

The Impact of Experiential birth rehearsal on the Birth Experience of Primiparas: A quasi-experimental study

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Abstract

Background

Fear of childbirth is a common cause of stress among pregnant women and is a global issue that needs to be addressed to improve maternal mental health. It is reported that using health education methods before and during childbirth to inform pregnant women about the delivery process can effectively reduce their pain and stress during the delivery. Therefore, the aim of this study is to determine the impact of experiential birth rehearsal on fear of childbirth (primary outcome), the self-efficacy of mothers in labor, and their delivery outcomes (secondary outcomes).

Methods

A total of 118 primiparas who participated in antenatal classes at a tertiary hospital in Changsha, China, from January 2025 to January 2026, were selected as subjects. They were randomly divided into experimental and control groups by using randomly generated numbers in Microsoft Excel. The control group received routine antenatal health education, while the experimental group participated in an experiential birth rehearsal at 32 weeks in addition to the routine education. These two groups were compared in terms of childbirth fear, birth experience and preferred delivery mode.

Results

According to the survey, the score for childbirth self-efficacy was 262.44 ± 34.22 in the experimental group, higher than that for the control group (243.05 ± 57.81). While the fear of childbirth score was 37.57 ± 11.99 for the control group, the score for the experimental group was notably lower, at 33.88 ± 7.66 . The rate of natural delivery was higher in the experimental group than in the control group, with statistically significant differences ($P < 0.05$).

Conclusion

Experiential birth rehearsal for primiparas can effectively reduce fear of childbirth and enhance childbirth self-efficacy. The rehearsal helps pregnant women better understand the delivery process, encourage them to choose natural delivery, and reduce the need for unnecessary medical interventions, benefiting both maternal and infant health.

Background

The experience of childbirth is often regarded as an important milestone in the lives of many women⁽¹⁾. Although childbirth is a normal and natural physiological experience for women of childbearing age, the pain associated with it is considered one of the most severe pains which has ever been evaluated in the

world. During labor, the uterine smooth muscles contract, and the intrauterine pressure can reach up to 100–150 mmHg, causing intense pain. In other words, labor pain is a unique kind of pain, whose intensity is comparable to that of the pain a person experiences when his finger is severed (2). Largely because of the fear of the labor pain, many expectant mothers think of childbirth as an unknown, uncontrollable yet inevitable event which is closely associated with the fear of death. For some women, these feelings can trigger doubts about their ability to cope with the changes it brings, leading to undue anxiety. In such cases, a fear of childbirth FOC can easily arise (3). This phenomenon is understandably more common among first-time mothers (4).

Common among pregnant women, FOC is a complex emotion characterized by anxiety and avoidance behaviors that arise when expectant mothers face the approaching or ongoing process of labor (5). Reports indicate that the global prevalence of FOC is about 16%(6), while in China it is approximately 22.3%(7). Fear of childbirth is often considered a common psychological stressor in late pregnancy(8). It not only triggers various physical and mental discomforts during pregnancy but also leads to increased likelihood of emergency cesarean sections (9, 10), various psychological disorders, and a higher risk of adverse neonatal outcomes, such as preterm birth and low birth weight, affecting the overall outcome of delivery (11).

FOC and negative childbirth experiences can lead to postpartum depression and anxiety, severely undermining mothers' adaptation to their life after delivery and the relationship between the mother and the infant. In other words, they hinder the transition into the maternal role (3, 12, 13). In 2019, the Psychosomatic Health Group of the Chinese Preventive Medicine Association issued the "Expert Consensus on Maternal Mental Health Management," which identified fear of childbirth as one of the most common stress issues among pregnant women. The consensus advocates for enhancing maternal mental health care to reduce the incidence of fear of childbirth and improve overall maternal psychological well-being(14). Currently, an increasing body of literature has recognized the importance of identifying FOC and pregnancy-related anxiety in maintaining women's perinatal mental health (1, 15). Therefore, reducing the incidence of fear of childbirth has become an urgent issue that needs to be addressed clinically.

Childbirth preparation training and education generally involve real-life simulations and detailed demonstrations to familiarize expectant mothers with every important stage of childbirth, from contractions to delivery of the placenta(16). This approach aims to help expectant mothers understand the common procedure, reduce their anxiety, reinforce their confidence, and ultimately increase the rate of natural childbirth. Taking one step further, the study employs experiential childbirth simulations to improve first-time mothers' knowledge about childbirth and to reduce their fear of childbirth.

