

Latent profiles of fear of childbirth among partners of pregnant women in Northeast China: a cross-sectional study

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Abstract

Background

Fear of childbirth is common among pregnant women, but the psychological experiences of their partners remain insufficiently studied, particularly in non-Western cultural contexts. Partners' fear may impair their ability to provide support, increase paternal stress, and affect family well-being. This study aimed to identify latent profiles of fear of childbirth among partners of pregnant women and examine factors associated with profile membership.

Methods

A cross-sectional study using convenience sampling recruited 647 eligible partners of pregnant women from two hospitals in Jilin Province, China, between December 2025 and January 2026. Fear of childbirth was assessed using the Chinese version of the Fathers' Fear of Childbirth Scale. Latent profile analysis was used to identify subgroups, and multinomial logistic regression was performed to examine factors associated with profile membership.

Results

Three profiles were identified: high fear (59.66%), moderate fear (12.37%), and low fear (27.98%). Compared with the low-fear profile, moderate-fear membership was associated with higher depressive symptoms (OR = 1.074, 95% CI 1.025–1.125), lower family support (OR = 0.674, 95% CI 0.577–0.787), lower income (< 3000 RMB: OR = 25.311, 95% CI 7.710–83.093; 3001–6000 RMB: OR = 4.191, 95% CI 1.937–8.904), and gestational stage (14–27 vs $\geq$ 28 weeks: OR = 0.135, 95% CI 0.064–0.286). High-fear membership was associated with higher depressive symptoms (OR = 1.139, 95% CI 1.106–1.172), income < 3000 RMB (OR = 7.221, 95% CI 2.543–20.502), adverse childbirth experience (OR = 1.921, 95% CI 1.250–2.952), and gestational stage (14–27 vs $\geq$ 28 weeks: OR = 0.470, 95% CI 0.306–0.723).

Conclusions

Fear of childbirth among partners was heterogeneous, and the high-fear profile predominated. Screening and support should account for depressive symptoms, financial strain, gestational stage, adverse childbirth experiences, and profile-specific differences in family support. Multicenter longitudinal studies are needed to confirm these associations and inform culturally tailored, tiered interventions.

Background

Fear of Childbirth (FOC) refers to the intense fear of the labor and delivery process experienced by women during the perinatal period, which is a common issue affecting maternal mental health and quality of life [1]. As research deepens, scholars have gradually recognized that FOC is not unique to pregnant women; their spouses may also experience similar psychological reactions. Studies indicate that FOC among spouses is prevalent and may trigger various negative effects, such as weakening their ability to provide emotional and behavioral support to the pregnant woman, further affecting her emotional state, reducing her confidence in childbirth, and even impacting parent-fetal attachment and infant growth and development [2]. Additionally, a spouse's FOC may increase their

preference for cesarean section and harm their own physical and mental health, manifesting as higher paternal stress and postpartum fatigue [3].

Early identification of pregnant women's spouses experiencing FOC is helpful for timely intervention, thereby alleviating their psychological burden and reducing potential negative outcomes [4]. However, current research on FOC among spouses of pregnant women is largely concentrated in Western countries. Due to differences in regional culture, assessment tools, and definitions of FOC, reported prevalence rates vary significantly. Currently, domestic and international research on FOC predominantly focuses on the pregnant population, with relatively insufficient attention paid to spouses. Moreover, research methods are mostly variable-centered, such as using cut-off scores or regression analysis to explore influencing factors. While such methods help understand overall fear levels and related factors from a macro perspective, they struggle to reveal the potential heterogeneous psychological characteristics within this group [5]. Latent Profile Analysis (LPA) can divide a sample into several latent categories based on multiple observed indicators (e.g., scores on various dimensions or items of a fear scale), such that individuals within the same category share similar fear characteristics, while significant differences exist between categories. This method has been widely used in health psychology and behavioral medicine to explore latent subtypes of symptom clusters, cognitive patterns, or behavioral characteristics. Applying it to the study of FOC among spouses of pregnant women can overcome the limitations of traditional variable-centered approaches, providing empirical evidence for understanding the diversity of fear manifestations in this group and identifying high-risk psychological subgroups.

Research in this field in China is still in its infancy. Existing findings are mostly cross-sectional surveys or reviews [4, 6], and conclusions are inconsistent due to differences in cultural background, assessment tools, and sample sources. Therefore, this study aims to use Latent Profile Analysis to explore the latent class structure of FOC among spouses of pregnant women and further analyze the sociodemographic, obstetric, and psychosocial factors influencing different fear categories. This will provide a basis for developing classified and precise psychological interventions, contributing to the construction of an integrated care model combining medical and psychological support.

