and spontaneous abortions increase, there is a slight decrease in the average PFPAS scores. These findings may suggest either that women have not yet reached their desired number of children or that they have experienced adverse pregnancy outcomes due to poor FP usage levels.

As a result of this study, it was determined that women's attitudes towards family planning in the early postpartum period are positive and that education, mother tongue, place of residence, and place of service utilization affect attitudes towards FP. For women's attitudes towards family planning to translate into behavior, it is recommended to plan and implement family planning education and counseling services taking into account socio-demographic characteristics.

Disclosure statement

The authors declare no conflict of interest.

Authors' contributions

Conceptualization: Zeliha Turan, Fatma Koruk
Investigation: Zeliha Turan, Fatma Koruk
Methodology: Zeliha Turan
Formal analysis: Fatma Koruk
Writing – original draft: Zeliha Turan, Fatma Koruk
Writing – review & editing: Zeliha Turan, Fatma Koruk

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Management of Hereditary Angioedema in Pediatric, Pregnant, and Breast-Feeding Patients: An Expert Opinion – A Secondary Publication

Sun Young Yoon[1], Jae-Woo Jung[2], So Young Park[2], Gun-Woo Kim[3], Kyunghee Son[4], Sung-Yoon Kang[5], Hye Jung Park[6], Min-Kyu Kang[7], Joo-Hee Kim[8], Kyung Hee Park[9,10], Dong Hun Lee[11], Sae-Hoon Kim[12], Hyouk-Soo Kwon[13], Hye-Ryun Kang[14,15], Dong In Suh[16]*

[1]Department of Internal Medicine, Chungnam National University Sejong Hospital, Sejong, Republic of Korea.
[2]Department of Internal Medicine, Chung-Ang University College of Medicine, Seoul, Republic of Korea.
[3]Department of Internal Medicine, St. Carollo General Hospital, Suncheon, Republic of Korea.
[4]Department of Internal Medicine, Kyung Hee University Medical Center, Seoul, Republic of Korea.
[5]Division of Pulmonology and Allergy, Department of Internal Medicine, Gil Medical Center, Gachon University College of Medicine, Incheon, Republic of Korea.
[6]Department of Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea.
[7]Departmemt of Internal Medicine, Chungbuk National University Hospital and Chungbuk National College of Medicine, Cheongju, Republic of Korea.
[8]Division of Pulmonary, Allergy, and Critical Care Medicine, Hallym University Sacred Heart Hospital, Hallym University College of Medicine, Anyang, Republic of Korea.
[9]Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea.
[10]Institute for Allergy, Yonsei University College of Medicine, Seoul, Republic of Korea.
[11]Department of Dermatology, Seoul National University College of Medicine, Seoul, Republic of Korea.
[12]Department of Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Republic of Korea.
[13]Department of Internal Medicine, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Republic of Korea.
[14]Institute of Allergy and Clinical Immunology, Seoul National University Medical Research Center, Seoul, Republic of Korea.
[15]Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Republic of Korea.
[16]Department of Pediatrics, Seoul National University College of Medicine, Seoul, Republic of Korea.

***Corresponding author:** Dong In Suh, dongins0@snu.ac.kr

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Abstract: Hereditary angioedema (HAE) is a rare inherited condition marked by recurrent skin and submucosal edema. HAE is caused by a C1 inhibitor deficiency or decreased C1 inhibitor function. The initial attack may occur during childhood or pregnancy, with symptoms ranging from classic angioedema to nonspecific stomach cramps. In this review, we discuss strategies for children and pregnant women to manage HAE attacks effectively and safely in light of the recent increase in HAE diagnosis. To begin, an aggressive work-up is necessary to confirm HAE-1/2 and to determine the most effective countermeasures. Secondly, in the event of an acute attack, plasma-derived C1-inhibitor is the first line of defense for children and pregnant women. Icatibant is also appropriate for use, except in pregnant women. Fresh frozen plasma (FFP) may be suggested as an alternative. Thirdly, proactive measures to prevent HAE attacks should be considered whenever a procedure is performed that may result in an exacerbation. Finally, FFP, attenuated androgen, and antifibrinolytic agents

are recommended for long-term prophylaxis in South Korea where the C1 inhibitor is scarce. However, when making a decision, it is necessary to consider both the efficacy and the risk of adverse effects. For proper management, written action plans and first-aid kits are required. The action plans should be customized to the patient's unique circumstances.

Keywords: Hereditary angioedema; C1-inhibitor; Child; Pregnant; Breast-feeding

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1. Introduction

Hereditary angioedema (HAE) is a rare genetic disorder characterized by recurrent skin and mucosal swelling, which occurs due to deficiency or dysfunction of C1 esterase inhibitor (C1-INH). The severity of HAE varies widely, from asymptomatic to fatal, making it difficult to predict clinical outcomes and significantly impacting the daily lives of patients and their families.

More than half of patients experience their first symptoms during childhood or adolescence, requiring a differentiated approach to prevention and treatment for adults. Additionally, HAE is known to be influenced by factors such as stress, physical trauma, infection, and estrogen levels, which can affect the severity of acute attacks. Clinical courses in pregnant and breastfeeding women, who may experience increased hormonal levels, may differ from those of typical patients. Therefore, meticulous care from frontline healthcare providers is crucial for effective diagnosis and treatment in this patient population.

However, there is currently a lack of specialized literature focusing on children, pregnant women, and breastfeeding mothers domestically, and internationally, limited to a few reviews and case reports, posing significant challenges to clinical practice [1-6].

In response, healthcare professionals affiliated with the Korean Academy of Asthma, Allergy, and Clinical Immunology (KAAACI) who specialize in treating HAE have published expert opinions based on recent literature reviews and information [7]. This opinion paper aims to provide guidance for frontline clinicians, particularly regarding children, pregnant women, and breastfeeding mothers who require special consideration in managing HAE.

2. Definition and classification of HAE

To briefly summarize the overall classification of HAE for a better understanding of the content described in the primary expert opinion, the following points can be highlighted. Angioedema refers to swelling occurring in the deep dermis, subcutaneous tissue, mucosa, or mucosal tissue as local vascular permeability increases [8]. Based on the major mediators, angioedema is classified into histamine-mediated mast cell-mediated angioedema, bradykinin-mediated angioedema, and other types of angioedema that are difficult to clearly identify the cause [9]. Histamine-mediated angioedema mainly occurs as part of allergic reactions and is often accompanied by urticaria. In contrast, bradykinin-mediated angioedema occurs due to genetic or acquired deficiency of C1-INH and is mostly not accompanied by urticaria [10]. The HAE primarily addressed in this expert opinion belongs to bradykinin-mediated angioedema and is caused by genetic abnormalities.

HAE is classified into type 1 HAE, type 2 HAE, and normal C1-INH HAE based on genetic characteristics. Type 1 HAE is characterized by decreased levels of C1-INH, while type 2 HAE features normal levels of C1-INH but with functional impairment. Types 1 and 2 have similar mechanisms and clinical presentations, often collectively referred to as type 1/2 HAE. Type 1/2 HAE arises from mutations in the SERPING1 gene, which

encodes C1-INH, with over 700 different SERPING1 mutations reported to date [11]. Normal C1-INH HAE is very rarely encountered, and it is speculated that factors other than C1-INH are responsible for bradykinin receptor stimulation [12]. So far, six subtypes of normal C1-INH HAE have been reported [HAE due to factor XII gene (FXII) mutation (HAE-FXII); HAE due to angiopoietin-1 gene (ANGPT1) mutation (HAE-ANGPT1); HAE due to plasminogen gene (PLG) mutation (HAE-PLG); HAE due to kininogen-1 gene (KNG1) mutation (HAE-KNG1); HAE due to myoferlin gene (MYOF) mutation (HAE-MYOF); HAE due to heparan sulfate-glucosamine-3-O-sulfotransferase 6 gene (HS3ST6) mutation (HAE-HS3ST6)] [12]. Additionally, there are HAE cases where the exact causative gene is not known (HAE-UNK) [11].

3. HAE in Pediatrics

3.1. Clinical presentation and course of HAE in children

Mutations in the SERPING1 gene, which causes type 1/2 HAE, are present from birth, but the first symptoms typically manifest during childhood or adolescence. While there have been reported cases of symptoms appearing as early as 4 weeks after birth [13], such occurrences are extremely rare. According to large-scale studies in the United States, children with type 1/2 HAE experience their first attack at a median age of 11 years (range: 6–15 years), with a diagnosis typically occurring at around 19 years (range: 12–28 years), taking approximately 8 years (range: 1–16 years) from onset to diagnosis [14]. However, in Korea, the average age of initial symptom onset is 28 ± 14 years, with only about 26% experiencing their first attack before the age of 20 [15]. In children, attacks mostly present as cutaneous angioedema, which can be particularly dangerous in the pediatric airway due to its narrowness, potentially leading to asphyxiation [16]. Abdominal attacks are also rare in children, but due to the common occurrence of abdominal pain in this age group, it is difficult to accurately assess the true extent. The frequency and severity of attacks increase during adolescence, and the early onset of symptoms is associated with a more severe course of type 1/2 HAE [17]. Peripheral erythema is a common prodromal symptom in children, occurring in 42%–58% of all cases [11]. It is often misinterpreted as urticaria, leading to inaccurate and insufficient treatment [1,11,18,19].

3.2. Diagnosis of HAE in children

In situations where type 1/2 HAE is suspected, if angioedema occurs without erythema in children, it is recommended to measure the levels and activity of C1-INH antigen (protein) and C4 for diagnosis [11]. Since type 1/2 HAE follows an autosomal dominant inheritance pattern, children of affected patients have a 50% chance of inheriting the disease. Prompt testing is necessary for children of type 1/2 HAE patients, even if they currently do not exhibit clinical symptoms, to establish an optimal management plan [11,19,20]. Until all evaluations for type 1/2 HAE are completed, children of affected patients should be considered to have the disease and managed accordingly.

This consideration also applies to newborns. Until C1-INH deficiency is definitively ruled out, newborns should be considered to have the disease and cared for accordingly [11,20]. Interpretation of results requires attention due to the following factors: First, complement values measured using cord blood may yield false-negative results for HAE. Complement levels measured in cord blood are lower than those in maternal blood, with C1-INH levels in cord blood being only 70% and C1-INH activity being only 62% of those in adults [20,21]. Second, reference values for complement levels in pediatric peripheral venous blood are not yet established. However, it is known that C1-INH levels and activity are generally low in children with type 1/2 HAE, except in some exceptional cases in infants under 1 year old [22,23]. On the other hand, C4 levels can be low even in healthy infants, so diagnosing type 1/2 HAE based on decreased C4 levels in infants under 12

months old is not very helpful [22,23]. Third, genetic testing increases diagnostic reliability in children. Especially when biochemical test results are ambiguous, knowing the parents' genetic mutations can be very helpful in confirming the diagnosis of type 1/2 HAE through genetic testing [20,23]. However, genetic panels for HAE are not widely available in Korea, and some large hospitals only conduct them for research purposes. Due to the reasons mentioned above, all complement tests conducted initially in children of type 1/2 HAE patients should be repeated after the age of one [20,23].

Prenatal testing for type 1/2 HAE in fetuses during pregnancy is not recommended in clinical practice. The reasons include (1) the absence of observed mutations in the parents' C1-INH-related genes in many cases, up to about 10%, (2) even with the same mutation, phenotypes can vary significantly, and (3) advancements in treatment techniques have greatly improved disease control and quality of life for patients with type 1/2 HAE [24-26].

3.3. Treatment of HAE in pediatric patients

Just like in adults, it is essential to establish treatment guidelines in advance and have necessary emergency medications ready for all pediatric patients with type 1/2 HAE [11,27]. The approved emergency medications for pediatric patients with type 1/2 HAE are plasma-derived C1-inhibitor (trade name Berinert) and icatibant (trade name Firazyr). Recombinant C1-inhibitor (trade name Ruconest) is available as a rare drug for use in patients aged 13 and older, while ecallantide and Lanadelumab have not yet received approval in Korea. While all these medications are effective and safe for use, considering their availability in Korea, Icatibant is prioritized for use in adolescents and children under 12 years old [11]. Icatibant can be used in children aged 2 and older during acute attacks, with dosages based on weight. Icatibant is supplied in pre-filled syringes containing 30 mg in 3 mL, and the dosage is determined based on weight. Detailed recommended dosages are provided in **Table 1**. If Icatibant is unavailable, fresh frozen plasma (FFP) can be administered as an alternative [24,25]. Solvent-detergent-treated plasma is preferred over FFP, but both are considered second-line options [25]. Other available medications for pediatric use, their characteristics, and mechanisms of action are summarized in **Table 1** and **Figure 1**. In case of abdominal attacks, it is crucial to secure intravenous access and adequately replenish fluids. This is important as children are vulnerable to dehydration or hypovolemia, especially during HAE attacks involving leakage into the intestines or abdominal cavity [11].

Similar to adults, preventive measures for attacks are necessary before procedures. Medical, surgical, and dental procedures that can mechanically stimulate the upper airway or gastrointestinal tract fall under this category [28,29]. The primary consideration for preventive treatment is plasma-derived C1-inhibitor, administered at 15–30 units/kg. However, due to limited availability, attenuated androgens, such as danazol, at doses of 2.5–10 mg/kg/day (maximum 600 mg/day), may be considered as an alternative short-term option [20]. Androgens promote the synthesis of C1-INH protein, which is maintained by the expression of the remaining normal C1-related genes in the liver. Danazol is known to have increased efficacy with increasing doses, but individual doses required to prevent worsening of angioedema and maintain normal C1 and C4 levels vary significantly. Hence, it is recommended to adjust the dosage based on the response and side effects after starting the initial dose [27]. Since short-term preventive measures are not completely effective, emergency medications should also be available if needed [11].

Table 1. Treatment options available for HAE patients during pregnancy and breast-feeding

Drug	Route	Children			Pregnancy			Breast-feeding			Comments
		LTP*	STP	On-demand	LTP	STP	On-demand	LTP	STP	On-demand	
pdhC1INH[†]	IV	Y[‡]	Y[‡]	Y[‡]	Y[‡]	Y[‡]	Y[‡]	Y[‡]	Y[‡]	Y[‡]	Long-term prophylaxis requires individualized dosage intervals and doses.
FFP[†]	IV	(Y)	(Y)	(Y)	(Y)	(Y)	(Y)	(Y)	(Y)	(Y)	
AFs[†]	PO	(Y)	N	N	(Y)	N	N	(Y)	N	N	Efficacy is not proven. The suggested tranexamic acid dosage for children is 20–50 mg/kg.
rhC1INH[†]	IV	N	N	N	N	N	N	N	N	N	
AAs[†]	PO	(Y)	(Y)	N	N	N	N	N	N	N	The initial dose of danazol for children is 2.5 mg/kg per day. The advantages should exceed the risks of masculinization, hypogonadism, menstruation irregularities, and behavioral issues.
Icatibant[†]	SC	N	N	Y[‡]	N	N	N	N	N	N	Pediatric dosage is dependent on subjects' body weight: 12 to 25 kg, 10 mg (=1 mL); 26 to 40 kg, 15 mg (=1.5 mL); 41 to 50 kg, 20 mg (=2 mL); 51 to 65 kg, 25 mg (=2.5 mL); 65 kg and over, 30 mg (=3 mL). Isolated case reports of administration during pregnancy without adverse effects have been reported.
Ecallantide	SC	N	N	N	N	N	N	N	N	N	Approved only for adolescents in the US.
Lanadelumab	SC	N	N	N	N	N	N	N	N	N	Approved only for adolescents in the US.
Berotralstat	PO	N	N	N	N	N	N	N	N	N	

Abbreviations: HAE, hereditary angioedema; LTP, long-term prophylaxis; STP, short-term prophylaxis; pdhC1INH, plasma-derived C1-inhibitor; FFP, fresh frozen plasma; Afs, antifibrinolytics; rhC1INH, recombinant human C1 esterase inhibitor; AAs, attenuated androgens; IV, intravenous; SC, subcutaneous; PO, oral; Y, indicated; N, not indicated; (Y), only indicated if other drugs are not available. *This recommendation for LTP is confined to those aged under 12 years–for older children, follow the adult recommendation. [†]Available in Korea. [‡]First choice.

