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Effect of Family-Centered Prenatal Education on Anticipatory Fear of Childbirth Among Primigravida Mothers

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Abstract: *Objectives*: Childbirth fear affects 34.2% of Chinese primigravida women, leading to adverse birth outcomes. Family-centered prenatal education (FCPE) may reduce fear through enhanced support systems. *Methods*: This quasi-experimental study examined the effectiveness of FCPE among 120 primigravida women (14–20 weeks' gestation) at Yancheng Third People's Hospital. Participants with elevated Childbirth Fear Questionnaire (CFQ) scores (≥ 81) were assigned to either the experimental group (FCPE + standard care, n = 60) or the control group (standard care only, n = 60). FCPE consisted of five weekly 2-hour sessions involving pregnant women and family members. *Results*: Both groups showed moderate baseline fear levels (experimental: 85.68 ± 6.30; control: 88.57 ± 6.41, $p = 0.112$). Post-intervention, the experimental group achieved significantly lower fear scores (80.43 ± 8.53 vs. 87.35 ± 6.91, $p = 0.001$, Cohen's d = 0.88). 58.3% of experimental participants transitioned to low fear levels, compared to 16.7% in the control group. Educational level significantly moderated the outcomes within the experimental group ($p = 0.031$). *Conclusion*: FCPE effectively reduces anticipatory childbirth fear with a large effect size, supporting implementation in Chinese prenatal care for improving maternal psychological well-being.

Keywords: Anticipatory childbirth fear; Family-centered prenatal education; Primigravida; Childbirth fear questionnaire; China

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1. Introduction

Pregnancy represents a critical life transition characterized by complex physiological and psychological adaptations. Psychological challenges of pregnancy can manifest in different forms of fear. Psychological challenges can manifest as fear of pregnancy itself or fear of childbirth (tokophobia). This study focused on anticipatory fear of childbirth during 14–20 weeks of gestation.

Childbirth fear typically manifests during the second trimester (13–26 weeks). Global prevalence varies from 6–10% in Western countries to higher rates in Asian contexts [1].

Primigravida women face distinct challenges: lack of experiential knowledge, greater uncertainty about coping with labor pain, higher anxiety about complications, lower self-efficacy, and role transition anxiety [2]. In China, prenatal education participation is low (29.1%) [3]. Cultural factors further influence fear: traditional beliefs, family expectations, preference for male children, and collectivist values amplify anxiety [4,5]

Family-centered prenatal education addresses these concerns, prioritizing the family's role throughout prenatal, intrapartum, and postnatal periods. Structured programs improve maternal outcomes and reduce anxiety [6]. Most fear-reduction interventions focus on individual counseling or group education [7].

Given these gaps, this study aims to evaluate the effectiveness of a structured family-centered prenatal education program in reducing anticipatory childbirth fear among primigravida women at a tertiary hospital in China.

1.1. Research aim

This study examined whether a structured five-week family-centered prenatal education program reduces anticipatory fear of childbirth among primigravida women, compared with standard prenatal care.

1.2. Specific objectives

(1) To compare pre and post intervention levels of anticipatory fear of childbirth between primigravida women in the experimental and control groups.
(2) To evaluate within group changes in fear of childbirth before and after intervention
(3) To examine subgroup differences in post intervention fear scores in the experimental group according to age, educational level, and gestational age at recruitment

1.3. Significance of the study

This study demonstrates that family-centered prenatal education can effectively reduce anticipatory fear of childbirth among primigravida women. The findings provide evidence for nurses to implement targeted psychological support and structured health education during the prenatal period. The results may serve as a reference for improving clinical prenatal care protocols and developing family-involved intervention strategies in maternity nursing. In addition, the study offers a basis for future research exploring fear-reduction interventions and contributes to the growing evidence supporting family-centered care in maternal health.

2. Synthesis

Family-centered prenatal education can reduce maternal anxiety and childbirth fear, but evidence in Chinese healthcare settings is limited. Effectiveness is influenced by maternal age, education, timing of intervention, and cultural context. Most studies focus on the pregnant woman and her partner, with little attention to broader family involvement or integration of digital tools. These gaps highlight the need for culturally adapted, structured interventions that include mandatory family participation, use childbirth-specific outcome measures, and target the second trimester. The present study addresses these gaps through a five-session program, assessing its impact on anticipatory childbirth fear among primigravida women in a Chinese tertiary hospital.

3. Hypothesis

$H_0$1: There is no statistically significant difference in post-intervention anticipatory fear of childbirth scores among primigravida women in the experimental group based on: a) age groups (22–26, 27–31, 32–35 years); b) educational level (high school, college, post-graduate); and c) gestational age at recruitment (14–16, 17–20 weeks).