Methods

Participants and procedure

This study was conducted from December 2025 to January 2026, selecting partners of pregnant women receiving prenatal check-ups at two hospitals in Jilin Province. Inclusion criteria for spouses: ☐ Pregnant partner's gestational age 14–42 weeks; ☐ Age ≥ 18 years; ☐ Informed consent and voluntary participation. Exclusion criteria: ☐ Presence of severe psychological or psychiatric disorders; ☐ Accompanied by severe communication barriers.

Measurements

Data were collected using a structured questionnaire designed based on literature review and research objectives. The questionnaire consisted of 5 parts: Sociodemographic characteristics, Obstetric information, FOC, Family support, and Prenatal depression.

Sociodemographic data included spouse's age, residence, education level, ethnicity, occupation, medical payment method, average monthly family income per capita, and only-child status.

Obstetric data included pregnant partner's gestational week, parity, history of adverse childbirth experience (defined as negative experiences during delivery due to medical procedure mishaps, psychological trauma, or neonatal health problems), planned pregnancy status, conception method, and expected mode of delivery.

Fear of Childbirth (FOC) was measured using the Chinese version of the Fathers' Fear of Childbirth Scale (C-FFCS). This scale was developed by Ghaffari et al. [7] and translated into Chinese by Guo et al. [8]. It includes 16 items across three dimensions: fear for mother and infant health and safety, fear of healthcare service quality, and fear due to personal factors. It uses a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), with a total score ranging from 16 to 80. Higher scores indicate greater fear of childbirth. The Cronbach's alpha coefficient in this study was 0.963.

Family Support was measured using the Family APGAR Index (APGAR). This scale was designed by Smilkstein (1980) and introduced to China by Lu and Gu [9]. It includes 5 items assessing five dimensions: adaptation, partnership, growth, affection, and resolve. It uses a 3-point Likert scale (0 = never, 2 = often), with a total score ranging from 0 to 10. Higher scores indicate better family function and greater perceived family support and satisfaction. Scores of 7–10 indicate good family function, 4–6 indicate moderate family dysfunction, and 0–3 indicate severe family dysfunction. The Cronbach's alpha coefficient for this questionnaire was 0.911.

Prenatal Depression in spouses was assessed using the Edinburgh Postnatal Depression Scale (EPDS). The EPDS was developed by Cox et al. [10] and translated/revised into Chinese by Lee et al. [11]. While there is no specific scale for prenatal depression in spouses, research has proven EPDS to be a valid screening tool for this purpose [11]. The EPDS has 10 items, each scored 0–3, with a total score range of 0–30. Higher scores indicate more severe depressive symptoms. A score of 9–12 indicates mild depression, and ≥ 13 indicates severe depression. A score ≥ 9 suggests the spouse may have distressing symptoms requiring further assessment and management. The Cronbach's alpha coefficient in this study was 0.946.

Sample size calculation

Sample size estimation followed Kendall's recommendation that the sample size should be at least 5–10 times the number of study variables: $24 \times (5-10) = 120-240$. After allowing for incomplete questionnaires, the target sample size was 132–264. Nylund-Gibson et al. [12] further recommended a minimum sample size of 300 for latent class analysis. A total of 663 partners were recruited. Of these, 16 were excluded because their questionnaires were incomplete. Consequently, 647 participants were included in the final analysis, yielding an effective participation rate of 97.6%.

To ensure the stability of the latent profile analysis (LPA) results, the sample size of this study was determined with reference to the simulation study recommendations proposed by Tein et al. [13]. In latent profile analysis, the sample size should be sufficiently large to ensure the accurate identification of the number of latent classes and the stability of regression parameter estimates. The sample size of the present study ($N = 647$) met this requirement.

Data analysis

This study aimed to determine the optimal number of latent profiles that best represent FOC among spouses. Based on literature recommendations, models containing 1 to 4 profiles were tested. Analyses were conducted

using Mplus 8.3 software, with parameter estimation using the robust maximum likelihood method.

Following literature guidelines [14], lower values for criteria (AIC, BIC, SABIC) indicate better model fit. Likelihood ratio-based tests (LMR-LRT and BLRT) were used to compare the k-profile model with the k-1 profile model. A nonsignificant p value ($p \geq 0.05$) supports retaining the more parsimonious k-1 profile model. Additionally, higher entropy (range 0–1) indicates better classification accuracy. An average posterior probability for each profile exceeding 0.80 is also considered an indicator of good classification quality.