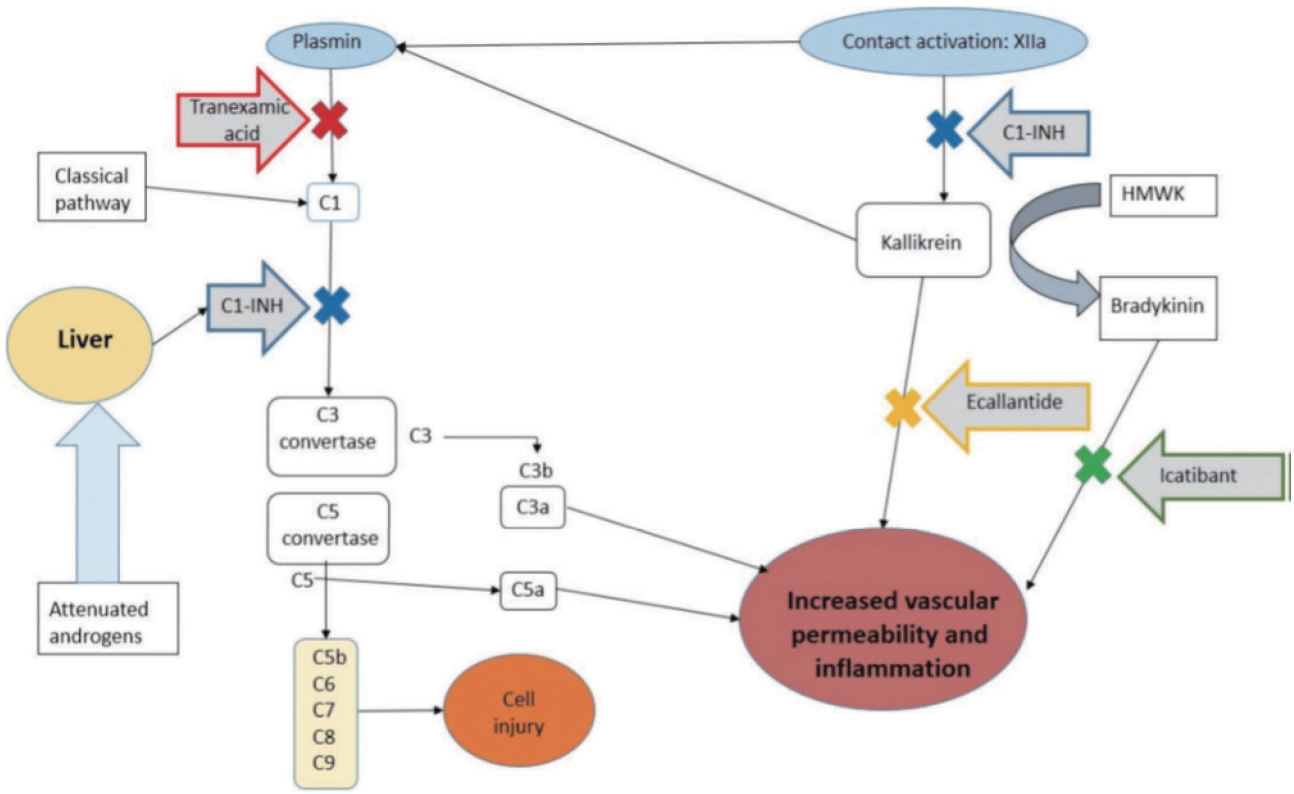

Figure 1. Targets and the action mechanisms of medications prescribed in children for managing their hereditary angioedema exacerbations [27]. Abbreviations: HMWK, high-molecular-weight kininogen.

The indications for long-term prophylactic therapy in adolescents are the same as those in adults [11]. Plasma-derived C1-inhibitor is recommended as the standard treatment for long-term prophylaxis in children under 12 years old, starting at 10–20 units/kg once or twice a week [20]. Subsequent dosing intervals and doses are adjusted based on individual responses to the medication [11]. However, considering the difficulty in obtaining C1-inhibitor in Korea, attenuated androgens or antifibrinolytics can be tried [11,19,20]. Antifibrinolytics inhibit the generation of plasmin, which is involved in the bradykinin pathway, without directly affecting C1-INH or C4 levels. Tranexamic acid is a representative antifibrinolytic, but due to the significant variability in the individual dose required to suppress symptoms, it is started at a low dose (20–50 mg/kg/day, divided into 2 or 3 doses) and adjusted based on the response and risk of side effects thereafter [27]. While using attenuated androgens may seem appropriate due to safety concerns with androgens being male hormones, the evidence supporting the efficacy of antifibrinolytics is still lacking. The safety of epsilon aminocaproic acid, another antifibrinolytic, compared to tranexamic acid is still unclear.

Close monitoring of safety indicators is necessary when administering attenuated androgens. These medications can cause virilization and hypogonadism in boys and menstrual irregularities in girls. They can also cause various behavioral abnormalities and may lead to premature closure of growth plates, potentially resulting in reduced final adult height [11,19,20]. Hence, attenuated androgens are not recommended for long-term prophylactic use in adolescents who have not reached Tanner stage V puberty and in all pediatric patients with HAE. It is important to periodically reassess the necessity of using attenuated androgens for long-term prophylaxis on a case-by-case basis and adjust the dosage and method of administration accordingly. For example, in the case of danazol, a representative attenuated androgen medication, the initial dose in children is

2.5 mg/kg/day, gradually increasing every 2 weeks. The dosage can be adjusted based on symptoms until the maximum recommended or tolerated dose (up to 200 mg once daily) is reached [11.20].

3.4. Considerations for primary prevention and management in pediatric HAE patients

In pediatric patients with type 1/2 HAE, most attacks occur without specific triggers [30], which is similar to adults. Infections are suspected as more common precipitating factors for attacks in children. Since essential vaccinations or recommended immunizations are safe, all should be administered. Preventing infections such as pharyngitis can reduce the frequency of attacks. Medications that can cause swelling as a side effect, such as ACE inhibitors, are not often necessary in children. However, in cases where oral contraceptives are required in children, contraceptive pills containing estrogen should be avoided as they can trigger HAE attacks [11,31]. On the other hand, intense physical activity accompanied by physical trauma or emotional stress, which are considered triggering factors in adults, are core exacerbating factors during childhood and adolescence [32]. However, overly restricting physical activity and lifestyle can be detrimental, so behavioral guidelines should be individualized according to the person's situation. The ultimate goal of managing type 1/2 HAE in all ages is for the patient to enjoy a safe and normal life [20,33].

In this context, providing appropriate information to pediatric patients and their families is essential for them to enjoy a healthy lifestyle and avoid complications [11]. It is important to provide information about this disease in document form to caregivers such as teachers and school nurses who handle children at daycare centers or schools. Among the information provided, management strategies for HAE attacks, including emergency treatment for respiratory attacks, must be included [11,19,20]. Ensuring that Icatibant is always available for emergency use at home, school, or during travel is essential. Guidelines for responding to attacks are needed, and emergency medications required for first aid should be available at home and local hospitals, with effective use of these medications included in the response plan [11]. While standardized forms for response plans are not yet well established, some countries are preparing for emergencies by providing standard forms for response plans from medical societies and having medical personnel describe detailed content for students to carry [34]. Since all HAE patients may potentially receive blood transfusions, it is advisable to administer hepatitis A and hepatitis B vaccinations if not already completed. Influenza vaccines and other essential vaccinations should also be administered if not yet completed. There are currently no recommendations regarding the COVID-19 vaccine, but based on reports targeting non-pregnant adult patients, many people were able to receive vaccinations well without short-term prophylactic therapy. Although some people experienced severe swelling as a side effect, they were able to manage acute exacerbations adaptively [35]. Based on these reports, it is recommended to proceed with the COVID-19 vaccination without short-term prophylactic therapy, and immediate response to acute exacerbations if necessary is recommended.

4. Pregnancy and breastfeeding in HAE

4.1. Clinical course of HAE during pregnancy and lactation

Anatomical, physiological, and hormonal changes during pregnancy can affect the symptoms of HAE and may impact the clinical course and treatment. Pregnancy can either alleviate or exacerbate the activity of HAE, or it may have no effect, and rarely, symptoms of angioedema may first appear during pregnancy. While the frequency of attacks observed during previous pregnancies can provide an estimate for the frequency of occurrence in subsequent pregnancies, accurate predictions are difficult [5,36-38]. Pregnant women with HAE require thorough and meticulous monitoring by specialists, and adjustment through close cooperation with experts in relevant fields is necessary. Labor and delivery rarely trigger attacks, but they can occur during

childbirth or within 48 hours postpartum, necessitating at least 72 hours of intensive observation even after uncomplicated vaginal delivery. Breastfeeding may be associated with an increase in attack frequency, such as abdominal symptoms or facial swelling, but breastfeeding is recommended based on the benefits of breastfeeding for the newborn [4,25]. In the case of cesarean section, especially when endotracheal intubation is required, it should be performed similarly to procedures performed on HAE patients described in the following sections.

4.2. Diagnosis of HAE during pregnancy

Due to an increase in plasma volume, plasma levels of C1-INH may decrease during pregnancy even in healthy women without HAE, and return to normal after delivery [39,40]. Therefore, measuring C1-INH, C1-INH activity, and C4 levels to diagnose type 1/2 HAE during pregnancy requires significant caution, and repeating tests after childbirth may be helpful for confirmation if HAE is suspected [4,25].

4.3. Treatment of HAE in pregnant and lactating women

C1-inhibitor (C1-INH) is recommended as first-line therapy for pregnant or lactating women with HAE due to its safety and high efficacy [11]. During pregnancy, medications such as Ecallantide, Lanadelumab, and Berotralstat are not indicated and have not been recommended as there have been no reported cases of their use to date. Although the use of Icatibant during pregnancy is contraindicated based on prescribing information, cases of its use during pregnancy have been reported without adverse effects on the mother or fetus [41-43]. If C1-INH is unavailable, fresh frozen plasma (FFP) may be considered as an alternative [5,36,37,44-46].

Prophylactic use of C1-INH is recommended before procedures that carry a risk of acute attacks during pregnancy, such as amniocentesis, cordocentesis, and termination of pregnancy surgery [4,11,25]. If prophylactic treatment is not administered before the procedure, immediate administration of C1-INH during the procedure is necessary, and if an attack occurs, it should be administered immediately. If managing acute attacks of HAE is difficult, it is advisable to give birth in a hospital where measures can be taken.

Although physical trauma or stress is known to trigger attacks, vascular swelling during labor or delivery is rare [5,25]. Therefore, while prophylactic treatment is not necessary for an uncomplicated vaginal delivery without complications, immediate administration of C1-INH concentrate should be available upon symptom onset. For patients who frequently experience swelling symptoms during the third trimester of pregnancy or have a history of genital swelling due to traumatic delivery or instrumental delivery [11,45-47], prophylactic administration of C1-INH concentrate before analgesia and delivery is recommended [11,37,44].

Preventive treatment may also be considered during pregnancy, especially for patients who have experienced an increase in the frequency of vascular swelling attacks during pregnancy. In such cases, plasma-derived C1-INH is recommended as a safe and effective preventive therapy [37]. Fibrinolytic inhibitors may be considered when C1-INH is not available, although their efficacy has not been proven [4,11,25]. Androgens are contraindicated during pregnancy because they pass through the placenta and can cause virilization of female fetuses, placental insufficiency, and fetal growth restriction. Androgen therapy must be discontinued before breastfeeding [48,49], as breastfeeding itself may reduce the frequency of attacks [37].

Plasma-derived C1-INH is recommended as the optimal treatment for symptomatic treatment, short-term prevention, and long-term prevention during lactation [11]. Androgens and fibrinolytic inhibitors are secreted in breast milk, but tranexamic acid has been shown to be safe during breastfeeding unlike androgens [50]. **Table 1** summarizes the types of medications that can be used during pregnancy and lactation [4,11].

4.4. Considerations for the management of pregnancy and childbirth in HAE patients

Type 1/2 HAE, although rare, can have a profound impact on the quality of life for patients and their families due to its unpredictable nature and potential lethality. Given the possibility of increased severity and acute exacerbation of HAE during pregnancy, systematic monitoring and maintenance therapy, as well as planning for acute symptoms, are paramount [4].

Expectant mothers diagnosed with type 1/2 HAE should receive management from healthcare professionals with sufficient knowledge, expertise, and experience in HAE. If diagnosed during pregnancy or with pre-existing HAE, it is essential to inform the obstetrician/gynecologist about the condition so that plans for short-term preventive treatment for acute attacks that may occur during surgery or procedures can be made in advance. Additionally, if long-term preventive therapy for pre-existing HAE is being conducted, consultation with the responsible specialist may be necessary to adjust medications, especially if taking drugs like attenuated androgens may be challenging to maintain during pregnancy. Moreover, caution is warranted regarding estrogen-containing oral contraceptives and estrogen hormone replacement therapy in relation to pregnancy planning, as they may exacerbate symptoms. Progesterone-only therapy for hormonal contraception may be beneficial for women with type 1/2 HAE [31,51].

Similar to general HAE patients, providing appropriate information about the condition and emergency response guidelines to patients and their families is essential for maintaining a normal life and preventing complications. Patients should have guidelines and medications for managing acute HAE attacks at home, and they should confirm and request emergency medications to be stocked by local emergency medical facilities.

5. Conclusion

Type 1/2 HAE, while rare, can significantly impact the quality of life and, if diagnosis is delayed, may lead to fatal outcomes. Although South Korea has a lower prevalence compared to Western countries, the difficulty in diagnosis suggests the possibility of undiagnosed patients, emphasizing the importance of early detection and appropriate treatment efforts. This statement hopes to contribute to such diagnosis and treatment efforts and further advocates for the domestic introduction of essential medications for optimal treatment of pediatric, pregnant, and lactating patients, who currently have a narrower range of treatment options.

Disclosure statement

The authors declare no conflict of interest.

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The Effect of Situational Simulation Education Teaching Mode on Clinical Obstetrics and Gynecology Specialty Teaching: A Comparative Study

Feifei Liu[1], Lili Zhang[2]*

[1]Department of Obstetrics, Shaanxi Provincial People's Hospital, Xi'an 710000, China
[2]Health Checkup Center, Shaanxi Provincial People's Hospital, Xi'an 710000, China

***Corresponding author:** Lili Zhang, 782377048@qq.com

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Abstract: *Objective:* To explore the effectiveness of applying the situational simulation education teaching mode in clinical gynecology and obstetrics specialty education. *Methods:* Seventy personnel specializing in clinical gynecology and obstetrics at Shaanxi Provincial People's Hospital between June and October 2023 were selected and randomly divided into a control group and a research group, with 35 personnel in each. The control group underwent traditional teaching methods, while the research group received instruction through the situational simulation education teaching mode. The study then compared the satisfaction levels of the two groups regarding the teaching methods, as well as their scores on theoretical and practical examinations. *Results:* Following the teaching sessions, the research group exhibited a teaching satisfaction rate of 94.29%, significantly higher than that of the control group ($P < 0.05$). Moreover, when comparing the scores of theoretical and practical examinations, the research group outperformed the control group, with statistical significance ($P < 0.05$). *Conclusion:* The implementation of situational simulation education teaching mode in clinical gynecology and obstetrics significantly enhances the satisfaction levels of professional personnel and improves their theoretical knowledge and clinical operational skills.