$H_0$2: There is no significant difference in the level of anticipatory fear of childbirth before and after the intervention in the control group.

$H_0$3: There is no significant difference in the level of anticipatory fear of childbirth between the control and experimental groups before the intervention.

$H_0$4: There is no significant difference in the level of anticipatory fear of childbirth before and after the intervention in the experimental group.

$H_0$5: There is no significant difference in the level of anticipatory fear of childbirth between the control and experimental groups after the intervention.

4. Conceptual framework

This study's conceptual framework is grounded in Johnson's (2008) core concepts of family-centered care, theoretically supported by Social Support Theory and Self-Efficacy Theory. These theoretical foundations explain the mechanisms through which family-centered prenatal education reduces anticipatory childbirth fear among primigravida women.

4.1. Johnson's framework for family-centered care

Family-centered care involves healthcare providers partnering with families to achieve safe, high-quality, and satisfying care. Four core concepts underpin this approach 2008 [8].

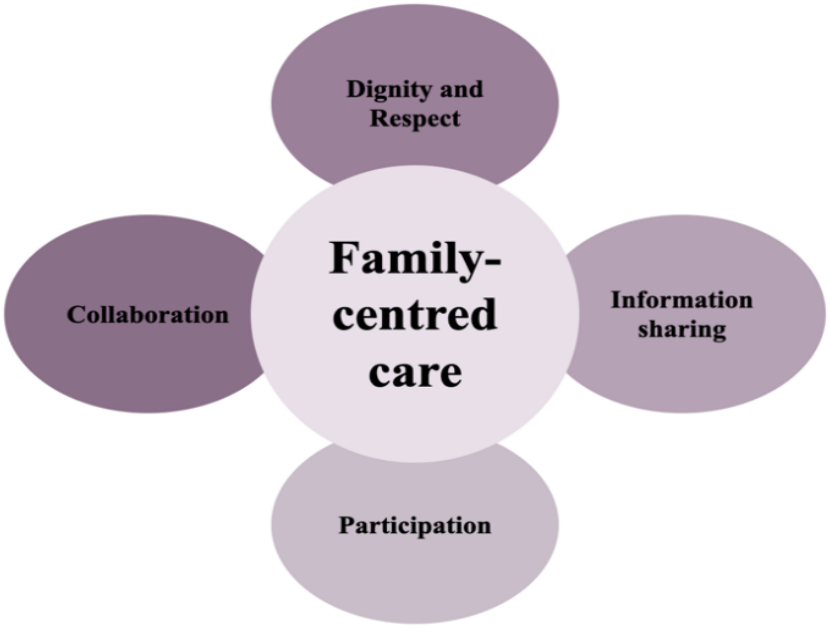

Figure 1. Core concepts of family-centered care.

(1) Dignity and respect

Recognize patients' and families' values, beliefs, and cultural backgrounds.

(2) Information sharing

Provide timely, accurate, and unbiased information to enable informed decision-making.

(3) Participation model

Support active participation of patients and families in care and decisions.

(4) Cooperation

Collaborate with families in care planning, policy, and program implementation.

4.2. Theoretical framework

Social Support Theory explains how family-centered care reduces childbirth fear by providing both structural support (availability of family) and functional support (emotional, informational, appraisal, and instrumental) [9,10]. Dignity and Respect enhance emotional support; Cooperation strengthens appraisal support, helping families provide constructive feedback.

Self-Efficacy Theory complements this by showing how family-centered education builds maternal confidence through mastery experiences, vicarious learning, verbal persuasion, and emotional reframing [11]. Johnson's core concepts operationalize these mechanisms in prenatal education.

Together, these frameworks explain how family-centered prenatal education reduces childbirth fear by enhancing social support and building maternal self-efficacy, addressing the vulnerabilities of primigravida women (limited experience, uncertainty about coping, anxiety about the unknown). The approach is culturally appropriate in Chinese contexts, where family support plays a central role in maternal well-being.

5. Research paradigm

The diagram illustrating the interaction of the variables in this study is presented in **Figure 2** below.