Based on the above criteria, the optimal model was determined. Participants were then assigned to groups with different levels of FOC based on their most likely latent class membership. Subsequently, multinomial logistic regression analysis was used to further identify predictors associated with different fear categories. Variables with statistical significance in univariate analyses, together with theoretically relevant psychosocial variables, were included in the multinomial logistic regression model.

Variable coding

To ensure the reproducibility of the analysis, all included variables were uniformly coded as follows.

(1) Continuous variables

Total family function score (APGAR): The original continuous score was entered into the regression model. A higher score indicated better family support function.

Total depression score (EPDS): The original continuous score was entered into the regression model. A higher score indicated more severe depressive symptoms.

(2) Ordinal categorical variables

The following ordinal variables were entered into the multinomial logistic regression model as dummy variables. The lowest or highest level was specified as the reference category to maintain the independence of each level:

Age: divided into three groups: “ ≤ 24 years”, “25–35 years”, and “ > 35 years”, with “ > 35 years” as the reference group.

Income: divided into three groups: “ < 3000 RMB”, “3001–6000 RMB”, and “ > 6000 RMB”, with “ > 6000 RMB” as the reference group.

Educational level: divided into five groups: “junior high school and below”, “senior high school/technical secondary school”, “junior college”, “undergraduate”, and “master’s degree or above”, with “master’s degree or above” as the reference group.

(3) Binary variables

All binary variables used “no”, “absence”, or the corresponding reference category as the reference group, as follows:

Adverse childbirth experience: “no” was used as the reference group.

Only-child status: “no” was used as the reference group.

Parity: multipara was used as the reference group.

Planned pregnancy: “no” was used as the reference group.

Conception method: artificial conception was used as the reference group.

Occupation: unemployed was used as the reference group.

Payment method: self-payment was used as the reference group.

(4) Nominal multicategorical variables

Residence: divided into “rural area”, “town”, and “city”, with “city” as the reference group.

Delivery mode: divided into “natural childbirth”, and “Cesarean section”, and “painless childbirth” as the reference group.

All categorical variables were entered as “Factors” in the SPSS multinomial logistic regression analysis.

Continuous variables were entered as “Covariates”.

Ethics approval

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Yanbian University (Approval No. 20251216, dated December 16, 2025). Data collection for the present study was carried out from December 2025 to January 2026. Written informed consent was obtained from all participants before enrollment.

Use of generative AI and AI-assisted technologies

During the preparation and revision of this work, the authors used ChatGPT (OpenAI) for language editing and improving readability. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the submitted manuscript.

Results

Demographic characteristics

After excluding ineligible questionnaires, 647 spouses were included. The mean age was 28.87 ± 4.60 years. Most resided in towns (n = 247, 38.2%), had a bachelor's degree (n = 230, 35.5%), were employed (n = 553, 85.5%), had a family monthly income per capita > 6000 RMB (n = 375, 58.0%), had Urban Employee Basic Medical Insurance (n = 314, 48.5%), and were only-children (n = 357, 55.2%). Univariate analysis showed that FOC scores significantly differed by age, family monthly income per capita, and only-child status ($P < 0.05$).

Regarding obstetric characteristics: Most pregnant partners were at ≥ 28 weeks gestation (n = 359, 55.5%), were primiparous (n = 410, 63.4%), had a history of adverse childbirth experience (n = 357, 55.2%), had a planned pregnancy (n = 458, 70.8%), conceived naturally (n = 565, 87.3%), and preferred vaginal delivery (n = 329, 50.9%).

FOC scores significantly differed by gestational week, parity, history of adverse childbirth experience, and planned pregnancy status ($P < 0.05$). (Table 1)

Table 1
Demographic characteristics of participants (N = 647)