Methods

This quasi-experimental trial was reported in accordance with the TREND guidelines. It has been reviewed and approved by the Ethics Committee of Changsha Maternal and Child Health Care Hospital,

with the ethical approval number (EC-20250430-11). All participant data were anonymized without any personally identifiable information retained.

Study design

This study is a quasi-experimental study, divided into an intervention group and a control group. The study conveniently selected first-time mothers who attended antenatal check-ups at the obstetrics outpatient department of Changsha Maternal and Child Health Care Hospital from January 2025 to January 2026 as the research subjects. Informed consent was obtained from the pregnant women. Blinding was only implemented for the data analysts in this study.

Study population

Inclusion criteria: (1) age ≥ 20 years old; (2) Primipara, single birth; (3) Head position, meet the conditions of vaginal delivery; (4) The gestational week is 32 ~ 36 weeks; (5) Have the intention of vaginal delivery; (6) Have normal reading and comprehension ability, volunteer to participate in this study; Exclusion criteria: (1) serious pregnancy complications or complications; (2) Multiple births; (3) Abnormal fetal position; (4) With mental illness or communication disorder.

Sample size calculation: In this study, the sample size calculation formula ($N1 = N2 = 2 \times [(\mu\alpha + \mu\beta) \times \sigma / \delta]^2$) for the comparison of two sample means was adopted, with $\mu\alpha = 1.96$ and $\mu\beta = 1.28$, and the loss of follow-up rate of 15% was considered. Finally, 116 samples were determined, and 58 cases were in the experimental group and the control group respectively. There was no significant difference in the general information between the two groups ($P > 0.05$).

Randomization & masking

Patients who met the inclusion criteria were numbered according to the order of admission. Random numbers were generated using Excel for group allocation. However, due to limitations inherent to a single-center clinical setting, allocation concealment was not implemented, resulting in a quasi-experimental design. Only the data analyst was blinded; the study participants and midwives were not blinded. A total of 116 mothers were chosen as subjects and were equally divided into two groups.

Procedures

Sampling was started after the study was approved by the hospital ethics committee. The researchers briefly introduced the study design and plan to Research Subjects in a face-to-face manner. Participants were assessed according to the inclusion and exclusion criteria, and if they were eligible and willing to participate in the study, they were asked to go to the maternity school at a specific time. At the maternity school, pregnant women were provided with a comprehensive research plan, including the goals,

importance and benefits of participating in the study, as well as the stages of study implementation. The socio-demographic characteristics of the subjects were collected in the form of an electronic questionnaire.

Control group

Participants in the control group received routine antenatal health education, including regular prenatal check-ups and maternity school lectures. The lectures covered safe delivery knowledge, precautions in late pregnancy, signs of labor onset, hospital admission preparation, breastfeeding, and newborn care.

Experimental group

In addition to the routine antenatal education, the experimental group participated in an experiential birth rehearsal training program, with the husbands required to attend all sessions. The training comprised the following components:

Theoretical course – Experienced midwives delivered specialized lectures on the labor process using PowerPoint presentations. The content included the determinants of delivery, fetal intrauterine anatomy, and the mechanism of fetal descent, illustrated with physical models and videos. Participants learned about fetal engagement, descent, flexion, internal rotation, extension, restitution, external rotation, and shoulder delivery, establishing reasonable expectations of labor.

Familiarization with the delivery room – All participants received a guided tour of the delivery ward. Staff demonstrated the use of delivery beds and rest rooms for prenatal and postpartum care, allowing participants to become acquainted with the facilities they would encounter during delivery.

Simulated labor practice – Under the guidance of medical staff, participants engaged in simulated uterine contraction experience, Lamaze breathing exercises, and standard labor posture drills.

Pain management education – Midwives explained the physiological causes of labor pain and introduced various clinical analgesia options. Participants also learned home-based relaxation methods, including yoga ball training, prenatal yoga, and mindfulness music therapy for pain relief.

Emergency simulation – Trainees were educated on common intrapartum emergencies (e.g., prolonged labor, abnormal fetal position, and sudden rapid labor), mastered basic coping skills, and understood when to seek immediate medical attention.

Interactive couple role-play – Pregnant women and their partners learned early signs of labor and practiced corresponding coping strategies through role-play, enabling calm responses when labor began.

Question-and-answer session – Participants and their partners could raise questions at any time during the rehearsal, and medical staff answered all queries to clarify any confusion regarding each stage of labor.

Outcome measurement

Before hospital admission, participants completed two validated scales assessing childbirth self-efficacy and childbirth fear. After delivery, data on the mode of delivery were collected.