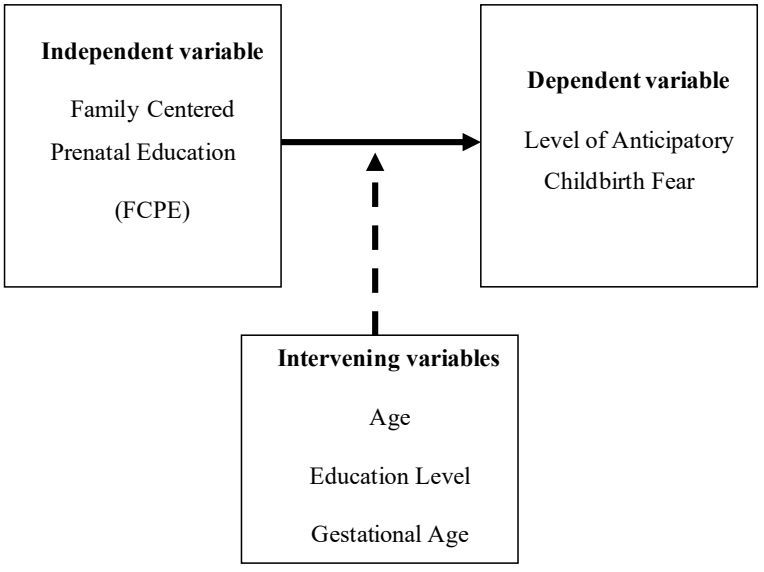

Figure 2. Research diagram on the effect of Family-Centered Prenatal Education on anticipatory fear of childbirth among primigravida.

The research diagram illustrates the relationship between Family-Centered Prenatal Education (FCPE) as the independent variable and Level of Anticipatory Childbirth Fear as the dependent variable. The diagram illustrates how FCPE directly influences the Level of Anticipatory Childbirth Fear, as shown by the solid arrow connecting these two variables. Additionally, the framework identifies three intervening variables (Age, Education Level, and Gestational Age), indicated by a dashed arrow. This paradigm suggests that while FCPE may directly affect the Level of Anticipatory Childbirth Fear, the effectiveness of the intervention could be influenced by these demographic and pregnancy-related factors.

6. Definition of terms

6.1. Fear of childbirth

Anticipatory fear of childbirth refers to anxiety and concern about the birthing process, which may manifest as psychological and physiological responses [1,7]. In this study, it is measured using the 40-item Childbirth Fear Questionnaire (CFQ), with scores ranging from 0–160: minimal (0–40), low (41–80), moderate (81–120), and high fear (121–160). A score ≥ 81 indicates elevated fear and serves as an inclusion criterion.

6.2. Family-centered prenatal education

FCPE is a structured educational program promoting maternal and family well-being through infant care, breastfeeding, postpartum support, and coping strategies for pregnancy and childbirth. In this study, it consists of a five-week program with weekly 2-hour group sessions, requiring participation of the pregnant woman and at least one family member, addressing stage-specific fear components.

6.3. Primigravida mother

A primigravida mother is a woman experiencing her first pregnancy with no history of prior pregnancies (miscarriage, ectopic pregnancy, or abortion). Participants in this study were 22–35 years old, carrying a single viable fetus, at 14–20 weeks gestation, and without diagnosed pregnancy complications.

6.4. Standard prenatal care (control group)

Standard prenatal care includes routine medical visits with physical exams, laboratory tests, ultrasounds, and health guidance on nutrition, lifestyle, and delivery preparation, without participation in the structured FCPE program.

7. Research methodology

This chapter covers the research design, demographics and sampling, research location, instrument, data collection process, statistical analysis of the data, and ethical considerations.

7.1. Research design

This study employed a non-equivalent quasi-experimental pretest-posttest control group design, appropriate when randomization is not feasible in clinical settings [12]. This design has been successfully implemented in similar prenatal education studies in Asian contexts [13].

Participants were primigravida women aged 22–35 years, at 14–20 weeks' gestation, carrying singleton

pregnancies. Those with pregnancy complications or psychiatric disorders were excluded to prevent confounding. Baseline equivalence testing and demographic matching ensured comparability between the experimental and control groups.

The experimental group received a five-week Family-Centered Prenatal Education (FCPE) program in addition to standard prenatal care, while the control group received standard care only. Both groups completed pretest and posttest assessments using the Childbirth Fear Questionnaire (CFQ) at baseline (T1) and post-intervention (T2, 21–26 weeks' gestation).

FCPE consisted of five weekly 2-hour sessions incorporating fear-specific content, interactive skill-building exercises, structured family involvement, and multiple teaching modalities, grounded in Johnson's (2008) core concepts of family-centered care. Standard care included routine prenatal education and medical monitoring. The key difference was that FCPE explicitly targeted psychological preparation and fear reduction, whereas standard care emphasized physical health and medical management.

7.2. Population and sampling

The study population comprised primigravida women attending prenatal outpatient clinics at Yancheng Third People's Hospital, Jiangsu Province, China. A priori power analysis using G*Power 3.1 indicated a minimum sample size of 50 participants per group (total n = 100) based on a moderate effect size ($d = 0.4$), $\alpha = 0.05$, and power = 0.80. Ultimately, 60 participants per group were recruited using purposive sampling.