Keywords: Situational simulation teaching mode; Clinical obstetrics and gynecology specialty teaching; Effect

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1. Introduction

Situational simulation education is an emerging teaching method, distinct from traditional teaching modes, with the unique advantage of allowing students to learn and practice in a near-real medical environment by simulating actual clinical scenarios. Due to this characteristic, it has garnered significant attention from the educational community. This teaching approach not only enhances students' clinical thinking abilities and operation skills but also effectively mitigates the risks associated with novices directly intervening in real

clinical operations [1-3].

In light of these advantages, this study selected 70 clinical gynecology and obstetrics professionals to investigate the application effects of situational simulation education in clinical obstetrics and gynecology teaching.

2. General information and methods

2.1. General information

A total of 70 clinical obstetrics and gynecology professionals, all of whom were female, were selected from Shaanxi Provincial People's Hospital during the period from June to October 2023. These personnel were divided into a control group and a research group using the randomized numerical table method, with 35 individuals in each group. The age range of the control group was 22–35 years, with a mean age of 28.12 ± 4.21 years, while the age range of the research group was 21–34 years, with a mean age of 27.65 ± 4.09 years. Statistical analysis revealed no significant differences between the two groups in terms of age, gender, or other general information ($P > 0.05$).

2.2. Methods

2.2.1. Control group

In the control group, the traditional teaching mode was implemented, consisting of classroom lectures, textbook learning, and standard clinical internships. The focus of this mode was on imparting theoretical knowledge and basic operational skills. Members of the control group practiced basic clinical operations by listening to lectures, reading textbooks, and under the guidance of teachers. They completed designated course content and clinical skill operations under the direct supervision of clinical teachers.

2.2.2. Research group

The members of the research group adopted a situational simulation education teaching mode for clinical obstetrics and gynecology.

(1) Scenarios are created to stimulate the interest of study group members in learning. Clinical obstetrics and gynecology involve considerable theoretical knowledge, some of which can be abstract. Using scenarios helps research group members to learn and remember deeply. For instance, simulating an emergency delivery of a pregnant woman requires students to apply theoretical knowledge to assess the woman's condition and decide the best delivery method. This process reinforces theoretical knowledge of prenatal examination and the application of delivery techniques in emergencies [4,5].

(2) Role-playing allows students to practice real-world knowledge. During role-playing sessions, students take on specific roles, such as practicing physicians, and engage in scenarios based on actual cases under mentor guidance. This exercise requires research group members to apply theoretical knowledge of obstetrics and gynecology diseases, such as diagnostic criteria and treatment principles of pre-eclampsia, to communicate and collaborate effectively with patients or other healthcare professionals, deepening their understanding and application of theoretical knowledge [6-8].

(3) Group discussions are conducted to address challenging problems in clinical obstetrics and gynecology specialties. Students are divided into small groups to discuss specific obstetrics and gynecology issues, such as management strategies for hypertensive disorders of pregnancy. Each group deliberates and proposes solutions using the latest clinical guidelines and research literature.

(4) Relevant scenarios are simulated to assess personnel and enhance their resilience. Specific simulated

assessments, such as scenarios involving obstetric hemorrhage management or emergency cesarean section, test students' theoretical knowledge and practical operation abilities. In these simulations, students must comprehensively apply their learned theoretical knowledge and skills to make rapid and accurate clinical judgments and operations, thereby improving their resilience in real clinical environments [9-12].

2.3. Observation indicators

The observation indexes of this study include teaching satisfaction and scores on theoretical and operational examinations. Teaching satisfaction is categorized into three levels: "very satisfied," "satisfied," and "dissatisfied." "Very satisfied" indicates full recognition of the teaching content, method, and effectiveness; "satisfied" denotes basic approval of the teaching arrangement, with some suggestions for improvement; "dissatisfied" suggests varying degrees of dissatisfaction with the teaching process or outcome. "Satisfactory rate" includes those who are "very satisfied" and "satisfied." The scores on theoretical and operational examinations are assessed based on students' actual examination results, providing a tangible reflection of their mastery of course knowledge and skills.

2.4. Statistical methods

Statistical analysis of the research data was conducted using SPSS 21.0 software. For continuous data, the *t*-test was employed to compare differences between the two groups. For categorical data, such as teaching satisfaction, the chi-squared test was utilized to analyze differences between the groups, with significance determined when the *P*-value was less than 0.05.

3. Results

3.1. Comparison of the teaching satisfaction

Comparing the teaching satisfaction of the two groups, the total satisfaction of the research group was 94.29%, which was significantly higher than the 71.43% of the control group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of teaching satisfaction between the two groups [*n* (%)]

Group (*n*)	Very satisfied	Satisfied	Dissatisfied	Satisfactory rate
Control group (35)	7	18	10	25 (71.43)
Research group (35)	10	23	2	33 (94.29)
χ^2				6.437
P				0.011

3.2. Comparison of theory and operational examination scores

In terms of theory and operational examination scores, there was no significant difference between the scores of the two groups before teaching. However, after teaching, the scores of the research group were higher than those of the control group ($P < 0.05$; **Table 2**).

Table 2. Comparison of theoretical and operational examination scores between the two groups (mean ± standard deviation, points)

Group (*n*)	Theoretical examination score		Operational examination score	
	Before teaching	After teaching	Before teaching	After teaching
Control group (35)	74.28 ± 3.54	78.65 ± 4.17	74.18 ± 2.87	83.23 ± 2.91
Research group (35)	73.67 ± 3.92	89.54 ± 4.21	74.21 ± 2.71	94.12 ± 3.43
t	0.683	10.872	0.045	14.323
P	0.497	0.000	0.964	0.000

4. Discussion

Clinical obstetrics and gynecology is a crucial branch of the medical field, focusing on women's reproductive health and providing medical services during pregnancy, childbirth, and the postpartum period. This specialty demands personnel with solid theoretical knowledge and superb clinical skills to ensure the health and safety of both mothers and infants [13-15].

Situational simulation education teaching mode is an innovative teaching method primarily involving the simulation of real clinical environments and medical scenarios. This approach enables related professionals to learn and train in settings closely resembling actual clinical practice. Compared to traditional single-type narration, situational simulation turns abstract theoretical knowledge into tangible scenarios, thereby stimulating personnel's interest in learning. Particularly, when students realize they can apply theoretical knowledge to solve problems in simulated clinical environments, their motivation to learn significantly increases [16]. Additionally, by simulating real medical scenarios, this method offers numerous practice opportunities for professionals to hone basic clinical operation skills in real-life situations. It also equips them to make decisions and respond to complexity or emergencies, deepening their understanding and application of obstetrics and gynecology professional knowledge in practice [17-19]. Moreover, this teaching mode enhances the teamwork abilities of clinical obstetrics and gynecology professionals. During scenario simulation, relevant professionals collaborate with team members to solve problems, fostering communication and coordination skills crucial for future teamwork in real clinical environments [20].

In line with the research presented in this paper, the teaching satisfaction of the research group using situational simulation education was 94.29%, significantly higher than that of the control group employing traditional teaching methods, which was 71.43% ($P < 0.05$). Before the teaching intervention, there was no significant difference in the theoretical and operative examination scores between the two groups ($P > 0.05$). However, after the teaching, a noticeable disparity emerged in the theory and operation test scores between the two groups, with the research group outperforming the control group ($P < 0.05$).

In conclusion, the situational simulation education teaching mode significantly enhanced the teaching satisfaction and practical operation ability of clinical obstetrics and gynecology professionals, underscoring its important value and potential application in medical education.

Disclosure statement

The authors declare no conflict of interest.

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Analysis of the Effects and Incidence of Adverse Reactions of Hormone Replacement Therapy for Perimenopausal Syndrome

Yu Cai*

Haimen District Traditional Chinese Medicine Hospital, Nantong 226100, China

***Corresponding author:** Yu Cai, cy37677883@sina.com

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Abstract: *Objective:* To introduce hormone replacement therapy for patients with perimenopausal syndrome and observe its clinical application effect. *Methods:* Patients with perimenopausal syndrome were the subjects of this study, with a total of 110 participants clinically admitted from January 2022 to December 2023. Upon enrollment, patients were divided into groups based on differences in treatment modes. The observation group ($n = 55$) received routine health care combined with hormone replacement therapy, while the control group ($n = 55$) received only routine health care treatment. Evaluation criteria included psychological state, symptom scores, improvement in hormone levels, and the incidence of adverse reactions. The clinical effects of different treatment options were compared. *Results:* Post-treatment, scores of the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) in the observation group were significantly lower than those in the control group ($P < 0.05$). Additionally, the female menopausal syndrome self-diagnosis assessment scale (Kupperman) score was 12.31 ± 1.25 points in the observation group compared to 15.22 ± 1.84 points in the control group ($t = 9.7018$, $P < 0.05$). Furthermore, levels of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) were lower in the observation group than in the control group, while estradiol (E2) and progesterone levels were higher in the observation group than in the control group ($P < 0.05$). There was no statistically significant difference in the total incidence of adverse reactions between the observation and control groups ($P > 0.05$). *Conclusion:* The application of hormone replacement therapy in Chinese medicine can improve patients' mental state, alleviate clinical symptoms, and restore hormone levels. This treatment modality is deemed safe with minimal adverse reactions, thus offering positive value.

Keywords: Hormone replacement therapy; Perimenopausal syndrome; Incidence of adverse reactions

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1. Introduction

Perimenopausal syndrome, also known as "menopausal syndrome," encompasses a range of nervous system dysfunctions accompanied by physical and psychological symptoms. It primarily manifests in women before and after menopause, characterized clinically by fluctuations and abnormalities in sex hormones. Menopause constitutes an inevitable natural physiological stage in women's life development, marked by changes in total

menstrual volume, cycle irregularities, and ovarian function alterations, leading to hormonal imbalances and subsequent clinical symptoms such as metabolic disorders and fatigue. Moreover, the physiological changes and clinical symptoms in women during this period exacerbate psychological problems and emotional disorders [1].

Currently, clinical treatment of perimenopausal syndrome primarily involves a combination of conventional healthcare and hormone supplementation. Conventional healthcare predominantly addresses the psychological and physiological needs of patients, while hormone supplementation therapy focuses on selecting drugs based on individual physiological requirements. Motivated by this context, this research embarked on a controlled trial, designed to introduce a hormone replacement treatment regimen, and assessed its practical efficacy in patients with perimenopausal syndrome. This study encompassed 110 cases admitted between January 2022 to December 2023, aiming to contribute valuable insights into the management of this condition.

2. Materials and methods

2.1. General information

The study spanned from January 2022 to December 2023, during which a total of 110 patients diagnosed with perimenopausal syndrome were screened as observation subjects. Upon enrollment, patients were categorized into two groups based on distinct treatment modalities: the observation group and the control group, each comprising 55 cases. The former received routine health care combined with hormone replacement therapy, while the latter underwent routine health care treatment. In the observation group, patients' ages ranged from 44 to 55 years, with an average of 48.72±2.49 years. The duration of the disease varied from 1 to 5 years, with an average of 3.02±0.49 years, and the body mass index ranged from 21.5 to 28.6 kg/m^2, with an average of 24.64±2.52 kg/m^2. Similarly, in the control group, patients' ages ranged from 44 to 56 years, with an average of 48.85±2.64 years. The disease duration ranged from 1 to 4.5 years, with an average of 3.06±0.38 years, and the body mass index ranged from 21.0 to 28.5 kg/m^2, with an average of 24.56±2.57 kg/m^2. The collected data underwent uniform analysis using information technology (SPSS 22.0 system), with statistical significance found to be $P > 0.05$, indicating the data were comparable. Approval for the study was granted by the local ethics committee, with approval number 20210215.

2.2. Inclusion and exclusion criteria

Inclusion criteria:

(1) Complete collection of all clinical data without any omissions.
(2) Patients presenting with typical symptoms of perimenopausal syndrome (such as insomnia, palpitations, irritability, hot flashes, and sweating), confirmed through physical examination and symptom evaluation.
(3) Absence of allergies or contraindications to the drugs involved in the study.
(4) Understanding of the entire study process, voluntary participation, and good compliance.

Exclusion criteria:

(1) Presence of serious underlying diseases or other complications, such as hyperthyroidism.
(2) Presence of severe organ failure, such as heart, liver, or kidney conditions.
(3) Presence of cognitive or communication impairments.
(4) Inability to fully cooperate in completing the research due to other reasons.

2.3. Method

The control group received routine health care treatment, which involved assessing the patient's mental state, conducting psychological adjustments, and guiding the patient in techniques such as deep breathing and muscle

relaxation to alleviate psychological stress. Additionally, patients were advised to adopt a healthy lifestyle and diet, including regular exercise and avoiding spicy, irritating, and greasy foods.

In addition to routine health care treatment, the observation group also underwent hormone replacement therapy, specifically taking orally administered estrogen tablets (Wyeth Medica Ireland, National Drug Approval No. J20050120) at a dosage of 0.625 mg once daily for a duration of 1 month.

2.4. Observation indicators

(1) Mental state: Mental state assessment was conducted before and after treatment (initial review at the end of treatment) using the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) [2]. Each scale comprises 20 assessment items, with SAS and SDS having score cut-off values of 50 and 53 points, respectively. Higher scores indicate more severe psychological anxiety and depression.

(2) Symptom score: Symptom evaluation, measured concurrently with mental state assessment, utilized the Kupperman scale [3]. This scale assesses 12 symptoms including anxiety, fatigue, and insomnia, with scores ranging from 0 to 51. Elevated scores indicate more pronounced symptoms.

(3) Hormone levels: Hormone levels were measured simultaneously with the above indicators using a fully automatic biochemical analyzer (Cobas C312, Roche, Switzerland). Fasting venous blood samples were collected for analysis, with detection items including follicle-stimulating hormone (FSH), estradiol (E2), progesterone (P), and luteinizing hormone (LH).

(4) Incidence rate of adverse reactions: Throughout the treatment period, patients were followed up and observed for adverse reactions, with the types and number of reactions (e.g., gastrointestinal reactions, dizziness) recorded. The total incidence rate was calculated.

2.5. Statistical analysis

Statistical analysis was conducted independently using computer processing and inputting research data into the SPSS 20.0 system. Counting data were statistically analyzed with chi-squared tests and expressed as %, while measurement data conforming to normal distribution were analyzed with *t*-tests and expressed as mean ± standard deviation (SD). Statistical significance was determined as $P < 0.05$, indicating the presence of a statistical difference.

3. Results

3.1. Mental state

Table 1 shows that the SAS and SDS scores of the observation group were lower than those of the control group after treatment ($P < 0.05$).

Table 1. Psychological state analysis (mean ± SD, points)

Group	SAS		SDS	
	Before treatment	**After treatment**	**Before treatment**	**After treatment**
Observation group (n = 55)	57.45 ± 3.56	38.42 ± 2.18*	60.24 ± 4.58	37.54 ± 3.27*
Control group (n = 55)	57.37 ± 3.74	40.24 ± 2.86*	60.37 ± 4.55	40.66 ± 3.73*
t	0.1149	3.7533	0.1493	4.6646
P	0.9087	0.0003	0.8816	0.0000

Note: Compared with this group before treatment, * P <0.05.