Variables	Class	N(647)	Percentage(%)	FOC(Mean ± SD)	t/F	P
Age	≤ 24	65	10	43.72 ± 13.56	5.333	0.005
	25–35	460	71.1	50.19 ± 12.47		
	>35	122	18.9	55.89 ± 13.19		
Residence	rural	184	28.4	48.71 ± 11.58	2.279	0.103
	town	247	38.2	49.71 ± 13.07		
	city	216	33.4	50.12 ± 13.68		
Educational level	Junior high school and below	37	5.7	51.89 ± 15.02	0.188	0.945
	Senior High School/Secondary Technical School	94	14.5	50.02 ± 11.74		
	junior college	220	34	48.00 ± 12.51		
	undergraduate	230	35.5	50.66 ± 13.92		
	Master's degree or above	66	10.2	47.50 ± 11.10		
Occupation	Have a job	553	85.5	50.10 ± 12.64	0.658	0.511
	Unemployed	94	14.5	47.35 ± 14.88		
Income	≤ 3000	69	10.7	57.43 ± 8.91	3.489	0.031
	3001–6000	203	31.4	48.94 ± 12.79		
	>6000	375	58	43.06 ± 13.03		
Payment method	Medical Insurance for Urban Employees	314	48.5	50.02 ± 13.38	0.271	0.762
	Urban and Rural Residents' Medical Insurance	227	35.1	48.90 ± 13.11		
	at one's own expense	106	16.4	50.59 ± 9.92		

Variables	Class	N(647)	Percentage(%)	FOC(Mean ± SD)	t/F	P
It's the only child	Yes	357	55.2	49.40 ± 12.64	-2.261	0.019
	No	290	44.8	50.23 ± 13.76		
Gestational weeks	14-27weeks	288	44.5	39.40 ± 9.87	-3.589	<0.001
	28 weeks and above	359	55.5	55.07 ± 11.08		
Parity	Primipara	410	63.4	46.36 ± 12.59	-3.246	<0.001
	Multiparous	237	36.6	55.61 ± 11.59		
history of adverse childbirth experience	Yes	357	55.2	54.72 ± 11.64	4.491	<0.001
	No	290	44.8	47.14 ± 12.94		
planned pregnancy status	Yes	458	70.8	50.09 ± 13.05	-2.042	0.042
	No	189	29.2	47.52 ± 12.66		
Conception method	Natural conception	565	87.3	49.60 ± 13.25	-0.133	0.894
	artificial insemination	82	12.7	50.21 ± 11.43		
Delivery method	natural childbirth	329	50.9	51.16 ± 12.48	0.372	0.69
	Cesarean section	178	27.5	47.81 ± 14.21		
	painless childbirth	140	21.6	47.05 ± 11.42		

Characteristics of the different classes

Latent profile analysis was conducted using Mplus 8.3 with robust maximum likelihood estimation. Models with one to four classes were fitted. The model specification imposed the constraints of equal variances across classes and zero covariances among observed indicators, which are the default settings in Mplus. The optimal number of classes was determined based on AIC, BIC, aBIC, LMRT, BLRT, and entropy. Using the 16 items of the C-FFCS as indicators, models with 1 to 4 latent profiles were fitted. Model fit indices are shown in Table 2. As the number of classes increased from 1 to 4, AIC and aBIC continuously decreased. Although the entropy for the 2-class model (0.990) was slightly higher than for the 3-class model (0.976), both were well above the recommended threshold of 0.80, indicating excellent classification quality. However, the LMRT and BLRT tests showed that the 3-class model provided a significantly better fit than the 2-class model ($p < 0.001$), indicating the existence of three meaningful subgroups in the data. When extending to 4 classes, the LMRT was not significant ($p = 0.3503$),

suggesting the 3-class model was superior. Therefore, the 3-class model was selected as optimal. Low-fear group (Class 1): 27.98%, with the lowest total FOC score and mean scores across dimensions ranging from 2.06 to 2.25. Moderate-fear group (Class 2): 12.37%, with a moderate total FOC score and mean scores across dimensions ranging from 2.91 to 3.55. High-fear group (Class 3): 59.66%, with the highest total FOC score and mean scores across dimensions ranging from 4.20 to 4.35.

Based on the mean scores of the three classes on the C-FFCS (Fig. 1), Class 3 with the highest scores was labeled the High FOC Group, Class 2 the Moderate FOC Group, and Class 1 the Low FOC Group.

Table 2
Latent profile analysis fit indices (N = 647)

Class	AIC	BIC	aBIC	Entropy	LMRT(P)	BLRT(P)	Class Probabilities (%)
1	33124.764	33267.879	33166.28				1
2	25303.435	25522.580	25367.006	0.990	<0.001	<0.001	34.16/65.70
3	24691.992	24987.166	24777.619	0.976	<0.001	<0.001	27.98/ 12.37/ 59.66
4	24580.107	24951.311	24687.789	0.932	0.3503	<0.001	20.71/58.11/11.90/9.27

Fear due to personal factors: X2, X3, X4, X5, X11;

Fear for mother and infant health and safety: X1,X6,X7,X8,X9,X10,X16;

Fear of healthcare service quality: X12,X13,X14,X15

Profile demographics and related characteristics

Significant differences were found among the three latent classes in age, monthly income, only-child status, gestational week, parity, history of adverse childbirth experience, and planned pregnancy status ($P < 0.05$). Family support (APGAR) and prenatal depression (EPDS) scores also differed significantly among the classes ($P < 0.001$). Details are shown in Table 3.