Primary outcomes

Fear of childbirth Questionnaire

Compiled by American scholars Lowe et al., the questionnaire was translated into Chinese by Wei Juan(17). The questionnaire, which has a total of 16 items, includes four parts: fear of child health, fear of pain and injury, fear of hospital intervention and environment, and fear of losing control of childbirth. The Likert four-point rating is arranged with a scale from "never" (1 point), mild (2 points), moderate (3 points), to severe (4 points). Therefore, the total score ranges from 16 to 64 points. The higher the score, the more severe the fear of childbirth. Scores from 16 to 27 points, 28 to 39 points, 40 to 51 points, and 52 to 64 points represent no, mild, moderate, and severe fear of childbirth, respectively. The internal consistency coefficient of the scale is 0.83, and the Cronbach's α coefficient of the scale is 0.91(17).

Secondary outcomes

Chinese version of the Childbirth Self-Efficacy Scale (CBSEI-C32)

This scale, which contains 32 items, includes two parallel subscales: the outcome expectation scale and the childbirth self-efficacy scale. Each subscale consists of the same 16 items, scored on a scale from 1 to 10, with a total score of 32 to 320 points. The higher the score, the higher the childbirth self-efficacy; that is, the more confident one is of her ability to have a natural childbirth. The reliability and validity test has been conducted on pregnant women in mainland China, and its internal consistency coefficient was 0.9(18).

Delivery outcome

After the subjects had given birth, the number of cesarean sections and vaginal delivery in the two groups were counted.

Statistical analysis

SPSS 25.0 software was used for statistical analysis of the data. The measurement data were in accordance with normal distribution and homogeneity of variance, and were described statistically as mean $\pm$ standard deviation, and statistical inference was performed using independent sample t test. The count data were expressed as frequency and percentage (%), and statistical inference was performed using χ^2 test. The significance level of the statistical test was less than 0.05. All analyses were performed based on the intention to treat.

Results

A total of 118 pregnant women agreed to enroll and completed the entire research protocol in this study. Table 1 shows the sociodemographic information of the participants in the two study groups. There was no significant difference between the two groups in terms of sociodemographic information (Table 1).

Table 1
Comparison of socio-demographic characteristics between the two groups

Variable	Intervention (n = 58)	Control(n = 58)	t/x ²	P
Age(years)	32.10 ± 6.25	30.27 ± 4.85	1.778	0.078 ^b
Gestational weight gain (kg)	19.52 ± 13.80	16.53 ± 7.31	1.471	0.144
Education level			3.986	0.263 ^a
Junior high school and below	8	2		
Technical secondary/high school	10	12		
College or undergraduate	37	41		
Master and above	4	4		
Payment method			1.448	0.229 ^a
Self-funded	8	13		
Medical insurance	51	46		
Pregnancy method			0.702	0.402 ^a
Natural conception	57	55		
Assisted reproduction	2	4		
Monthly household income (CNY)			3.440	0.329 ^a
< 2000	1	1		
2000–4000	12	13		
4001–6000	12	20		
> 6000	34	25		
Willingness to attend maternity school			0.915	0.339 ^a
Yes	40	35		
No	19	24		
Note: a Chi-squared test; b Independent sample t-test.				

Outcomes

Before the intervention, there was no significant difference in the total scores of childbirth self-efficacy and fear of childbirth scale between the experiential childbirth rehearsal group and the control group ($P = 0.574/0.535$). After the intervention, the total scores of childbirth self-efficacy in the experiential childbirth rehearsal group were higher than those in the control group ($P = 0.029$), and the total scores of fear of childbirth scale were lower than those in the control group ($P = 0.049$). (Table 2).

Table 2
Comparison of childbirth self-efficacy and fear of childbirth scores between the two groups

Group	childbirth self-efficacy scores (CBSEI-C32)		Fear of childbirth scores (CFQ)	
	Before intervention	After intervention	Before intervention	After intervention
Intervention(n = 58)	229.78 ± 67.92	262.44 ± 34.22	40.17 ± 10.61	33.88 ± 7.66
Control (n = 58)	222.98 ± 63.04	243.05 ± 57.81	38.81 ± 12.95	37.57 ± 11.99
t	0.720	2.217	0.622	-1.994
P	0.574	0.029	0.535	0.049
Note: Independent t-test was used for intergroup comparison before intervention. CBSEI-C32 was adopted to measure childbirth self-efficacy; CFQ was used to assess childbirth fear.				