Eligible participants met the following inclusion criteria: first-time mothers aged 20–35 years, 14–20 weeks gestation, carrying a single healthy pregnancy, literate in Chinese, and demonstrating elevated childbirth fear (CFQ ≥ 81). Exclusion criteria included multiparity, pregnancy complications, severe medical or psychiatric conditions, and inability to participate fully in the study.

Participants were screened through medical record review and baseline CFQ assessment. Eligible respondents were alternately assigned to the experimental or control group. For the experimental group, family member availability was confirmed prior to enrollment to ensure participation in the family-centered prenatal education sessions.

7.3. Research locale

The study was conducted at Yancheng Third People's Hospital, a 1600-bed tertiary care facility in Jiangsu Province, China. This setting was selected due to its high volume of prenatal cases (approximately 1,000 primiparas per month) and well-equipped facilities for educational interventions.

7.4. Research instrument

Two instruments were used: a demographic questionnaire and the Childbirth Fear Questionnaire (CFQ). The demographic questionnaire collected basic information, including age, education, and relevant socioeconomic factors.

The CFQ is a 40-item self-report instrument scored on a 5-point Likert scale (0 = not at all fearful, 4 = extremely fearful), with total scores ranging from 0 to 160. This study targeted women with moderate to high fear (CFQ ≥ 81). The Chinese version demonstrated good reliability (Cronbach's alpha = 0.845).

Translation followed standard forward–back translation procedures, with review by a translation expert to ensure semantic and conceptual equivalence. Reliability testing was conducted in a sample of 182 primigravida

women from the same hospital using the same inclusion criteria. Standardized data collection protocols were followed throughout the study.

7.5. Data gathering timeline

The selection of specific gestational age windows for recruitment, intervention, and assessment was based on extensive research regarding the optimal timing for prenatal interventions and the development of fear trajectories during pregnancy.

(1) Recruitment window (14–20 weeks of gestation):
Participants were recruited between 14 and 20 weeks of gestation.

(2) Intervention period (15–20 weeks for a 5-week program):
The intervention was delivered during weeks 15–20 of gestation to ensure completion before 21 weeks.

(3) Post-Intervention Assessment Window (21–26 weeks of gestation):
The post-intervention assessment occurred at 21–26 weeks, 5–6 weeks after baseline. Both groups experienced identical gestational age progression.

7.6. Data collection process

7.6.1. Phase 1: Preparatory phase

The preparatory phase commenced with securing the necessary approvals and establishing the study foundations. This study received ethical approval from the Far Eastern University Ethics Review Committee (FEU-ERC) (Approval Number: REB-2025-98, dated March 5, 2025) and from the Research Ethics Committee of Yancheng Third People's Hospital (dated May 1, 2025). All procedures were conducted in accordance with the ethical standards and regulations governing healthcare research. Written informed consent was obtained from all participants before the commencement of any study procedures.

A crucial component of the preparatory phase involved translating and validating the Childbirth Fear Questionnaire (CFQ). The validation process followed these steps. First, the translation phase involved forward translation from English to Chinese by a professional translator, followed by back-translation to English by a different professional translator who had not seen the original version. A translation expert then reviewed the translations to assess semantic, idiomatic, and conceptual equivalence between versions and resolve any discrepancies. Following translation, the reliability testing phase was conducted with 182 primigravida women recruited from the same hospital setting, using the same inclusion/exclusion criteria as the main study.

Two types of reliability were assessed: internal consistency reliability, where Cronbach's alpha will be calculated from the first administration of the translated CFQ to determine how well the items measure the same underlying construct; and test-retest reliability, the main study commenced only after establishing satisfactory reliability coefficients (Cronbach's alpha ≥ 0.70 and test-retest correlation ≥ 0.70).

7.6.2. Phase 2: Initial medical record screening

Initial screening commenced with a review of medical records at Yancheng Third People's Hospital. The researcher identified potentially eligible respondents based on fundamental criteria (primigravida status, age between 20 and 35 years, gestational age between 14 and 20 weeks, single healthy pregnancy status, Chinese literacy, and absence of severe medical or psychiatric conditions).

The process of accessing medical records followed hospital privacy regulations, and only minimum necessary

information was collected for eligibility.

7.6.3. Phase 3: Informed consent

Women meeting these initial eligibility requirements were approached during their scheduled prenatal visits to discuss participation in the study.

The process of accessing medical records followed hospital privacy regulations, and only minimum necessary information was collected for eligibility.

7.6.4. Phase 4: Baseline assessment and final eligibility determination

Respondents completed demographic information and CFQ in a private setting. This CFQ served to determine eligibility and provide baseline data.