3.2. Symptom score

Post-treatment, the Kupperman score of the observation group was lower than that of the control group (P <0.05), as shown in **Table 2**.

Table 2. Symptom score assessment (mean ± SD, points)

Group	Kupperman		*t*	*P*
	Before treatment	After treatment		
Observation group (n = 55)	2 5.52 ± 3.84	12.31 ± 1.25	24.2595	0.0000
Control group (n = 55)	2 5.58 ± 3.82	15.22 ± 1.84	18.1205	0.0000
t	0.0821	9.7018	-	-
P	0.9347	0.0000	-	-

3.3. Hormone levels

Table 3 shows that after treatment, the FSH and LH levels of the observation group were lower than those of the control group, while the E2 and P levels were higher than those of the control group (P < 0.05).

Table 3. Hormone level assessment (mean ± SD)

Group	FSH (U/L)		E2 (mmol/L)	
	Before treatment	After treatment	Before treatment	After treatment
Observation group (n = 55)	24.23 ± 6.85	12.17 ± 4.41*	80. 84 ± 10.48	124.54 ± 13.07*
Control group (n = 55)	24.35 ± 6.91	16.04 ± 5.26*	80.87 ±10.45	103.66 ± 11.73*
t	0.0914	4.1812	0.0150	8.8174
P	0.9273	0.0001	0.9880	0.0000
Group	**P (pmol/L)**		**LH (U/L)**	
	Before treatment	**After treatment**	**Before treatment**	**After treatment**
Observation group (n = 55)	2.62 ± 0.48	3.97 ± 0.62*	16.57 ± 3.53	11.62 ± 2.12*
Control group (n = 55)	2.59 ± 0.44	3.12 ± 0.55*	16.64 ± 3.49	13.24 ± 2.61*
t	0.3416	7.6059	0.1045	3.5864
P	0.7333	0.0000	0.9169	0.0005

Note: Compared with this group before treatment, * P <0.05.

3.4. Incidence of adverse reactions

Table 4 shows that there were no statistically significant differences between the two groups when comparing the total incidence of adverse reactions (P > 0.05).

Table 4. Adverse reaction incidence statistics [n (%)]

Group	Gastrointestinal reactions	Dizziness	Overall incidence
Observation group (n = 55)	1 (1.81)	1 (1.81)	2 (3.63)
Control group (n = 55)	0	0	0
χ^2	-	-	2.0370
P	-	-	0.1535

4. Discussion

The pathological mechanism of perimenopausal syndrome is relatively complex, primarily stemming from hypothalamic-pituitary dysfunction triggered by ovarian dysfunction and declining serum hormone levels. This condition manifests in symptoms such as fatigue, hot flashes, and metabolic disorders, while also impacting the patient's psychological and emotional state due to prolonged estrogen level imbalances and physiological dysfunction, resulting in a detrimental cycle. Current clinical treatment for perimenopausal syndrome relies on conventional healthcare interventions, including psychological counseling, dietary control, and lifestyle guidance. While these measures offer some relief, they often fall short of providing an optimal outcome, necessitating the exploration of more effective and safer treatment modalities [4].

In recent years, hormone replacement therapy has emerged as a promising approach in the clinical management of perimenopausal syndrome, yielding favorable outcomes [5]. This therapy aims to alleviate menopausal symptoms by supplementing estrogen, progesterone, and other hormones in perimenopausal women with estrogen deficiency. By enhancing estrogen levels, hormone replacement therapy effectively mitigates symptoms associated with ovarian function decline and corrects related manifestations stemming from insufficient estrogen secretion and other factors. Consequently, it reduces patients' anxiety, depression, and other negative emotions while promoting their recovery [6]. Among the options for hormone replacement therapy, estrogen tablets, predominantly composed of conjugated estrogen extracted from pregnant horse urine, are commonly used due to their efficacy and safety profile [7].

In this study, the observation group received combined hormone replacement therapy alongside routine healthcare treatment, with estrogen tablets as the therapeutic agent. This combined approach facilitated psychological counseling, dietary modifications, and lifestyle interventions to enhance patients' overall well-being and foster healthier habits [8]. Concurrently, hormone replacement therapy regulated serum hormone levels, alleviated clinical menopausal symptoms, and effectively managed patients' conditions, thereby positively impacting their psychological state and prognosis. Notably, the therapeutic ingredients of hormone replacement therapy demonstrated a low incidence of adverse reactions, enhancing patient comfort and acceptance while achieving superior clinical efficacy [9].

A study by Lu involving 96 perimenopausal syndrome patients further supports the effectiveness and safety of hormone replacement therapy [10]. The data showed that 48 patients in the research group received additional treatment based on routine health care. After hormone replacement therapy, the Kupperman score after treatment was 12.81±3.15 points, and the incidence of adverse reactions was 4.17%. The 48 patients in the control group only received conventional healthcare treatment, and the Kupperman score after treatment was 15.06±3.46 points, and no adverse reactions occurred. It illustrates the effectiveness and safety of hormone replacement therapy for patients. The conclusion is similar to this study.

In conclusion, for patients with perimenopausal syndrome, combining routine healthcare with hormone replacement therapy offers an effective strategy to alleviate negative emotions, manage the condition, and improve hormone levels with minimal risk of adverse reactions. This approach holds significant clinical value and warrants consideration and application in clinical practice.

Disclosure statement

The author declares no conflict of interest.

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Study on the Diagnostic Effect of Serum Tumor Marker Detection on Benign and Malignant Pelvic Tumors

Juan Yu*

Dongxihu People's Hospital of Wuhan, Wuhan 430040, China

***Corresponding author:** Juan Yu, yujuan200248@163.com

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Abstract: *Objective:* To analyze the diagnostic effect of serum tumor marker detection for benign and malignant pelvic tumors. *Methods:* A total of 90 subjects, including healthy individuals and patients with benign and malignant pelvic tumors, were selected for research from April 2021 to July 2022. Two milliliters of venous blood were drawn on an empty stomach in the early morning. The serum was separated and processed within 2 hours, and then microparticle chemiluminescence was used to detect various serum tumor markers, including carcinoembryonic antigen (CEA), alpha-fetoprotein (AFP), carbohydrate antigen 125 (CA- 125), and carbohydrate antigen 19-9 (CA19-9). *Results:* Through testing of the observation and control groups, it was found that patients with pelvic tumors had significantly higher CA-125 and CA19-9 ($P < 0.05$). Additionally, CA-125 and CA19-9 in patients with malignant tumors were significantly higher than those in benign patients ($P < 0.05$). The correlation between CEA and AFP and pelvic tumor is low, while CA-125 and CA19-93 are positively correlated with the severity of the disease. *Conclusion:* Multiple serum tumor marker detection demonstrated a higher value for diagnosing benign and malignant pelvic tumors and can improve the sensitivity and specificity of single marker detection. Analysis of CA-125 and CA19-9 levels accurately distinguishes between benign and malignant pelvic tumors, as well as provides data support for clinical treatment.

Keywords: Pelvic benign and malignant tumors; Serum tumor markers; Diagnostic effect

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1. Introduction

Pelvic benign and malignant tumors encompass a group of tumors affecting various organs such as the ovary, uterus, cervix, and others. Their occurrence and progression entail intricate biological processes and involve multiple anatomical structures. Based on their nature, pelvic tumors are categorized into two types: benign and malignant. Benign tumors typically exhibit non-invasive characteristics and pose relatively lower threats to the patient's life. However, they may still induce symptoms, and functional impairment, and carry a risk of malignant transformation. Common examples include ovarian cysts and uterine fibroids. In contrast, malignant tumors are highly invasive and metastatic, posing significant threats to both survival rate and quality of life.

Examples include ovarian cancer, cervical cancer, and endometrial cancer.

Benign tumors usually arise from abnormal proliferation of normal cells, exhibiting slow growth with well-defined borders [1]. Conversely, malignant tumors often stem from genetic mutations, leading to uncontrolled cell division and invasiveness. The pathogenesis involves various factors such as genetics, environment, and hormones, adding complexity to clinical treatment. However, the symptoms of both benign and malignant tumors are typically mild in the early stages of the disease, lacking typical manifestations. Clinical presentations may include pelvic pain, abnormal vaginal bleeding, and frequent urination, which may not prompt immediate concern from patients. Therefore, early diagnosis becomes imperative to enhance treatment success rates.

Serum tumor markers represent biomolecules measured in patients' bodily fluids, and alterations in their presence or levels can indicate the presence of tumors [2]. This study primarily investigates the diagnostic efficacy of serum tumor marker detection for benign and malignant pelvic tumors. To achieve this, a total of 90 subjects, including healthy individuals and those with benign and malignant pelvic tumors, were selected for research between April 2021 and July 2022.

2. Materials and methods

2.1. General information

The study was conducted between April 2021 and July 2022, encompassing a total of 90 patients. Among these, 40 were healthy subjects, and 50 had pelvic tumors, comprising 31 benign cases and 19 malignant cases. The control group (healthy subjects) underwent routine physical examinations, aged between 24 and 72 years old, with an average age of 45.93 ± 4.22 years old. The observation group (pelvic tumor patients) ranged in age from 25 to 71 years, with an average age of 45.06 ± 4.37 years. Inclusion criteria were as follows: (1) Consent provided by all participants; (2) Availability of complete clinical data and relatively accurate ultrasound and pathological examination results; (3) Diagnosis of patients in the observation group confirmed through comprehensive methods such as clinical imaging. Exclusion criteria included: (1) Coexistence with other malignant tumors; (2) Presence of multiple organ dysfunction; (3) Patients with mental disorders impeding independent communication; (4) Instability of condition among patients in the observation group.

2.2. Methods

All participants provided 2 mL of venous blood in the early morning on an empty stomach, with serum separated within 2 hours. Microparticle chemiluminescence was employed to detect various serum tumor markers, including carcinoembryonic antigen (CEA), alpha-fetoprotein (AFP), carbohydrate antigen 125 (CA-125), and carbohydrate antigen 19-9 (CA19-9).

2.3. Observation indicators

(1) Analysis of differences in serum tumor markers between healthy individuals undergoing physical examinations and patients with pelvic tumors.
(2) Analysis of various serum tumor markers in malignant and benign patients.
(3) Observation of the relationship between various serum tumor markers and diseases.

2.4. Statistical analysis

Data analysis was performed using SPSS 23.0 software. Differences between groups were compared using *t*-tests and χ^2 tests, with *P*-values analyzed to explore intergroup differences. A *P*-value of < 0.05 was considered statistically significant.

3. Results

3.1. Serum tumor marker levels of both groups

Table 1 shows that patients with pelvic tumors had significantly higher CA-125 and CA19-9 levels ($P < 0.05$).

Table 1. Serum tumor marker levels of both groups

Group	CEA (ng/mL)	AFP (ng/mL)	CA-125 (U/mL)	CA19-9 (U/mL)
Observation group ($n = 50$)	1.76 ± 0.62	3.42 ± 0.35	237.44 ± 40.31	106.53 ± 41.99
Control group ($n = 40$)	1.52 ± 0.64	3.31 ± 0.32	14.18 ± 1.14	12.01 ± 1.14
t	1.799	1.539	34.978	14.216
P	> 0.05	> 0.05	< 0.05	< 0.05

3.2. Serum tumor marker levels in patients with malignant and benign tumors

As shown in **Table 2**, CA-125 and CA19-9 in patients with malignant tumors were significantly higher than those in benign patients ($P < 0.05$).

Table 2. Serum tumor marker levels in patients with malignant and benign tumors

Group	CEA (ng/mL)	AFP (ng/mL)	CA-125 (U/mL)	CA19-9 (U/mL)
Malignant patients ($n = 19$)	1.81 ± 0.70	3.45 ± 0.37	421.57 ± 60.26	159.62 ± 50.88
Benign patients ($n = 31$)	1.62 ± 0.58	3.39 ± 0.33	59.88 ± 20.11	48.92 ± 16.71
t	1.039	0.596	34.978	11.227
P	> 0.05	> 0.05	< 0.05	< 0.05

3.3. Relationship between serum tumor marker levels and disease conditions

Research has concluded that CEA and AFP have a low correlation with benign and malignant diseases, while CA-125 and CA19-93 positively correlate with the disease – higher levels of CA-125 and CA19-93 indicate a more severe disease (**Table 3**).

Table 3. Correlation analysis of serum tumor marker levels

Indicator	γ	*P*
CEA	0.071	> 0.05
AFP	0.014	> 0.05
CA-125	0.826	< 0.05
CA19-9	0.875	< 0.05

4. Discussion

Pelvic gynecological tumors can be categorized as benign or malignant, with the most common malignancies including ovarian cancer, cervical cancer, and endometrial cancer, which pose significant threats to female patients' lives. Therefore, adhering to the principles of early diagnosis and treatment is imperative to effectively control disease progression, enhance patient prognosis, and extend survival time. While benign pelvic tumors may not have as severe impacts on women's daily lives, they still hold potential health implications and carry a risk of malignant transformation if left untreated. Consequently, clinical research efforts focus on distinguishing

between benign and malignant pelvic tumors to provide a scientific foundation for clinical interventions [3].

Tumor markers, synthesized by tumor cell gene expression during tumor occurrence and proliferation, serve as active substances reflecting tumor presence and growth. These markers, which can be proteins, carbohydrates, nucleic acids, etc., originate from either tumor cells themselves or as responses to the tumor growth environment. Clinical practice encompasses various types of serum tumor markers, categorized by properties and sources such as protein markers and carbohydrate markers [4]. In this study, CEA, AFP, CA-125, and CA19-9 were selected for observation.

CA-125, a high molecular weight glycoprotein, primarily originates from embryonic cells and ovarian epithelial cells, with significantly increased production in ovarian cancer lesions. However, it is noteworthy that CA-125 detection alone is not specific to ovarian cells and may be detected in tissues and diseases beyond the pelvic cavity, including endometriosis, uterine fibroids, and breast cancer [5]. Yet, elevated levels of CA-125 are often related to the extent and progression of pelvic tumors. CA19-9, a glycoprotein antigen composed of polysaccharide chains and protein parts [6], originates from various tissues such as the pancreas, stomach, large intestine, uterus, etc., and involves cell-cell adhesion and antibody-mediated immune response in the body. CA19-9 flows into the blood in large quantities and increases abnormally in the presence of tumor cells, and its level is positively correlated with the disease development and malignancy degree. AFP is a protein produced in the placenta and liver during fetal life [7]. Clinical studies found that the level of AFP is normally low in healthy adults and is commonly present in liver cells [8]. It has a high value for cancer detection, and the increase in its level is closely related to the existence and severity of hepatocellular carcinoma. However, in pelvic tumors, its increase is not obvious, hence AFP detection alone cannot effectively detect pelvic tumors [9]. CEA is an adhesion molecule that belongs to the glycoprotein family and is mainly distributed in tissues such as the pancreas, colon, and stomach. Diseases such as colon cancer, lung cancer, and breast cancer all cause an increase in CEA. However, due to the high specificity of this indicator, it may also increase in some non-cancer patients, such as the elderly and smokers. Therefore, CEA is not clinically used as a cancer screening indicator but can be used as an observation indicator for postoperative patient recovery [10].