Table 3
Comparison of the number of cesarean sections and vaginal delivery between two groups of the experiential birth rehearsal and control

Variable	n	cesarean sections	vaginal delivery	χ^2	P
experiential birth rehearsal	58	4	55	4.035	0.045
Control	58	11	46		

Chi-squared test was used to compare delivery mode after intervention between the two groups

Discussion

This study mainly examined the effect of experiential childbirth rehearsal on the fear of childbirth as the primary outcome and on childbirth self-efficacy and childbirth outcomes as secondary indicators. The results of this study showed that the fear of childbirth and the cesarean section rate in the experiential childbirth rehearsal group were lower than those in the control group. On the other hand, the childbirth self-efficacy was higher among the subjects in the experimental group than those in the control group. All the differences were statistically significant.

Experiential childbirth rehearsal can reduce the fear of childbirth for primiparas and increase their childbirth self-efficacy

In 2021, the Maternal and Child Health Department of the National Health Commission(19) issued the [“Maternal and Child Safety Action Enhancement Plan \(2021–2025\)”](#), which pointed out that the Maternal and Child Safety Action Enhancement Plan should be organized and implemented nationwide to safeguard the health rights and interests of women and children. For first-time mothers, childbirth is a completely new experience. They lack understanding of every step of the childbirth process, which makes them feel uneasy and afraid(20). This study showed that experiential childbirth rehearsal can effectively reduce the fear of childbirth in primiparas, which is consistent with the study of Wang Xiu-yu et al(21). Experiential birth rehearsal training is a method of real-life simulation and detailed demonstration to help pregnant women understand and become familiar with the entire process from hospital admission to delivery in advance, so as to reduce the adverse effects of pregnancy on the delivery process, thereby improving the self-efficacy of pregnant women and alleviating their fear of delivery(16). The aim of experiential birth rehearsal training education is to let pregnant women know and be familiar with the whole process, starting from hospital admission to delivery in advance through real-life simulation and detailed demonstration. It is hoped that when first-mothers are equipped with necessary knowledge and coping strategies, the adverse impacts of fear on the delivery process can be reduced and their confidence in giving birth naturally can be enhanced. According to the study, through experiential birth rehearsal, primiparas can find out more about the whole process of delivery, including the specific steps and possible situations in each stage. Moreover, through actual simulation operations, primiparas can have a better understanding of what is going to happen during the delivery process, such as the feeling of uterine contractions. Primiparas can become familiar with and even try different pain management strategies, which helps them find the most suitable pain relief method for themselves, thereby reducing anxiety about labor pain. Moreover, this practical operation experience can help them better cope with various situations that might happen during the real delivery and thus reduce the panic caused by emergencies. This increase in knowledge can effectively help them reduce their fear of the unknown. In addition, the experiential birth rehearsal invites partners to participate together. By rehearsing with their husbands, primiparas can feel the support and encouragement from their families, which is very important for reducing the fear of delivery. What’s more, experiential childbirth rehearsal provides an opportunity to interact with medical staff. First-time mothers can take this opportunity to ask questions, understand possible problems and coping methods during childbirth, build trust in medical staff, and thus reduce their fear of the medical environment.

Effect of experiential childbirth rehearsal on the delivery mode of primiparas

The results of this study show that experiential childbirth rehearsal increases primiparas’ willingness to choose natural childbirth, which is consistent with the study of Wang Xiu-yu et al (21). Through experiential childbirth rehearsal, primiparas can understand and practice different childbirth postures

and strategies. These exercises can enhance their self-confidence, make them believe that they can cope with the challenges of childbirth, and increase their self-efficacy in childbirth, which makes them feel more in control during the actual childbirth process. This sense of control can greatly reduce anxiety and promote a more positive childbirth experience, thus affecting their choice of childbirth method. Through experiential childbirth rehearsal, primiparas can better understand the process and coping strategies of natural childbirth, which in turn increases their confidence in natural childbirth. By designing and establishing simulated childbirth procedures and scenarios, this study integrates medical expertise, technical support and realistic environmental settings to provide pregnant women with an opportunity to have a simulated experience of the childbirth in advance. This increases not only their self-confidence but also their understanding of the process, which enhance their confidence to opt for natural childbirth rather than rely on medical interventions such as cesarean section. In addition, through the simulation of emergency situations, primiparas can be better prepared to deal with emergencies, so that they are more confident in the actual childbirth that they will have. Through rehearsal, primiparas not only acquire practical knowledge and skills, but also receive psychological preparation and emotional support. These preparations and supports can alleviate their fear of the mode of delivery and make them calmer and more rational when facing actual delivery, so as to make a choice of the mode of delivery that is more suitable for them.