7.6.5. Phase 5: Group assignment

Respondents with elevated CFQ scores (≥ 81) were alternately assigned to control or intervention groups. Additional screening verified family member availability for the intervention. Contact information was collected follow-up.

7.6.6. Phase 6: Intervention implementation

The intervention phase employed a parallel-group design, with all respondents recruited between 14 and 20 weeks of gestation. Control group: Received standard prenatal care per existing hospital protocols. Experimental group: The five-week FCPE was delivered by trained obstetric nurses. Treatment fidelity was maintained through a standardized curriculum, checklist, and separate assessors. Scheduling was consistent across five sessions.

7.6.7. Phase 7: Post-intervention assessment

The post-intervention assessment was conducted at 21–26 weeks of gestation. Both groups completed the CFQ, and data were matched using unique identifiers.

7.6.8. Phase 8: Data processing and analysis

All collected data underwent analysis using SPSS V26.

7.7. Research flow

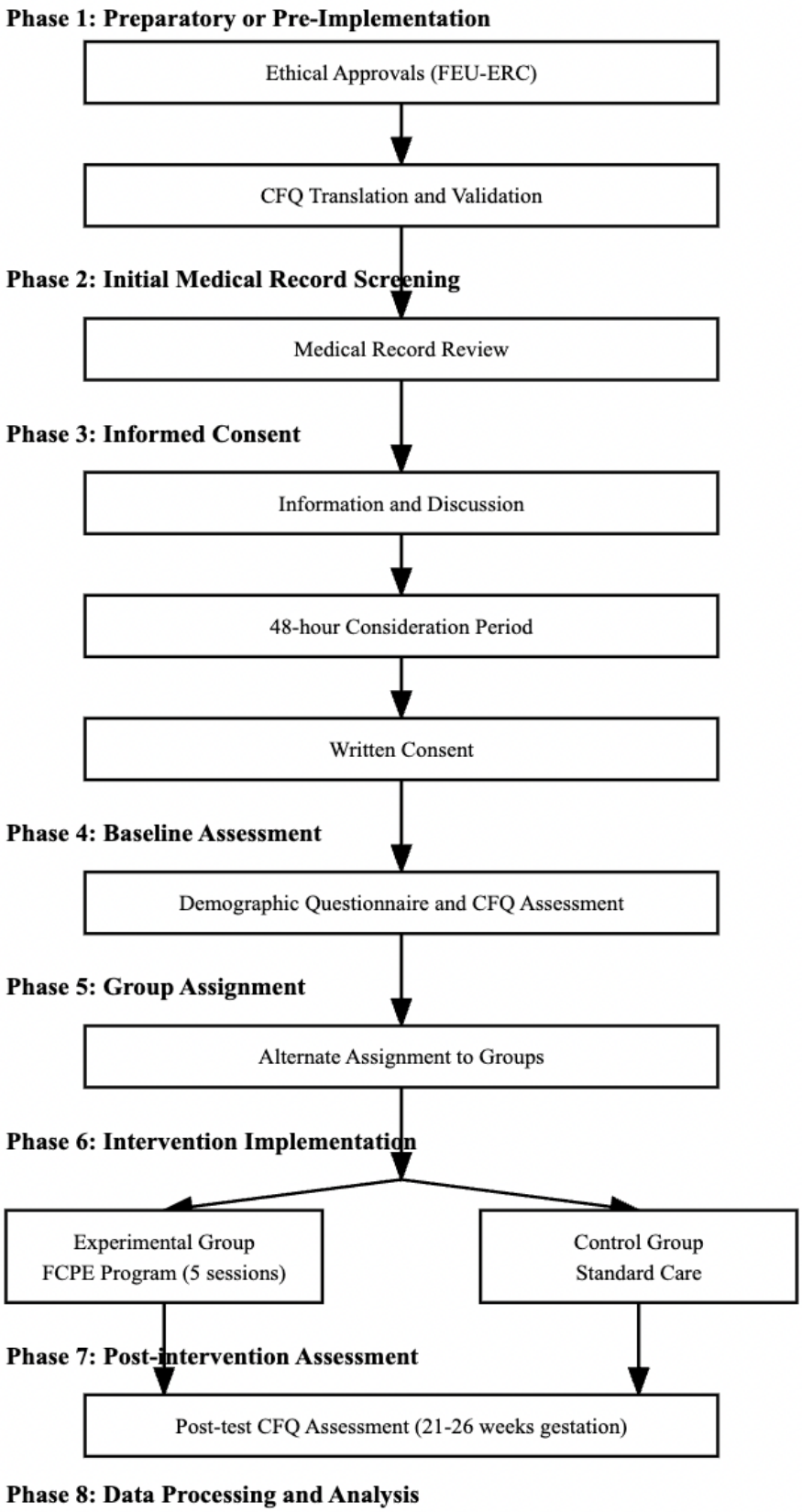

Figure 3. Data collection process.