The study results revealed significant differences in CA-125 and CA19-9 levels between the observation and control groups, with higher levels observed in malignant tumor patients. CA-125 and CA19-9 levels positively correlated with disease severity, confirming their relevance in distinguishing between benign and malignant pelvic tumors. While CEA and AFP showed lower specificity, their combined analysis contributes to assessing treatment effects in clinical settings. Early diagnosis is crucial in pelvic tumor management, and serum tumor marker detection plays a pivotal role in early cancer screening and treatment monitoring. The success rate of treatment and the increase of CA-125 and CA19-9 are clues for the early detection of pelvic tumors [11]. Regular monitoring of specific marker levels facilitates accurate assessment of patients' survival and disease progression, providing essential insights for personalized treatment strategies [12].

In summary, the detection of multiple serum tumor markers holds significant value in detecting benign and malignant pelvic tumors, enhancing sensitivity and specificity compared to single marker detection. Analysis of CA-125 and CA19-9 levels facilitates accurate disease differentiation and provides essential data support for clinical treatment.

Disclosure statement

The author declares no conflict.

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Research Progress on the Relationship between Intestinal Microecology and Cervical HPV Infection

Yangyan Chen*

Shanghai Zhangjiang Institute of Medical Innovation, Shanghai 201204, China

Corresponding author: Yangyan Chen, chenyangyan6@126.com

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Abstract: In recent studies, researchers have found a close relationship between intestinal microecology and human papillomavirus (HPV) infection. Gut microbiota refers to the microorganisms present in the human intestine, including both beneficial and harmful bacteria. These microorganisms exert a significant impact on human health. Some studies suggest that an imbalance in gut flora may lead to systemic abnormalities and increased susceptibilities to HPV. Consequently, the adjustment of intestinal microbiota to counteract HPV has emerged as a rapidly growing research area. Probiotics, as essential components of intestinal microecology, can effectively modulate it. They increase the population of beneficial bacteria while suppressing the growth of harmful ones, thereby restoring the balance of intestinal flora. This, in turn, contributes to intestinal health, bolstering the body's defenses. This article aims to explore and review the relationship between intestinal microecology and cervical HPV infection.

Keywords: Intestinal microecology; Cervical HPV infection; Relationship; Research progress

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1. Introduction

Cervical cancer stands as one of the prevalent gynecological malignancies. According to the 2023 ICO/IARC China HPV and Related Diseases Report, in 2020, among women aged 15 to 44 in China, cervical cancer ranked third in both incidence and mortality among female tumors, with approximately 110,000 new cases and nearly 60,000 deaths. This poses a significant threat to women's health. On November 17, 2020, the World Health Organization (WHO) officially released the "Global Strategy to Accelerate the Elimination of Cervical Cancer." In 2023, China's National Health Commission, Ministry of Education, Ministry of Civil Affairs, and 7 other departments jointly issued the "Global Strategy to Accelerate the Elimination of Cervical Cancer Action Plan (2022–2030)," aimed at promoting and expediting the elimination of cervical cancer in China to safeguard and enhance women's health [1].

Intestinal flora plays a crucial role in maintaining digestive tract homeostasis, constituting a diverse microbial community [2]. Numerous studies have explored the correlation between intestinal flora microecology

and the onset and progression of gynecological diseases, making it a current research focal point. This article delves into the relationship between intestinal microecology and cervical human papillomavirus (HPV) infection.

2. Research related to cervical HPV infection

HPV infection constitutes a sexually transmitted disease wherein the virus infects cervical epithelial cells, inducing squamous epithelial proliferation. Transmission primarily occurs through sexual contact, indirect contact, mother-to-child transmission, and other means. Cervical HPV infection is highly prevalent, typically manifesting symptoms such as common warts, genital warts, and flat warts, with severe cases potentially leading to cervical cancer [3,4].

Symptoms vary across different stages, including the incubation period, early stage, and late stage. During the incubation period, HPV may remain dormant for 3 weeks to 8 months, with an average of about 3 months, primarily affecting sexually active individuals aged 20–25, often without noticeable symptoms. In the early stage, patients may develop small, light red papules on the vulva, progressively enlarging into bumpy, soft papillary lesions resembling cauliflower. Increased secretions, appearing off-white, dirty gray, or red, characterize these lesions. In the late stage, vulvar surface erosion and exudation may occur, accompanied by itching, potential secondary bacterial infection, purulent discharge, odor, and local pain. Diagnosis involves physical examination, laboratory tests, and imaging tests. Currently, over 200 types of HPV have been identified and categorized into high-risk and low-risk types based on their carcinogenic potential [5]. Common high-risk HPV types include HPV16, HPV18, HPV31, HPV33, HPV35, HPV39, HPV45, HPV51, HPV52, and HPV58, with approximately 98% of cervical cancers in Chinese women attributed to high-risk HPV [6,7].

The introduction of HPV vaccines has transformed cervical cancer into a preventable disease, with eradication on the horizon. In 2023, China's "Comprehensive Cervical Cancer Prevention and Control Guidelines (2nd Edition)" proposed a three-level prevention strategy. Primary prevention involves health education and HPV vaccination, while secondary prevention focuses on efficient cervical cancer screening. Tertiary prevention emphasizes appropriate treatment according to the disease stage. HPV vaccination represents the cornerstone of effective cervical cancer prevention. Women are encouraged to prioritize self-health protection, acquire accurate knowledge about HPV and cervical cancer, undergo timely vaccination, and participate in regular cervical cancer screening.

3. Research on the association between intestinal microecology and cervical HPV infection

Normal intestinal flora plays a pivotal role in maintaining the stability of the human intestinal tract. Imbalances in intestinal flora can lead to a decline in bodily functions. Numerous studies have confirmed a correlation between intestinal flora and the onset and progression of tumors. Tumors such as breast cancer and colorectal cancer have been linked to intestinal flora, primarily through mechanisms involving mucosal damage, chronic inflammation, and the production of harmful substances, all contributing to tumor formation and development [8-10]. Additionally, some studies have indicated a connection between intestinal flora and tumor metastasis and drug resistance. Gastric, cervical, and rectal cancers, among others, have been closely associated with intestinal flora, which is vital in immune defense, digestive metabolism, inflammation, and cell proliferation. Intestinal flora not only interacts with intestinal epithelial cells but also communicates with distant organs and body systems [11-13].

Advances in genome sequencing technology have revealed that intestinal flora imbalance is associated

with various female reproductive system diseases, including endometriosis (EMS), polycystic ovary syndrome (PCOS), perimenopausal syndrome, cervical cancer, and ovarian cancer [14,15]. In healthy women, the gastrointestinal and vaginal microbiota are shielded from the host by a multi-level defense system comprising the mucosal layer, secretion of soluble immune mediators, intact epithelial cell tight junctions, and immune cells. Disruption of this defense system allows pathogenic bacteria to penetrate the gastrointestinal tract and vaginal epithelium, leading to diseases, including cancer. Cervical cancer, the fourth most common malignant tumor in terms of morbidity and mortality, is primarily caused by high-risk HPV infection. Dysbiosis has been identified as a risk factor for HPV infection and cervical cancer development [16]. Expert consensus underscores the significance of maintaining intestinal microecological balance in preventing cervical cancer.

Research has confirmed that HPV is a carcinogenic factor for cervical cancer, with chronic infections, sexually transmitted diseases, and smoking acting as synergistic factors. Persistent infection with high-risk HPV, particularly HPV16 and HPV18 [17,18], accounts for most cases of cervical cancer. HPV infection can be cleared when local resistance is robust. Studies have indicated that HPV-positive women exhibit a more diverse intestinal microecological composition, potentially increasing their susceptibility to multiple HPV types and raising the risk of cervical low-grade squamous intraepithelial lesions. Consequently, intestinal microecology plays a crucial role in HPV infection and clearance, with the composition of intestinal microecology influencing persistent HPV infection and secondary cervical cancer.

Numerous studies exploring the relationship between intestinal flora and cervical cancer, have identified differences in intestinal microorganisms between cervical cancer patients and healthy individuals. A study published in "Food & Function" demonstrated that traditional Chinese medicine *Sanghuang* (*Shanghuangporus* spp.) can promote the proliferation of *Akkermansia* intestinal bacteria, which in turn interferes with tumor glucose uptake and utilization, inducing tumor autophagy and inhibiting the growth of cervical cancer cells. Additionally, research has highlighted the connection between intestinal microorganisms and estrogen metabolism [19], with elevated estrogen levels playing a significant role in endometrial cancer. Imbalances in intestinal flora may contribute to endometrial cancer by influencing the secretion and metabolism of estrogens.

4. Research on the application of adjusting intestinal microecology in the treatment of cervical HPV infection

Research conducted both domestically and internationally has reached a consensus that HPV infection does not inevitably lead to cancer, and nearly all cervical cancer patients are positive for HPV infection. It typically takes 5–10 years from HPV infection to the development of cervical cancer. During this period, the body's immunity strengthens, leading to the clearance of the virus in approximately 80% of infected individuals, particularly among young women. The risk of disease primarily hinges on the continuous accumulation and intensification of HPV infection, notably the accumulation of specific HPV subtypes, leading to various outcomes.

Imbalances in intestinal flora result in a gradual increase in harmful bacteria and a decrease in beneficial bacteria, thereby disrupting the intestinal environment. Intestinal microecological treatments can effectively increase the number and types of beneficial bacteria while inhibiting the growth of harmful bacteria, thereby restoring ecological health to the intestinal tract. The principle of intestinal microecological preparations involves utilizing normal microorganisms or substances that promote microbial growth beneficial to the host to maintain the host's microecological balance and improve overall health. These preparations play a crucial role in maintaining intestinal function, inhibiting the growth of intestinal pathogens, forming a protective layer on the intestinal mucosa, producing various enzymes to aid in food digestion and absorption, alleviating symptoms of lactose intolerance, promoting probiotic proliferation, improving intestinal flora, and providing healthcare benefits.

There exists a close connection between intestinal flora microecology and cervical cancer. Maintaining a healthy and stable intestinal flora can aid in the prevention and treatment of cervical cancer. Conversely, an unhealthy intestinal flora may promote cancer development and negatively impact cancer immunity, chemotherapy efficacy, and prognosis [20]. Therefore, it is imperative for women to regularly monitor the status of their intestinal flora. Comprehensive and accurate detection of changes in intestinal flora and metabolite levels can facilitate the early detection and prevention of cervical cancer and other related diseases, providing scientific references and personalized prevention and treatment recommendations.

Studies have demonstrated that chemotherapy can increase intestinal permeability, leading to ectopic colonization of intestinal microorganisms and the induction of systemic immune responses. These responses can result in chronic inflammation, promoting the occurrence of metabolic disorders, malnutrition, and cachexia. Hence, maintaining intestinal barrier function may help alleviate cachexia symptoms in cervical HPV infection. Research has indicated that supplementation with a probiotic complex containing *Bifidobacterium breve*, *Lactobacillus acidophilus*, *Lactobacillus casei*, and *Streptococcus thermophilus* can mitigate 5-fluorouracil-induced intestinal damage, including reduced severity of intestinal tissue scores, increased villus length, crypt depth, and mucus layer, as well as decreased expression of inflammatory cytokines and markers.

5. Conclusion

Gut microbiota can influence tumor susceptibility and progression through various mechanisms, including the regulation of inflammation, induction of DNA damage, and production of metabolites involved in tumorigenesis or tumor suppression. As research in this field continues to deepen, it is becoming increasingly common to screen for cervical cancer using intestinal flora, aiming to detect the disease at an earlier stage or enhance treatment efficacy. This approach offers women a novel direction in the prevention and treatment of cervical cancer.

Maintaining the health and stability of intestinal flora microecology holds significant importance in preventing and treating cervical HPV infection. The judicious use of antibiotics to preserve the health and stability of the body's bacterial flora is crucial for bolstering the immune function against cervical HPV infection. This ensures the effectiveness of antimicrobial drugs in patients with cervical HPV infection, thereby facilitating successful prevention and treatment measures.

Disclosure statement

The author declares no conflict of interest.

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Impact of Active Implementation of Prenatal Screening on Preventing Congenital Disabilities: A Study of 10,695 Pregnant Women

Hong Quan*, Yujie Lv, Qiuzhi Yu

Qingdao City Chengyang District Maternal and Child Health and Family Planning Service Center, Qingdao 266109, China

Corresponding author: Hong Quan, qh750504@sina.com

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Abstract: *Objective:* To explore the impact of active implementation of prenatal screening on preventing congenital disabilities. *Methods:* A total of 10,695 pregnant women at Chenyang District Maternal and Child Health and Family Planning Service Center underwent prenatal screening between January 2021 to December 2023. These women were divided into two groups: 18 to 30 years old and 31 to 45 years old. High-risk rates of Down syndrome (DS), Edwards syndrome (ES), and neural tube defects (NTD) were compared between the two groups of pregnant women. *Results:* Among the 10,695 pregnant women who received prenatal screening, 1,588 were identified as high-risk. Pregnant women aged 31 to 45 years old showed higher high-risk rates of DS, ES, and NTD compared to those aged 18 to 30 years old ($P < 0.05$). The high-risk group demonstrated elevated rates of DS, ES, and NTD diagnoses ($P < 0.05$). Additionally, the high-risk group's evaluation of spontaneous abortion rates exhibited higher levels, although not significantly different from the low-risk group ($P > 0.05$). Moreover, the high-risk group's evaluation of congenital disabilities in pregnant women showed a significantly higher rate ($P < 0.05$). *Conclusion:* Prenatal screening enables the early detection of potential fetal problems, facilitating the implementation of corresponding measures to reduce the incidence of congenital disabilities.

Keywords: Prenatal screening; Prevention of congenital disabilities; Clinical effect

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1. Introduction

Preventing congenital disabilities is crucial for ensuring the health and survival of babies while reducing the burden on families and society. Prenatal screening encompasses various aspects during pregnancy check-ups, requiring pregnant women to undergo numerous screening procedures during routine prenatal visits [1].

Firstly, nuchal translucency (NT) thickness must be measured using color ultrasound technology between 11 and 14 weeks of pregnancy. An NT thickness value exceeding 2.5 mm warrants heightened vigilance for Down syndrome (DS) and the risk of congenital heart disease. Screening for Down syndrome typically occurs between 15 and 21 weeks of pregnancy. This involves assessing the levels of relevant markers in pregnant women's blood to determine the fetus's DS risk, or utilizing ultrasound technology to evaluate fetal growth,

development, and anatomy [2].

Additionally, screening for diabetes after 24 weeks of pregnancy often involves an oral glucose tolerance test (OGTT). This test evaluates a pregnant woman's glucose metabolism to identify diabetes or gestational diabetes. Early detection of gestational diabetes through OGTT enables appropriate disease management, medication, and prevention of macrosomia, thereby safeguarding the health of both mothers and children.

The utilization of ultrasound and other technologies in prenatal screening facilitates the timely detection of congenital disabilities. This enables doctors to identify fetal abnormalities promptly and initiate necessary interventions early, thereby preventing the onset of congenital disabilities [3]. Furthermore, it allows pregnant women and their families to prepare mentally and take proactive measures to ensure the health of their newborns. This article aims to analyze the role of prenatal screening in preventing congenital disabilities such as DS, Edwards syndrome (ES), and neural tube defects (NTD).

2. Materials and methods

2.1. General information

A total of 10,695 pregnant women at Chenyang District Maternal and Child Health and Family Planning Service Center underwent prenatal screening. The research spanned from January 2021 to December 2023, during which participants were categorized based on different age groups. The 18–30-year-old group comprised 7,068 cases, with an average age of 27.96 ± 6.55 years and gestational age ranging from 16 to 21^{+5} weeks, with an average of 19.03 ± 4.82 weeks. The 31–45-year-old group included 3,627 cases, with an average age of 27.98 ± 6.61 years and gestational age ranging from $16–22^{+4}$ weeks, with an average of 19.12 ± 4.77 weeks. No statistically significant differences were observed between the two groups ($P > 0.05$).