Strengths and limitations

International studies have verified that childbirth simulation can improve maternal psychological status, yet most foreign training programs only involve pregnant women without partner participation, and lack comprehensive drills of labor environment, pain coping and obstetric emergencies. This study developed a localized multi-module experiential birth rehearsal program suitable for Chinese clinical settings, requiring husbands to take part in the whole training process. Combined with ward tours, Lamaze breathing practice, emergency simulation and couple role-play, the intervention fully meets domestic family-centered maternity care demands and offers a practical antenatal psychological intervention model for local hospitals.

This study has several limitations. First, subjects were recruited by convenience sampling from a single tertiary maternal and child hospital in Changsha, which may cause selection bias and limit the generalizability of findings to grassroots hospitals or women from other regions. Second, only short-term prenatal indicators were measured, including childbirth fear, childbirth self-efficacy and delivery mode. Long-term postpartum outcomes such as postpartum depression and mother-infant attachment were not followed up, so the sustained effect of the intervention remains unclear. Third, as a quasi-experimental trial, allocation concealment was not implemented, and both midwives and participants knew the group assignment, which might lead to information bias. Rigorous randomized controlled trials are needed for further verification.

Nevertheless, this experiential birth rehearsal program is worthy of clinical promotion. It can be carried out in existing maternity schools with regular midwives, requiring no extra expensive equipment and bringing low labor and financial costs. Integrated into routine antenatal care, the rehearsal effectively

relieves nulliparous women's fear of childbirth, boosts their confidence in vaginal delivery, and reduces unnecessary cesarean deliveries caused by psychological anxiety. It conforms to national maternal and child safety policies and is suitable for popularization in tertiary maternal and child health institutions in China.

Conclusion

Fear of childbirth is a common psychological stressor during late pregnancy, which can induce physical and psychological discomfort, non-medically indicated cesarean sections, postpartum mood disorders, and adverse delivery outcomes such as preterm birth and low birth weight. This study confirms that implementing a realistic childbirth rehearsal intervention for primiparous women can effectively reduce their fear of childbirth, enhance childbirth self-efficacy, help pregnant women fully familiarize themselves with the delivery process, autonomously choose vaginal delivery, reduce unnecessary medical interventions, and improve maternal and infant health outcomes. In summary, the childbirth rehearsal intervention is compatible with the clinical prenatal care system and is recommended to be incorporated into routine prenatal education programs for primiparous women and implemented on a broader scale.

Abbreviations

CBSEI-C32

Chinese version of Childbirth Self-Efficacy Inventory

CFQ

Fear of Childbirth Questionnaire

FOC

Fear of Childbirth

All abbreviations are defined at their first appearance in the manuscript text.

Declarations

2. Ethics approval and consent to participate

This quasi-experimental study was reviewed and approved by the Ethics Committee of Changsha Hospital for Maternal & Child Health Care Affiliated to Hunan Normal University (Ethics Approval No. EC-20250430-11). All procedures performed involving human participants in this research strictly complied with the ethical standards stated in the 1964 Declaration of Helsinki and its subsequent revised editions, as well as relevant domestic clinical research ethical regulations in China. All eligible primiparas received full verbal and written explanations of research objectives, intervention content, potential benefits and risks before enrollment. Each participant voluntarily signed written informed consent prior to data collection. All personal identifiable information was anonymized during data sorting and statistical analysis to fully protect participant privacy.

3. Consent for publication

Not applicable. No individual identifiable clinical images, videos or personal case records are included within this manuscript; only aggregated anonymized group statistical data are presented.

4. Availability of data and materials

The raw datasets generated and analysed during this study cannot be publicly released due to hospital patient privacy protection rules and ethics committee restrictions. Anonymized de-identified aggregate data supporting the findings of this study can be obtained from the corresponding author upon reasonable formal research request.

5. Competing Interests

The authors declare that they have no competing financial or non-financial interests in relation to this research work and manuscript submission.

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7. Authors' contributions

XL Li and XL Wu jointly designed the research framework, completed field data collection, drafted the original manuscript and conducted repeated manuscript revisions. YQ Fang, Z Yin, YJ Wang, Q Shu participated in participant recruitment, scale distribution and data sorting. QH Xiang supervised the whole research project, guided statistical analysis and revised the final version of the manuscript. All authors read and fully approved the final submitted manuscript.

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