7.8. Statistical analysis

The questionnaire data collected in this study were entered into IBM SPSS Statistics version 26 for data creation and statistical analysis. Descriptive statistical analysis was used to answer research questions one and two. Inferential Statistical analysis was applied to answer research questions three and four. *p*-values less than 0.05 determined statistical significance.

7.8.1. Descriptive statistics

Demographic and baseline characteristics were summarized using appropriate descriptive statistics. For continuous variables (such as age and gestational age), Categorical variables (such as education level) were presented as frequencies and percentages.

7.8.2. Inferential statistics

Independent sample *t*-tests and one-way ANOVAs were used to analyze the differences in socio-demographic characteristics and childbirth fear levels among primiparas.

7.9. Ethical consideration

This study adhered strictly to ethical guidelines for research involving human subjects. The study protocol was approved by the Far Eastern University Ethics Review Committee (Approval No.: FEU-ERC-2025-98) and the Research Ethics Committee of Yancheng Third People's Hospital. Written informed consent was obtained from all participants prior to enrollment.

8. Presentation, analysis, and interpretation of data

A total of 120 primigravida women were recruited from the outpatient clinics of Yancheng Third People's Hospital between May and July 2025. Sixty respondents were assigned to the experimental group and sixty to the control group. All respondents met the inclusion criteria, including elevated fear of childbirth scores (≥ 81 on the Childbirth Fear Questionnaire). There was a 100% retention rate, with all participants completing the post-intervention assessment.

8.1. Research question 1

What are the demographic characteristics of participants in the experimental group, specifically in terms of: a) Age; b) Education level; and c) Gestational age?

The demographic characteristics of the study participants are presented in **Table 1**, revealing a well-balanced distribution across both groups.

8.2. Research question 2

What are the levels of anticipatory fear of childbirth among primigravida women before and after the intervention in the control group? At baseline, all 60 participants (100%) in the control group exhibited moderate levels of anticipatory fear (scores 81–120). The mean CFQ score at pre-intervention was 88.57 (SD = 6.41, 95% CI: 86.9-90.2). Post-intervention, 10 participants (16.7%) moved to low-fear category, 50 participants (83.3%) remained in moderate-fear. The mean CFQ score decreased slightly to 87.35 (SD = 6.30, 95% CI: 84.1-87.3) (refer **Table 2**).

Table 1. Baseline demographic characteristics of study participants

Characteristic	Control group (n = 60)	Experimental group (n = 60)	Total (N = 120)
Age (years)			
Mean ± SD	28.8 ± 3.2	28.1 ± 3.4	28.4 ± 3.3
22–26 years	13 (21.7%)	21 (35.0%)	34 (28.3%)
27–31 years	24 (40.0%)	27 (45.0%)	51 (42.5%)
32–35 years	23 (38.3%)	12 (20.0%)	35 (29.2%)
Education level			
High school or below	16 (26.7%)	13 (21.7%)	29 (24.2%)
College/university	33 (55.0%)	38 (63.3%)	71 (59.2%)
Graduate degree	11 (18.3%)	9 (15.0%)	20 (16.7%)
Gestational age			
Mean ± SD	17.1 ± 1.7	17.3 ± 1.8	17.2 ± 1.8
14–16 weeks	19 (31.7%)	16 (26.7%)	35 (29.2%)
17–20 weeks	41 (68.3%)	44 (73.3%)	85 (70.8%)

Table 2. Pre-intervention and post-intervention childbirth fear questionnaire (CFQ) scores in the control group

Scores interval	Level of fear	Pre-intervention		Post-intervention	
		Frequency	Percentage	Frequency	Percentage
0–40	Minimal	0	0	0	0
41–80	Low	0	0	10	16.7
81–120	Moderate	60	100	50	83.3
121–160	High fear	0	0	0	0
Mean (SD)		88.57 (6.41) (95% CI: 86.9–90.2)		87.35 (6.30) (95% CI: 84.1–87.3)	

8.3. Research question 3

What are the levels of anticipatory fear of childbirth among primigravida women before and after the intervention in the experimental group? Pre-intervention mean CFQ = 85.68 (SD 6.30, 95% CI 85.6–89.1), 100% moderate fear. Post-intervention mean CFQ = 80.43 (SD 8.53, 95% CI 78.2–82.6).35 participants (58.3%) reached low-fear, 25 (41.7%) remained moderate-fear, 0 high-fear (refer **Table 3**).