2.2. Methods

2.2.1. Prenatal screening

During prenatal screening, 3 mL of venous blood was extracted from pregnant women, and the serum was separated and stored below -20°C. Alpha-fetoprotein (AFP) and free β-human chorionic gonadotropin (β-hCG) levels in the blood were detected. Pregnant women underwent DS screening, non-invasive DNA prenatal screening, and pregnancy ultrasound screening, with relevant precautions communicated to them before the examination, such as drinking water on an empty stomach to enhance ultrasound image clarity.

2.2.2. Prenatal diagnosis methods for pregnant women at high risks of DS, ES, and NTD

Prenatal diagnosis was conducted on pregnant women identified as high risk for DS after obtaining informed consent. Amniocentesis (a method of extracting amniotic fluid for testing by puncturing the abdominal wall, uterus, and amniotic membrane, and can accurately detect chromosomal abnormalities in the fetus, including DS), chorionic villus biopsy (a method of removing and testing a small sample of villous tissue from the placenta for testing to detect placental abnormalities and chromosomal abnormalities and can also be used to screen for DS), non-invasive prenatal genetic testing (NIPT; a method that uses cell-free fetal DNA in the blood of pregnant women to detect chromosomal abnormalities such as DS at an early stage), and dual marker test (combined assessment with maternal serum DS screening and ultrasound examination results to more accurately assess the risk of DS) were employed. For those at high risk of ES, 20 mL of amniotic fluid extraction (the gold standard for prenatal screening) under ultrasound guidance was performed at 17 to 24 weeks of pregnancy for cell culture and karyotype analysis. Those identified as high risk of NTD underwent fetal system ultrasound diagnosis at 18 to 24 weeks. Upon confirmation of congenital disabilities, pregnant women were promptly

informed of the consequences, advised on labor induction, and provided with appropriate follow-up care.

2.3. Observation indicators

High-risk rates of DS, ES, and NTD were statistically analyzed among pregnant women in both age groups using DS screening software. High DS risk was determined by a comprehensive risk coefficient ≥1/270; high ES risk by a comprehensive risk coefficient ≥1/350; and high NTD risk by an AFP detection value ≥2.5 MOM [4].

2.4. Statistical analysis

Data analysis was conducted using SPSS 27.0 software. Measurement data were expressed as mean ± standard deviation (SD), and results were obtained through *t*-tests. Count data were presented as [*n* (%)], and results were obtained through χ^2 tests. A significance level of $P < 0.05$ indicated statistical significance.

3. Results

3.1. Comparison of the high-risk rates of DS, ES, and NTD among pregnant women between the two groups

Among 10,695 pregnant women who received prenatal screening, there were 1,588 cases found to be high-risk. The 31–45-year-old group indicated a higher rate of high congenital disease risk as compared to the 18–30-year-old group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of the high-risk rates of DS, ES, and NTD among pregnant women between the two groups [*n* (%)]

Group	*n*	DS high-risk rate	ES high-risk rate	NTD high-risk rate
18–30 years old	7,068	541 (7.65)	195 (2.76)	208 (2.94)
31–45 years old	3,627	350 (9.65)	150 (4.14)	144 (3.97)
χ^2	-	12.499	14.554	7.949
P	-	0.000	0.000	0.005

3.2. Analysis and comparison of diagnosis of three diseases among different groups of people

Table 2 shows that the high-risk group had a higher level of DS, ES, and NTD diagnosis rates ($P < 0.05$).

Table 2. Analysis and comparison of diagnosis of three diseases by different groups of people

Group	Number of examples	Number of confirmed cases	Diagnosis rate (%)
DS high risk	891	12	1.35
ES high risk	345	6	1.74
NTD high risk	352	2	0.57
Total	1,588	20	1.26

3.3. Comparison of spontaneous abortion rates and congenital disability rates among pregnant women with different risks

The high-risk group displayed a higher spontaneous abortion rate, but insignificant compared to the low-risk group ($P > 0.05$). However, the high-risk group had a higher congenital disability rate compared to the low-risk

group ($P < 0.05$). See **Table 3**.

Table 3. Comparison of spontaneous abortion rates and congenital disability rates among pregnant women with different risks [*n* (%)]

Group	Number of examples	Spontaneous abortion	Congenital disabilities
High risk	1,588	28 (1.76)	10 (0.63)
Low risk	9,107	0 (0.00)	18 (0.19)
χ^2	-	160.998	9.668
P	-	6.847	0.002

4. Discussion

Congenital disabilities encompass structural or functional abnormalities occurring during embryonic development, resulting in organ, systemic, or tissue anomalies at birth. These defects may stem from genetic factors, external environmental influences, or their interaction [5]. Congenital disabilities impose significant psychological, economic, and social burdens on children and families. Severe congenital disabilities may compromise a patient's quality of life, necessitating long-term or lifelong treatment. Timely prenatal screening and diagnosis are pivotal in preventing congenital disabilities.

DS arises from the presence of an additional part or a complete pair of chromosome 21, leading to individuals carrying three chromosome 21s instead of the typical two. This extra chromosome can impede both physical and mental development, with varying degrees of cognitive impairment. Prenatal screening and diagnosis play a crucial role in DS prevention [6]. High-risk pregnancies may undergo amniocentesis for further diagnostic assessment.

ES is a rare chromosomal abnormality involving an extra chromosome 18, resulting in diverse physical and intellectual developmental challenges. Children with ES may experience respiratory difficulties, skeletal deformities, kidney issues, and other complications, significantly affecting their quality of life and longevity. Early detection of ES through prenatal screening and diagnosis, particularly via amniocentesis, enables families to make informed decisions [7].

NTD represents a prevalent form of nervous system development impairment, posing significant threats to patients' health and quality of life. Physical manifestations may include spinal cord and spinal deformities, alongside neurological complications such as mental retardation and cognitive impairments. Prenatal screening methods, including ultrasound examination and amniocentesis, facilitate early NTD detection, allowing for timely treatment and intervention to reduce the incidence of congenital disabilities [8].

Presently, congenital disability prevention primarily hinges on prenatal screening. Combined with effective treatment interventions, prenatal screening can mitigate the risk of fetal congenital disabilities and reduce their incidence. However, inadequate awareness and incomplete screening procedures among pregnant women undermine congenital disability prevention efforts. Hence, it is imperative to enhance prenatal screening, raise pregnant women's examination awareness, leverage advanced medical examination technologies for fetal observation, and provide appropriate interventions for congenital disabilities. This study revealed that among 10,695 pregnant women who underwent prenatal screening, 1,588 were identified as high-risk pregnancies. High-risk rates of DS, ES, and NTD were higher among pregnant women aged 31 to 45 compared to those aged 18 to 30 ($P < 0.05$). This underscores the significant decline in physical health with advancing maternal age, contributing to fetal development restrictions and congenital disabilities, impacting both pregnant women

and their families. Prenatal screening and effective intervention play crucial roles in preventing congenital disabilities in children and reducing their incidence [9,10]. This study further demonstrated that within the high-risk group, evaluation of DS, ES, and NTD diagnosis rates, as well as spontaneous abortion and congenital disability rates yielded higher results. This suggests a higher proportion of spontaneous abortion and congenital disabilities among high-risk groups compared to low-risk ones. Therefore, it is imperative to provide comprehensive education to high-risk pregnant women, informing them of the adverse consequences and the significance of prenatal screening and diagnosis in preventing congenital disabilities.

Prenatal screening, a non-invasive examination method, assesses fetal chromosomes, genes, biochemical markers, and other indicators in pregnant women to detect hereditary or congenital diseases. It provides families with crucial information and risk assessments, enabling informed decisions regarding further diagnostic testing, elective abortion, or childbirth preparation. While prenatal screening cannot entirely prevent congenital disabilities, it can reduce the risk of specific conditions by enabling medical teams to provide targeted interventions and management to high-risk groups. Offering various screening items, prenatal screening enhances the early detection rate of common congenital disabilities and genetic diseases, including DS, congenital heart disease, and NTD. This empowers pregnant women with more information and choices, facilitating informed decision-making during pregnancy. Prenatal screening is particularly vital for high-risk pregnant women, including older mothers and those with a family genetic history, as it mitigates disease risks and enhances newborn health. It is essential to acknowledge that while prenatal screening aids in preventing congenital disabilities to a certain extent, it cannot entirely eliminate them. Its primary role lies in providing information and risk assessments to aid families in decision-making. Moreover, prenatal screening must be evaluated comprehensively with clinical manifestations and other examination results. Thus, pregnant women should fully grasp the significance, limitations, and risks of the screening program and make rational, informed decisions.

In conclusion, prenatal screening effectively assists pregnant women in understanding their fetuses' health status, detecting potential issues early, and implementing corresponding measures to reduce the incidence of congenital disabilities.

Disclosure statement

The authors declare no conflict of interest.

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Analysis of the Application Effect of Painless Delivery Technology in Clinical Obstetrics

Dongmei Shen*

Obstetrics Department, The People's Hospital of Junan, Linyi 276600, China

***Corresponding author:** Dongmei Shen, shendongmei2003@163.com

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Abstract: *Objective:* To explore the application effect of painless delivery technology in clinical obstetrics. *Methods:* Clinical data of 900 women who gave birth were collected and randomly divided into groups A and B, each comprising 450 cases. Group A served as the control group, while Group B acted as the observation group. Group A underwent natural delivery, whereas Group B received combined spinal-epidural anesthesia for painless delivery. The effects of these two delivery techniques were comprehensively evaluated based on maternal pain level, postpartum recovery, postpartum lactation, and other relevant indicators. *Results:* In Group B, there were more individuals with pain levels of 0 and 1 compared to Group A, and significantly fewer individuals with pain levels of 2 and 3 than in Group A ($P < 0.05$). This suggests that the pain level in Group B was significantly superior to that in Group A. Additionally, postpartum recovery indicators among mothers in Group A were significantly higher than those in Group B ($P < 0.05$). Furthermore, the time for the onset of colostrum mobilization and adequate breast milk production was significantly longer in Group A compared to Group B ($P < 0.05$). *Conclusion:* Combined spinal-epidural anesthesia with ropivacaine + sufentanil demonstrates a positive application effect in painless delivery.

Keywords: Painless delivery; Obstetrics; Combined spinal-epidural anesthesia; Application effects

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1. Introduction

With the rapid development of modern medicine, painless delivery technology has become an integral component of contemporary obstetric practice [1]. Its primary objective is to mitigate or eliminate pain during childbirth through pharmacological anesthesia or other technical interventions, thereby enhancing the delivery experience in terms of comfort and safety. The advent of painless delivery technology signifies a significant departure from traditional delivery methods, marking the onset of a new era in obstetrics. However, despite the manifold advantages offered by painless delivery technology, its clinical application is not devoid of controversies and challenges.

For instance, various painless delivery techniques exhibit disparities in terms of safety and efficacy, while the adaptability of different mothers' physical constitutions and delivery conditions to such technology varies. Consequently, conducting an in-depth analysis of the application effects of painless delivery technology in

clinical obstetrics holds immense significance for guiding clinical practice, enhancing delivery standards, and ensuring maternal and infant well-being.

This article endeavors to compare the application of natural delivery with the use of combined spinal-epidural anesthesia employing ropivacaine + sufentanil for painless delivery in clinical obstetrics. By doing so, it aims to furnish clinicians with more scientifically informed and rational guidance regarding the utilization of painless delivery technology, thereby facilitating the provision of superior and safer delivery services to mothers.

2. Materials and methods

2.1. General information

The clinical data of 900 parturients who underwent painless delivery surgery were collected and randomly divided into groups A and B, each comprising 450 cases. Group A served as the control group, while Group B constituted the observation group. Inclusion criteria encompassed: (1) Women with singleton pregnancy; (2) Women with full-term pregnancy; (3) Women with no serious systemic diseases such as heart, lung, liver, kidney, etc., and no serious complications during the entire pregnancy; (4) Women who signed the relevant informed consent agreement, comprehended the research's purpose, methods, and risks, and were willing to participate in this study. Exclusion criteria included: (1) Parturients with serious diseases such as cardiovascular disease, respiratory disease, liver and kidney insufficiency, etc.; (2) Parturients with pregnancy complications such as placenta previa, placental abruption, gestational hypertension, fetal distress, abnormal fetal position, etc.; (3) Parturients who failed to complete the entire research process or had incomplete data records due to various reasons, thereby affecting the analysis and evaluation of research results.

2.2. Methods

Group A underwent natural delivery. Upon admission, intravenous access was established, and respiration, pulse, non-invasive blood pressure, and fetal heart rate were monitored. No analgesic intervention was administered during labor.

Group B received combined spinal-epidural anesthesia for painless delivery. Upon admission, intravenous access was established, and respiration, pulse, non-invasive blood pressure, and fetal heart rate were monitored. Subsequently, in the operating room, the mother assumed a lateral position, and local anesthesia was applied to the lumbar region. Anesthetic drugs containing ropivacaine and sufentanil were injected into the subarachnoid space via lumbar puncture. These drugs collaborated to block nerve conduction and achieve analgesic effects. Following the completion of anesthesia injection, 10 mg of dexamethasone was administered intravenously to prevent anesthesia allergy.

2.3. Observation indicators

This study utilized the pain standards specified by the World Health Organization to assess the degree of maternal pain; hospitalization time, lochia disappearance time, and lochia amount were utilized to evaluate maternal postpartum recovery; while the time to the onset of colostrum and the time to sufficient breast milk supply were employed to evaluate maternal postpartum lactation.

2.4. Statistical analysis

SPSS 20.0 software was employed to analyze the research data. Measurement data conforming to the normal distribution were expressed as mean ± standard deviation (SD), with a *t*-test conducted between groups. The rank sum test was employed for registration data. A significance level of $P < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of maternal pain effects between the two groups

There were more individuals in Group B experienced pain levels of 0 and 1 compared to Group A, while there were significantly fewer individuals in Group B experienced pain levels of 2 and 3 compared to Group A ($P < 0.001$; **Table 1**), indicating that Group B's pain level is superior compared to Group A.

Table 1. Comparison of maternal pain effects between the two groups

Pain index	Group A (n = 450)	Group B (n = 450)	Z	P
Level 0	146	259	9.377	0.000
Level 1	138	131		
Level 2	97	60		
Level 3	69	0		

3.2. Comparison of postpartum recovery indicators between the two groups

As seen in **Table 2**, Group B exhibited significantly shorter postpartum recovery indicators as compared to Group A ($P < 0.001$).

Table 2. Comparison of postpartum recovery indicators between the two groups

Rehabilitation indicators	Group A (n = 450)	Group B (n = 450)	t	P
Length of stay (d)	3.76 ± 1.39	3.16 ± 1.01	7.408	0.000
Lochia disappearance time (d)	17.59 ± 4.38	14.62 ± 3.63	11.075	0.000
Amount of lochia (mL)	276.34 ± 15.48	262.21 ± 12.82	14.913	0.000

3.3. Comparison of postpartum lactation indicators between the two groups

Table 3 shows that Group B displayed significantly shorter postpartum lactation indicators as compared to Group A ($P < 0.001$).

Table 3. Comparison of postpartum lactation indicators between the two groups

Lactation index	Group A (n = 450)	Group B (n = 450)	t	P
Colostrum onset time	32.67 ± 8.86	27.36 ± 7.57	9.666	0.000
Sufficient breast milk supply time	38.51 ± 10.23	32.10 ± 7.22	10.860	0.000

4. Discussion

Painless delivery technology, also known as labor analgesia, encompasses various methods aimed at reducing or eliminating maternal pain during childbirth. This technology strives to enhance the comfort and safety of childbirth, enabling mothers to remain composed and relaxed throughout labor, thereby better coping with the challenges of childbirth [2]. Principally, painless delivery technology revolves around the principle of pain control, employing pharmacological or non-pharmacological means to block or interfere with pain signal transmission, ultimately diminishing or eradicating the pain. Drug-induced analgesia primarily relies on the effects of narcotic drugs, while non-drug analgesia alleviates pain through physical stimulation or psychological intervention. Painless delivery technology is generally applicable to most women, particularly those sensitive

to labor pain or apprehensive about childbirth. Nonetheless, certain special conditions, such as coagulation disorders, spinal deformities, spinal surface infections, hypertension, cardiac insufficiency, etc., may render painless delivery unsuitable.

When implementing painless delivery, selecting an appropriate method is crucial [3,4]. Epidural anesthesia and combined spinal-epidural anesthesia are commonly utilized in clinical practice [5]. Epidural anesthesia involves local anesthesia in the mother's lumbar region, with drugs injected into the epidural space via an epidural catheter. Following drug metabolism within the mother's body, minimal amounts are absorbed through the placenta, posing negligible risks to the fetus. This anesthesia technique disperses around nerve roots through the epidural space, effectively blocking pain signal transmission from the uterus to the brain, thus achieving analgesia [6]. Despite its analgesic efficacy, epidural anesthesia presents certain drawbacks. Firstly, its muscle relaxation effect may be inadequate, potentially leading to intraoperative injuries and prolonged incision healing time. Secondly, the procedure necessitates local anesthesia in the mother's lumbar region and the insertion of an epidural catheter, which consumes time; hence, it may not be ideal for parturients requiring urgent pain relief. Moreover, as the preparation and administration of epidural anesthesia require time, it might prolong the labor process, particularly in emergencies such as fetal distress, potentially impeding rapid delivery.

Combined spinal and epidural anesthesia entails the fusion of spinal and epidural anesthesia techniques. Initially, a small dose of local anesthetic is administered via lumbar puncture to swiftly induce analgesia. Subsequently, additional drugs are introduced through an epidural catheter to sustain analgesia until labor concludes. Compared to epidural anesthesia, combined spinal and epidural anesthesia offers distinct advantages. Firstly, it swiftly delivers a small dose of local anesthetic drugs via lumbar puncture, thereby promptly relieving pain for parturients in urgent need. Secondly, by combining spinal and epidural anesthesia, the technique minimizes overall drug dosage, thereby reducing potential side effects and risks [7]. Thirdly, by supplementing drugs via an epidural catheter, combined spinal and epidural anesthesia ensures continuous and effective analgesia throughout labor, accommodating various delivery scenarios, whether natural or surgical.

In combined spinal-epidural anesthesia, the choice of anesthetic medication typically comprises local anesthetics and analgesics. Local anesthetics such as lidocaine, bupivacaine, and ropivacaine alleviate pain by impeding nerve conduction. Analgesics such as fentanyl and sufentanil mitigate pain by inhibiting pain receptor activity. These drugs are usually administered epidurally or intravenously, with a specific regimen tailored to the mother's condition and physician's recommendations. In this study, ropivacaine and sufentanil were the preferred anesthetics and analgesics. Ropivacaine, an amide local anesthetic, inhibits nerve fiber conduction, providing adequate analgesia while minimizing the impact on maternal motor function, and allowing mobility during delivery [8,9]. Sufentanil, a potent synthetic opioid analgesic, rapidly and durably alters pain perception signal transmission by binding to brain pain receptors, thereby inducing analgesia [10]. In combined spinal-epidural anesthesia, sufentanil is frequently combined with local anesthetics like ropivacaine to enhance analgesia. It swiftly reduces maternal pain, aiding in surgical procedures or the birthing process. Consistent with many studies, this study's findings demonstrate that compared to natural delivery (Group A), painless delivery with sufentanil combined with ropivacaine under combined spinal-epidural anesthesia (Group B) resulted in reduced maternal pain and shorter postpartum recovery and lactation time ($P < 0.001$). Zhang *et al*. proposed that the combined use of sufentanil and ropivacaine can reduce the dosage of both drugs and is safer for both mothers and infants [11]. Wang also found that sufentanil combined with ropivacaine has a more significant effect on combined spinal-epidural labor analgesia [12].

It is imperative to note certain considerations when utilizing these drugs for anesthesia. Firstly, ropivacaine exhibits relatively low cardiotoxicity, necessitating caution in patients with cardiovascular conditions. Secondly,

sufentanil may induce side effects such as respiratory depression, nausea, vomiting, and drowsiness. Thus, close monitoring of vital signs during administration is essential to prevent unexpected side effects, including dizziness, headache, and dyspnea. Thirdly, in patients with respiratory or liver diseases, sufentanil should be used cautiously, as it may exacerbate respiratory depression. In conclusion, combined spinal-epidural anesthesia with ropivacaine + sufentanil demonstrates significant efficacy in painless delivery and warrants further clinical promotion.

Disclosure statement

The author declares no conflict of interest.

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The Effect of Hysteroscopy Combined with Diane-35 on Endometrial Polyps and Its Impact on the Recurrence Rate

Lili Wei*

Department of Obstetrics and Gynecology, Jingyuan County People's Hospital, Baiyin 730600, China

***Corresponding author:** Lili Wei, WLL100136@163.com

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Abstract: *Objective:* To analyze the effect of hysteroscopy combined with Diane-35 on endometrial polyps and observe its value in reducing the recurrence rate. *Methods:* Between June 2022 and January 2023, 90 patients with uterine polyps who met the research criteria were included in the study. A controlled experimental design was employed, and the digital table random grouping method was utilized to divide the patients into the observation and control groups, with 45 cases in each. Patients in the control group underwent hysteroscopic polypectomy, diagnostic curettage during the operation, and routine anti-inflammatory treatment post-surgery. The observation group received Diane-35 treatment after hysteroscopy. The analysis included patient treatment effects, recurrence rate post-surgery, and endometrial thickness. *Results:* The effective rate among patients treated with combined Diane-35 was 95.56%, which was significantly higher than that among patients treated with hysteroscopy alone (82.22%; $\chi^2 = 4.050$, $P < 0.05$). Both groups were followed up for one year. The recurrence rate in the observation group was 2.22%, significantly lower than that in the control group (13.33%; $\chi^2 = 3.873$, $P < 0.05$). Preoperative endometrial thickness was compared between the two groups, showing no significant difference in the data ($P > 0.05$). However, at the 6-month and 12-month follow-up post-surgery, the endometrial thickness in the observation group was significantly lower than that in the control group ($P < 0.05$). After surgery, no adverse reactions such as uterine adhesion, infection, or massive bleeding occurred in either group ($P > 0.05$). *Conclusion:* Hysteroscopic surgery combined with Diane-35 yields higher efficacy in patients with endometrial polyps. This approach not only improves surgical outcomes but also reduces the recurrence rate of postoperative polyps and enhances the patient's endometrial thickness, thus safeguarding the health of female patients.
Keywords: Hysteroscopy; Diane-35; Endometrial polyps; Treatment effect; Recurrence rate

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1. Introduction

Endometrial polyps are a common gynecological disease characterized by polyp-like protrusions formed by localized proliferation of the endometrium. This condition is often accompanied by symptoms such as irregular bleeding, irregular menstruation, and fertility problems, which have a significant negative impact on patients'

quality of life and fertility. With the continuous development of medical technology, hysteroscopic surgery, as a minimally invasive treatment method, has gradually become an important choice for the treatment of endometrial polyps. Meanwhile, Diane-35, as an oral contraceptive, has also achieved remarkable results in the treatment of some gynecological diseases due to its ability to inhibit endometrial hyperplasia. Building upon this context, this study aimed to explore the efficacy of hysteroscopy combined with Diane-35 in treating endometrial polyps and its impact on the recurrence rate. A total of ninety patients with uterine polyps were recruited for the study between June 2022 and January 2023.

2. Materials and methods

2.1. Patient information

The study complied with ethical standards. The patients were informed and signed consent forms. From June 2022 to January 2023, 90 patients with uterine polyps who met the research criteria were included in the study. The inclusion criteria were: (1) The patients met the criteria for endometrial polyps' clinical diagnostic [1]; (2) The age range of participants is 18 years old and above; (3) All patients have no mental disorders and can communicate independently. The exclusion criteria included: (1) Those with severe heart, liver, kidney, and other dysfunctions; (2) Those with drug allergies used in this study; (3) Those with coagulation dysfunction; (4) Those with contraindications to surgery. Using a controlled experimental design and a digital table random grouping method, the patients were allocated into an observation group and a control group, each group with 45 cases. There was no significant difference in the general information of the two groups ($P > 0.05$), which is shown in **Table 1**.

Table 1. Clinical data of two groups of patients

Group name	*n*	Age	Average age	The course of the disease (months)	Average disease duration (months)
Observation group	45	29–60	41.35 ± 4.38	2–10	4.19 ± 0.33
Control group	45	30–69	41.37 ± 4.27	2–9	4.25 ± 0.34
χ^2 / t			0.910	0.605	
P			> 0.05	> 0.05	

2.2. Methods

Patients in the control group were treated with hysteroscopic polypectomy, diagnostic curettage during the operation, and routine anti-inflammatory treatment after surgery. The observation group was treated with Diane-35 after a hysteroscopy.

Hysteroscopic surgical treatment was performed 3–7 days after the patient's menstruation was clear. Routine examinations were performed before the operation, and misoprostol treatment was given one night before the operation. A total of 200–400 μg misoprostol was placed in the posterior vaginal fornix, and the uterus was expanded. Further uterus expansion was performed using the liquid, and the pressure in the uterine cavity was maintained at 100–120 mmHg. The polyp's base was removed using the circular electrosurgical knife, and the wound was trimmed. The depth of the electric resection should be 2–3 mm below the base of the polyp.

The observation group took 1 tablet of Diane-35 every day after surgery, with 3 weeks as one course of treatment, and the second course of treatment was performed 7 days apart, for a total of 3 courses.

2.3. Observation indicators

Analysis of treatment effects: Menstrual flow returns to normal after surgery with no irregular bleeding and the disappearance of various clinical symptoms was defined as "markedly effective"; Menstrual flow decreases after the operation with the occurrence of a small amount of irregular bleeding but does not affect daily life was defined as "effective"; The condition did not improve after treatment and relapse occurred was defined as "ineffective" [2]. The total effective rate is the sum of the markedly effective rate and the effective rate.

Analysis of postoperative recurrence rate.

Analysis of endometrial thickness.

Analysis of postoperative adverse reactions.

2.4. Statistical methods

SPSS 20.0 was used for article data analysis, the χ^2 test was utilized for enumeration data, and the *t*-test was employed for measurement data. $P < 0.05$ was considered a statistically significant difference.

3. Results

3.1. Comparison of treatment effects

Table 2 shows that the effective rate of patients treated with Diane-35 was 95.56%, which was significantly higher than that of patients treated with hysteroscopic surgery alone (82.22%, $P < 0.05$).

Table 2. Comparison of patient treatment effects

Group	*n*	Markedly effective	Effective	Ineffective	Total effective rate
Observation group	45	20	23	2	95.56%
Control group	45	17	20	8	82.22%
χ^2	-	-	-	-	4.050
P	-	-	-	-	0.044

3.2. Comparison of postoperative recurrence rates

As shown in **Table 3**, a one-year follow-up of both groups found that the observation group's recurrence rate was 2.22%, which was significantly lower than the control group (13.33%, $P < 0.05$).

Table 3. Analysis of patient recurrence rates

Group name	*n*	3 months after the operation	6 months after the operation	12 months after the operation	Recurrence rate
Observation group	45	0	0	1	2.22%
Control group	45	0	3	3	13.33%
χ^2	-	-	-	-	3.873
P	-	-	-	-	0.049

3.3. Comparison of endometrial thickness

The preoperative endometrial thickness of both groups showed no significant difference ($P > 0.05$). However, at 6- and 12-month follow-ups after the operation, the postoperative endometrial thickness was significantly lower in the observation group as compared to those in the control group ($P < 0.05$), as seen in **Table 4**.

Table 4. Endometrial thickness after surgery (mm)

Group name	*n*	Pre-operation	6 months post-operation	12 months post-operation
Observation group	45	8.82 ± 1.44	6.91 ± 0.51	4.62 ± 0.53
Control group	45	8.83 ± 1.56	7.35 ± 0.78	6.19 ± 0.62
t		0.032	3.167	12.912
P		0.975	0.002	0.001

3.4. Comparison of postoperative adverse reactions

After the operation, no patients in either group suffered from adverse reactions such as intrauterine adhesions, infections, or massive bleeding. However, only one headache was observed after oral administration of Diane-35 occurred in the observation group, with an incidence rate of 2.22%. There was no significant difference between both groups ($P > 0.05$).

4. Discussion

Endometrial polyps are a common gynecological disease. Their main pathological characteristic is local hyperplasia of the endometrium, forming polyp-like protrusions. Polyps can be located in different parts of the uterine cavity, including the internal cervical os and uterine cavity wall. Although the cause is unclear, changes in hormone levels, chronic endometritis, and other physiological and pathological factors are believed to be related to endometrial polyps. Patients often experience symptoms such as irregular menstruation, abnormal vaginal bleeding, and infertility that seriously affect the quality of daily life [3].

Hysteroscopic surgery, as a minimally invasive surgical technique, has been widely used in the treatment of gynecological diseases, including endometrial polyps. Introducing a hysteroscope into the uterine cavity allows the structure of the uterine cavity to be visually observed, and treatment is performed through the tiny operating channel. Compared with traditional laparotomy, hysteroscopic surgery has the advantages of less bleeding and faster postoperative recovery, so it is very popular in the treatment of endometrial polyps. However, recurrence may occur after surgery. Some researchers have suggested that the postoperative recurrence of patients is related to the body's estrogen secretion levels [4]. After surgery, the patient's estrogen levels increase, which will lead to proliferative changes in the endometrial base, thus causing recurrence. Hence, clinical research focuses on how to ensure the effect of hysteroscopic surgery and reduce the recurrence rate. Diane-35 is ethinyl estradiol and cyproterone tablets [5], which is an oral contraceptive. Its main ingredients include cyproterone acetate and ethinyl estradiol. In addition to its contraceptive effect, the drug is also widely used in the treatment of gynecological diseases, such as acne, female androgenic alopecia, mild hirsutism, and polycystic ovary syndrome. It inhibits endometrial hyperplasia, regulates hormone levels, and improves hormone-related gynecological symptoms [6].

After hysteroscopic treatment of uterine polyps, taking Diane-35 can achieve the following effects. Firstly, this drug is a synthetic estrogen that has an estrogenic effect on endometrial cells. By simulating the effects of estrogen in the body, ethinyl estradiol can inhibit the proliferation of the endometrium and slow down the rate of tissue regeneration, thus affecting the formation and development of polyps [7]. In addition, cyproterone in Diane-35 has the effect of inhibiting ovulation and changing the structure of the endometrium. By inhibiting the formation and function of the corpus luteum, it regulates hormone levels, slows down the proliferation of the endometrium, and inhibits the formation and recurrence of polyps. Moreover, since the formation of endometrial

polyps is closely related to the inflammatory response, the components of Diane-35 may inhibit the occurrence and development of the inflammatory response, reduce tissue inflammation, promote postoperative blood circulation, and accelerate postoperative healing. It helps reduce the formation and recurrence of polyps [8], and Diane-35 further inhibits the re-formation of polyps by adjusting the activity of the immune system, reducing postoperative inflammatory response, and reducing tissue immunogenicity. Therefore, combined with Diane-35 after hysteroscopy, the drug's inhibitory effect on the endometrium helps reduce the recurrence rate of endometrial polyps, adjusts hormone levels, and slows the proliferation of endometrial cells, thereby reducing the re-formation of polyps, providing patients with a more stable and long-term treatment effect [9]. And the author believes that patients with endometrial polyps are usually accompanied by symptoms such as irregular menstruation and abnormal vaginal bleeding. Taking Diane-35 after surgery, its estrogen component can regulate hormone levels, relieve the above symptoms, and improve the patient's quality of life.