8.4. Research question 4

What are the levels of anticipatory fear of childbirth among primigravida women in the control and experimental groups before the intervention? Control mean CFQ = 88.57 ± 6.41; Experimental mean CFQ = 85.68 ± 6.30; Both groups 100% moderate fear (refer **Table 4**).

Table 3. Pre-intervention and post-intervention childbirth fear questionnaire (CFQ) scores in the experimental group

Scores interval	Level of fear	Pre-intervention		Post-intervention	
		Frequency	Percentage	Frequency	Percentage
0–40	Minimal	0	0	0	0
41–80	Low	0	0	35	58.3
81–120	Moderate	60	100	25	41.7
121–160	High fear	0	0	0	0
Mean (SD)		85.68 (6.30) (95% CI: 85.6–89.1)		80.43 (8.53) (95% CI: 78.2–82.6)	

Table 4. Pre-Intervention childbirth fear questionnaire (CFQ) scores by group

Scores Interval	Level of fear	Control group		Experimental group	
		Frequency	Percentage	Frequency	Percentage
0–40	Minimal	0	0	0	0
41–80	Low	0	0	0	0
81–120	Moderate	60	100	60	100
121–160	High fear	0	0	0	0
Mean (SD)		88.57 (6.41) (95% CI: 86.9–90.2)		85.68 (6.30) (95% CI: 85.6–89.1)	

8.5. Research Question 5

What are the levels of anticipatory fear of childbirth among primigravida women in the control and experimental groups after the intervention? Post-intervention, the experimental group showed a substantial reduction in childbirth fear (mean 80.43 ± 8.53), with 58.3% achieving low fear levels, whereas the control group remained largely in the moderate range (mean 87.35 ± 6.30). These results indicate the effectiveness of the Family-Centered Prenatal Education (FCPE) program in reducing anticipatory fear (refer **Table 5**).

Table 5. Post-intervention childbirth fear questionnaire (CFQ) scores by group

Score interval	Level of fear	Control group		Experimental group	
		Frequency	Percentage	Frequency	Percentage
0–40	Minimal	0	0	0	0
41–80	Low	10	16.7	35	58.3
81–120	Moderate	50	83.3	25	41.7
121–160	High Fear	0	0	0	0
Mean (SD)		87.35 (6.30) (95% CI: 84.1–87.3)		80.43 (8.53) (95% CI: 78.2–82.6)	

8.6. Research question 6

Among primigravida women in the experimental group, is there a statistically significant difference in post-intervention anticipatory fear of childbirth scores based on: a) Age (22–26, 27–31, 32–35 years); b) Educational level (high school, college, post-graduate); c) Gestational age at recruitment (14–16, 17–20 weeks) (refer **Table 6**).

Table 6. Influence of demographic factors on post-intervention childbirth fear questionnaire (CFQ) scores in the experimental group

Profile	n	Mean	Computed value	*p*-value
Age				
22–26 years old	21	81.19		
27–31 years old	27	81.00	Kruscal-Wallis H= 1.146	0.564
32–35 years old	12	77.83		
Educational level				
High School	13	85.46		
College	38	79.95	Kruscal-Wallis H = 6.964	0.031
Post-graduate	9	75.22		
Gestational age				
14–16 weeks	16	80.70	Mann-Whitney U = 320	0.592
17–20 weeks	44	80.43		

8.7. Research question 7

Is there a significant difference in the level of anticipatory fear of childbirth before and after the intervention in the control group? (see **Table 7**)

Table 7. Post hoc analysis of educational level differences in post-intervention childbirth fear questionnaire (CFQ) scores

Variables	Mean difference	*p*-value	Interpretation
High School vs College	5.514	0.113	Not Significant
High School vs Post-graduate	10.239	0.018	Significant
College vs Post-graduate	4.725	0.294	Not Significant

Age and gestational age showed no significant effect on post-intervention CFQ scores. Educational level significantly influenced outcomes: participants with high school education had higher post-intervention fear scores than those with postgraduate education ($p = 0.018$).

8.8. Research question 8

Is there a significant difference in the level of anticipatory fear of childbirth among primigravida women between the control and experimental group before the intervention? The mean CFQ score in the control group decreased slightly from 88.57 to 87.38. Although statistically significant ($p = 0.001$), the reduction was minimal, indicating

that standard prenatal care alone has limited impact on reducing anticipatory fear among primigravida women (see **Table 8**).

Table 8. Comparison of pre-intervention and post-intervention childbirth fear questionnaire (CFQ) scores in the control group

Control group	Mean	Computed Wilcoxon signed rank test	*p*-value
Before intervention	88.57	-6.203	0.001
After intervention	87.38		

8.9. Research question 9

Is there a significant difference in the level of anticipatory fear of childbirth before and after the intervention in the experimental group? No statistically significant difference was found between groups at baseline ($p = 0.112$), confirming comparability in initial fear levels before the intervention (see **Table 9**).