Chen discussed the effect of hysteroscopic endometrial polyp resection combined with ethinyl estradiol cyproterone tablets in the treatment of patients with endometrial polyps and conducted a study on 80 patients with endometrial polyps using the random number table method [10]. They were divided into an observation group (40 cases) and a control group (40 cases). The control group was treated with hysteroscopic endometrial polyp resection, while the observation group was treated with ethinyl estradiol cyproterone tablets. The results were as follows: After 6 months, the total effective rate of the observation group reached 97.50%, which was higher than the control group (75.00%, $P < 0.05$), and the proportion of normal menstruation in the observation group was significantly higher than that of the control group ($P < 0.05$). The film thickness was 5.72 ± 1.52 mm, thinner than the control group (7.64 ± 1.91 mm). Regarding recurrence rate, the observation group was 2.50%, which was significantly lower than the control group (15.00%, $P < 0.05$). It was concluded that hysteroscopic endometrial polyp resection combined with ethinyl estradiol cyproterone tablets has a significant effect on the treatment of endometrial polyps, which can promote the recovery of patients' symptoms, improve endometrial thickness and reduce the recurrence rate. This is similar to the results of this study. The effective rate of patients treated with Diane-35 was 95.56%, and the recurrence rate was 2.22%, while the effective rate of single hysteroscopic surgery was 82.22%, and the recurrence rate was 13.33%. The difference between the groups is statistically significant ($P < 0.05$). At the 6-month and 12-month follow-ups after surgery, it was found that the endometrial data of the observation group was significantly lower than that of the control group ($P < 0.05$), which further confirmed the efficacy of Diane-35. Hysteroscopy combined with Diane-35 can effectively improve the surgical effect of endometrial polyps and reduce the postoperative recurrence rate.

In summary, for patients with endometrial polyps, the combination treatment of hysteroscopic surgery and Diane-35 is highly effective. It improves the surgical effect, reduces the recurrence rate of postoperative polyps, and improves the patient's health.

Disclosure statement

The author declares no conflict of interest.

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Safety Analysis of Umbilical Vein Puncture Guided by B-Ultrasound in Prenatal Diagnosis

Juan Chen[1], Qiumin Li[2]*

[1]Ultrasound Department, Shaanxi Provincial People's Hospital, Xi'an 710068, China
[2]Obstetrics Department, Shaanxi Provincial People's Hospital, Xi'an 710068, China

***Corresponding author:** Qiumin Li, 121842598@qq.com

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Abstract: *Objective:* To explore the safety of umbilical vein puncture guided by B-ultrasound in prenatal diagnosis. *Methods:* Patients undergoing prenatal examinations in the Department of Obstetrics and Gynecology from February 2023 to February 2024 were selected as the observational subjects. A total of 90 cases were included. Umbilical vein puncture was performed under B-ultrasound guidance to observe puncture safety. *Results:* The one-time puncture success rate of umbilical vein puncture under B-ultrasound guidance in 90 patients was 97.78%, with an average puncture time of 8.43 ± 1.04 minutes. Fetal heart rate slowed down in 2 cases during umbilical vein puncture guided by B-ultrasound and in 3 patients after surgery, resulting in an incidence rate of 5.56%. Logistic nonlinear multifactor analysis indicated that puncture time and the number of successful punctures were correlated. Additionally, fetal cardiovascular system abnormalities emerged as an independent risk factor for fetal heart rate slowdown, with a statistical value of $P < 0.05$. *Conclusion:* The one-time success rate of umbilical vein puncture guided by B-ultrasound for prenatal diagnosis is high. Early identification of high-risk groups and the implementation of targeted measures can reduce puncture adverse events and ensure the safety of prenatal diagnosis.

Keywords: B-ultrasound guidance; Umbilical vein puncture; Prenatal diagnosis; Safety

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1. Introduction

Prenatal diagnosis serves as a crucial method for screening fetuses for congenital diseases and malformations. With recent attention drawn to population issues, there has been a notable increase in the number of individuals voluntarily opting for prenatal diagnosis to enhance the quality of newborn delivery [1,2]. The advent of ultrasound technology has revolutionized prenatal diagnosis assisted by B-ultrasound to effectively mitigate the risks associated with traditional blind punctures, thereby enhancing clinical diagnosis safety. Umbilical venipuncture, guided by B-ultrasound, represents an invasive examination technique employed to gather fetal blood samples for screening blood diseases, chromosomal abnormalities, and genetic metabolic diseases [3-5]. In this context, this study focuses specifically on the utilization of umbilical venipuncture guided by B-ultrasound during delivery. This discussion centers on the safety of its pre-diagnosis application, with a selection of 90

patients as observation subjects.

2. Materials and methods

2.1. General information

Patients undergoing prenatal examinations in the Department of Obstetrics and Gynecology between February 2023 and February 2024 were selected as the observation subjects. A total of 90 cases were included. The age range varied from 21 to 46 years old, with a mean of 28.77 ± 2.50 years. Gestational age ranged from 18 to 34 weeks, with a mean of 25.18 ± 0.92 weeks, and gestation occurred 1–3 times, with a mean of 1.33 ± 0.21 times.

Inclusion criteria: (1) All 90 patients met the indications for umbilical venipuncture and voluntarily underwent the procedure under B-ultrasound guidance; (2) Patients and their families were informed of the research content; (3) The research received approval from the ethics committee.

Exclusion criteria: (1) Patients with complicated pregnancy complications, such as gestational hypertension; (2) Patients with potential allergies to inducers; (3) Patients with abnormal liver and kidney function or coagulation dysfunction; (4) Patients who were uninformed about or refused to participate in the research project.

2.2. Method

All selected patients underwent umbilical vein puncture under B-ultrasound guidance, performed by the same medical team. Before the procedure, patients were briefed on the purpose, operation method, precautions, and common complications of umbilical vein puncture guided by B-ultrasound. The location of the placenta, umbilical cord distribution, and puncture site were clarified. Patients were required to empty their bladder and lie down before the examination. The puncture site and surrounding skin were routinely disinfected. The operator inserted the puncture needle into the amniotic cavity while ensuring proper depth and angle using B-ultrasound. Once successful puncture was confirmed, the needle core was withdrawn, a syringe was attached to collect venous blood (1–2.5 mL), and the blood was stored in a heparin-containing test tube. The needle was then removed, and pressure was applied to the puncture site to reduce bleeding. Patients were observed post-operation to monitor umbilical blood vessels and fetal heart rate conditions, and discharge from the hospital was permitted only if no abnormalities were detected.

2.3. Evaluation criteria

The one-time puncture success rate of 90 patients was observed, along with monitoring fetal heart rate during the puncture. Fetal heart rate slowing was defined as < 100 beats/min lasting more than 1 minute. Fetal heart rate was also monitored during and after the procedure to assess the occurrence probability and risk factors associated with rate slowdown.

2.4. Statistical analysis

Statistical analysis was performed using SPSS 26.0 software, employing logistic nonlinear factors for adverse events. A statistical threshold of $P < 0.05$ indicated a difference, while $P < 0.01$ denoted a significant difference.

3. Result

3.1. Analysis of puncture success rate in 90 patients

Out of 90 patients, umbilical vein puncture guided by B-ultrasound was successful in 88 cases, with 2 cases

requiring a second puncture for success. The one-time puncture success rate stood at 97.78%. Among these, 85 cases were punctured within 10 minutes, while 4 cases were successfully punctured within 10–15 minutes. A single case required more than 15 minutes for a successful puncture, with an average puncture time of 8.43 ± 1.04 minutes.

3.2. Statistics on adverse events of umbilical vein puncture under B-ultrasound guidance

Fetal heart rate deceleration occurred in 2 cases during umbilical vein puncture guided by B-ultrasound, with an additional 3 cases experiencing deceleration after the procedure, resulting in an incidence rate of 5.56%.

3.3. Analysis of risk factors for fetal heart rate deceleration caused by umbilical vein puncture guided by B-ultrasound

Logistic nonlinear single-factor analysis revealed a correlation between fetal heart rate deceleration and puncture time, number of successful punctures, amniotic fluid volume, and fetal cardiovascular system abnormalities. Multiple factor analysis demonstrated that puncture time, number of successful punctures, and fetal cardiovascular system abnormalities can serve as independent risk factors for fetal heart rate deceleration (**Table 1**).

Table 1. Analysis of risk factors for fetal heart rate deceleration caused by umbilical vein puncture guided by B-ultrasound

Variable	OR	95% confidence interval	P value
Puncture time	2.175	1.030–3.455	$P < 0.01$
Number of successful punctures	1.903	0.602–2.381	$P < 0.05$
Amniotic fluid volume	0.522	0.291–0.481	$P > 0.05$
Abnormalities of the fetal cardiovascular system	1.302	0.774–2.018	$P < 0.05$

4. Discussion

With an increasing focus on reducing congenital birth defects in fetuses, the number of pregnant women opting for prenatal diagnoses has risen. Traditional umbilical vein puncture, due to its complexity and reliance on operator experience, often results in low one-time puncture success rates and a higher probability of adverse events such as premature birth, miscarriage, umbilical cord bleeding, and fetal heart rate deceleration [6-9]. However, recent advancements in ultrasound technology have introduced percutaneous umbilical vein puncture guided by B-ultrasound. This method simplifies puncture difficulty and clarifies puncture sites, enhancing success rates and minimizing risks associated with the procedure [10-12]. This study, involving 90 patients, demonstrated a high success rate of 97.79% for umbilical vein puncture guided by B-ultrasound, with most procedures completed within 10 minutes, underscoring its efficiency in prenatal diagnosis.

Despite its advantages, B-ultrasound-guided umbilical vein puncture still carries risks, particularly fetal heart rate deceleration [13-15]. This risk is attributed to the invasive nature of the procedure, its technical challenges, and prolonged puncture duration, which may stimulate the umbilical artery excessively, leading to vasovagal reflexes and subsequent fetal heart rate deceleration. In this study, fetal heart rate deceleration occurred in 2 cases during puncture and 3 cases post-surgery, with a 5.56% incidence rate. Logistic nonlinear analysis identified puncture time, number of successful punctures, amniotic fluid volume, and fetal cardiovascular system abnormalities as correlated factors. Multiple factor analysis confirmed puncture

time, number of successful punctures, and fetal cardiovascular system abnormalities as independent risk factors for fetal heart rate deceleration ($P < 0.05$). Research data confirms that if the fetus is accompanied by cardiovascular abnormalities, the body's blood circulation is impaired and the puncture tolerance is low; When stimulated by puncture, vasoactive substances are released in large quantities, leading to autonomic nerve reflexes and subsequent fetal heart rate deceleration.

Effective identification of puncture sites and avoidance of the umbilical artery are crucial in enhancing puncture success rates and minimizing adverse events. Precautions and common risk factors are thoroughly explained to the patients before the procedure, with experienced operators selected to improve success rates and reduce long-term umbilical artery stimulation. Close monitoring of fetal heart rate during the procedure enables timely detection of fetal heart rate deceleration, allowing for targeted interventions to prevent adverse outcomes.

In conclusion, B-ultrasound-guided umbilical vein puncture for prenatal diagnosis demonstrates a high one-time success rate, facilitating early identification of high-risk groups and implementation of targeted measures to mitigate adverse events and ensure safety.

Disclosure statement

The authors declare no conflict of interest.

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Innoscience Research (Malaysia), which is global market oriented, was founded in 2016.Innoscience Research focuses on services based on scientific research. By cooperating with universities and scientific institutes all over the world, it performs medical researches to benefit human beings and promotes the interdisciplinary and international exchanges among researchers.

Innoscience Research covers biology, chemistry, physics and many other disciplines. It mainly focuses on the improvement of human health. It aims to promote the cooperation, exploration and exchange among researchers from different countries. By establishing platforms, Innoscience integrates the demands from different fields to realize the combination of clinical research and basic research and to accelerate and deepen the international scientific cooperation.

Cooperation Mode

Clinical Workers

In-service Doctors

Foreign Researchers

Hospital

University

Scientific institutions

Our Journals

The *Journal of Architectural Research and Development* is an international peer-reviewed and open access journal which is devoted to establish a bridge between theory and practice in the fields of architectural and design research, urban planning and built environment research.

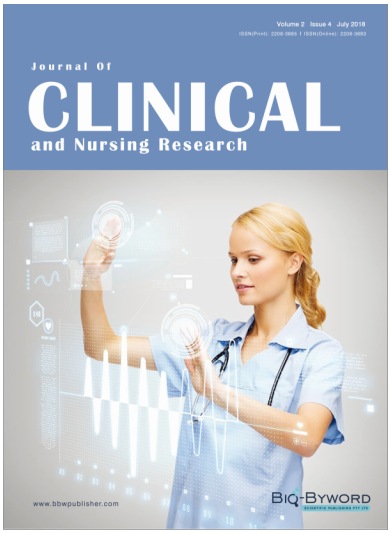
Topics covered but not limited to:

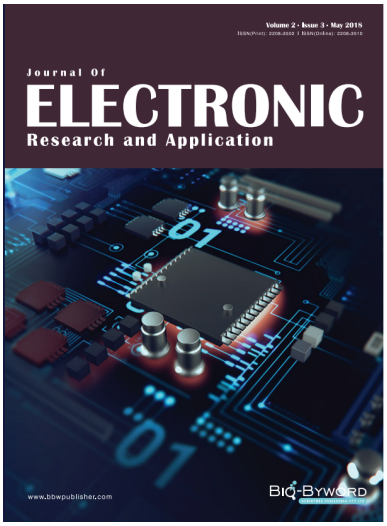
- Architectural design
- Architectural technology, including new technologies and energy saving technologies
- Architectural practice
- Urban planning
- Impacts of architecture on environment

Journal of Clinical and Nursing Research (JCNR) is an international, peer reviewed and open access journal that seeks to promote the development and exchange of knowledge which is directly relevant to all clinical and nursing research and practice. Articles which explore the meaning, prevention, treatment, outcome and impact of a high standard clinical and nursing practice and discipline are encouraged to be submitted as original article, review, case report, short communication and letters.

Topics covered by not limited to:

- Development of clinical and nursing research, evaluation, evidence-based practice and scientific enquiry
- Patients and family experiences of health care
- Clinical and nursing research to enhance patient safety and reduce harm to patients
- Ethics
- Clinical and Nursing history
- Medicine





Journal of Electronic Research and Application is an international, peer-reviewed and open access journal which publishes original articles, reviews, short communications, case studies and letters in the field of electronic research and application.

Topics covered but not limited to:

- Automation
- Circuit Analysis and Application
- Electric and Electronic Measurement Systems
- Electrical Engineering
- Electronic Materials
- Electronics and Communications Engineering
- Power Systems and Power Electronics
- Signal Processing
- Telecommunications Engineering
- Wireless and Mobile Communication