Table 9. Comparison of pre-intervention childbirth fear questionnaire (CFQ) scores between groups

Group	Mean	Computed Mann Whitney test value (U)	*p*-value
Control group	88.57	1498.00	0.112
Experimental group	85.68		

8.10. Research question 10

Is there a significant difference in the level of anticipatory fear of childbirth among primigravida women between the control and experimental group after the intervention? The mean CFQ score decreased significantly from 85.68 to 80.43 ($p = 0.001$), demonstrating that the family-centered prenatal education intervention effectively reduced anticipatory fear of childbirth. This reduction was substantially greater than that observed in the control group, highlighting the intervention's effectiveness.

Post-intervention, the experimental group demonstrated a mean CFQ score of 80.43, compared to 87.35 in the control group. Statistical analysis showed a significant between-group difference ($U = 1007.50$, $p = 0.001$), with a medium-to-large effect size (Cohen's $d = 0.88$), indicating that the family-centered prenatal education intervention substantially reduced anticipatory fear of childbirth. The control group showed minimal change (1.22-point reduction), confirming that standard prenatal care alone is insufficient for addressing elevated childbirth fear. These results highlight the clinical and practical significance of structured family-centered interventions in reducing childbirth anxiety among primigravida women (see **Table 10** and **11**).

Table 10. Comparison of pre-intervention and post-intervention childbirth fear questionnaire (CFQ) scores in the experimental group

Experimental group	Mean	Computed Wilcoxon signed rank test	*p*-value
Before intervention	85.68	-6.634	0.001
After intervention	80.43		

Table 11. Comparison of post-intervention childbirth fear questionnaire (CFQ) scores between groups

Group	Mean	Cohen's d	Computed Mann Whitney test value	*p*-value
Control group	87.35	0.88	1007.50	0.001
Experimental group	80.43			

9. Summary of findings

This quasi-experimental study examined the effect of family-centered prenatal education on anticipatory fear of childbirth among 120 primigravida women at Yancheng Third People's Hospital between May and July 2025. Sixty participants were assigned to the experimental group and sixty to the control group.

9.1. Participant characteristics

(1) Age

Predominantly late twenties to early thirties.

(2) Education

Majority college/university, smaller proportions high school or postgraduate.

(3) Gestational age at recruitment

Mostly later second trimester; groups were comparable in demographics.

9.2. Baseline fear levels

All participants had moderate levels of anticipatory childbirth fear (CFQ ≥ 81). No significant difference between groups at baseline (Control: M = 88.57, Experimental: M = 85.68).

9.3. Control group fear levels over time

Minimal reduction in fear after standard care (post-intervention M = 87.35). Most participants remained in the moderate fear category.

9.4. Experimental group fear levels over time

Significant reduction in fear after FCPE (post-intervention M = 80.43). Over half of participants achieved low fear levels; remaining participants showed reduced scores within the moderate range.

Between-group post-intervention difference was significant with a large effect size (Cohen's d = 0.88).

9.5. Moderating factors

Age and gestational age at recruitment had no significant effect on outcomes. Educational level significantly influenced post-intervention fear: higher education corresponded to greater reduction, particularly between high school and postgraduate participants.

9.6. Within-group changes

Both groups showed statistically significant reductions from baseline to post-intervention ($p < 0.001$), but the magnitude of change was much greater in the experimental group.

10. Conclusion

Family-centered prenatal education effectively reduces anticipatory childbirth fear among primigravida women. Standard prenatal care alone produces only minimal reductions in fear. Higher educational attainment enhances the effectiveness of FCPE, whereas age and gestational age at recruitment do not significantly affect outcomes. FCPE demonstrates both statistical and clinical significance, supporting its use as a structured, family-inclusive intervention in prenatal care.

11. Recommendations

11.1. For nursing practice

Implement FCPE programs to reduce childbirth fear and enhance maternal confidence. Engage family members actively in prenatal education to strengthen support systems.

11.2. For nursing education

Integrate family-centered approaches and psychological preparation strategies into nursing curricula.

Train nurses to recognize and address anticipatory childbirth fear in primigravida women.

11.3. For nursing research

Explore tailored interventions for women with lower educational attainment to ensure equitable outcomes. Investigate long-term effects of FCPE on birth outcomes and postpartum mental health.

11.4. For policy development

Support the integration of family-centered prenatal education into standard prenatal care protocols.

Allocate resources to provide structured, evidence-based prenatal programs in hospitals and community clinics.

Disclosure statement

The authors declare no conflict of interest.

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