Table 3
Demographic and characteristics by latent profile(N = 647)

Variables	class	Class1	Class2	Class3	F/χ ²	P
Age	≤ 24	28	7	30	16.629	0.002
	25–35	124	66	270		
	>35	29	7	86		
Residence	Rural	50	13	121	8.564	0.073
	Town	71	39	137		
	City	60	28	128		
Educational level	Junior high school and below	11	2	24	8.667	0.371
	Senior High School/Secondary Technical School	25	15	54		
	junior college	64	28	128		
	undergraduate	62	32	136		
	Master's degree or above	19	3	44		
Occupation	Have a job	153	69	331	0.192	0.908
	Unemployed	28	11	55		
Income	<3000	5	26	38	82.024	<0.001
	3001–6000	62	39	102		
	>6000	114	15	246		
Payment method	Urban Employee Medical Insurance	84	46	184	3.82	0.431
	Medical Insurance for Urban and Rural Residents	69	24	134		
	Own expense	28	10	68		
It's the only child	Yes	108	53	196	8.464	0.015
	No	73	27	190		
Gestational weeks	14-27weeks	114	13	161	52.102	<0.001
	28 weeks and above	67	67	225		
Parity	Primipara	131	51	228	9.407	0.009
	Multiparous	50	29	158		
history of adverse childbirth experience	Yes	79	32	246	28.6	<0.001
	No	102	48	140		
Planned pregnancy	Yes	136	63	259	6.65	0.036

Variables	class	Class1	Class2	Class3	F/ χ^2	P
	No	45	17	127		
Conception methods	Natural conception	160	69	336	0.299	0.861
	artificial insemination	21	11	50		
Delivery methods	Natural childbirth	86	45	198	3.218	0.522
	Cesarean section	51	23	104		
	Painless childbirth	44	12	84		
APGAR		3.37	1.35	5.13	60.637	<0.001
EPDS		19.08	19.68	28.61	104.361	<0.001

Multinomial logistic regression results

Multinomial logistic regression analysis was conducted using the low-fear group (Class 1) as the reference category (Table 4). The results showed that, compared with those with a monthly income of > 6000 RMB, partners of pregnant women with a monthly income of < 3000 RMB (OR = 25.311, 95% CI: 7.710–83.093) and 3001–6000 RMB (OR = 4.191, 95% CI: 1.937–8.904) were more likely to belong to the moderate-fear group (Class 2). Higher levels of depressive symptoms were associated with a greater likelihood of belonging to the moderate-fear group (OR = 1.074, 95% CI: 1.025–1.125), whereas higher levels of family support were associated with a lower likelihood of belonging to this group (OR = 0.674, 95% CI: 0.577–0.787). In addition, compared with partners of women in late pregnancy (≥ 28 weeks), partners of women at 14–27 weeks of gestation were less likely to belong to the moderate-fear group (OR = 0.135, 95% CI: 0.064–0.286), indicating that partners in late pregnancy were more likely to be classified into the moderate-fear group.

Factors associated with the high-fear group (Class 3) included the following: compared with those with a monthly income of > 6000 RMB, partners of pregnant women with a monthly income of < 3000 RMB were more likely to belong to the high-fear group (OR = 7.221, 95% CI: 2.543–20.502); those with adverse childbirth experiences were also more likely to belong to the high-fear group (OR = 1.921, 95% CI: 1.250–2.952); and higher levels of depressive symptoms were associated with a greater likelihood of belonging to the high-fear group (OR = 1.139, 95% CI: 1.106–1.172). Meanwhile, compared with partners of women in late pregnancy (≥ 28 weeks), partners of women at 14–27 weeks of gestation were less likely to belong to the high-fear group (OR = 0.470, 95% CI: 0.306–0.723), indicating that partners in late pregnancy were more likely to be classified into the high-fear group. Family support was not statistically associated with membership in the high-fear group (OR = 0.988, 95% CI: 0.914–1.068).

Table 4
Multinomial logistic regression results of latent profile(N = 647)

Variables	Class1 vs. Class2			Class1 vs. Class3		
	β	OR	95%CI	β	OR	95%CI
Age						
≤ 24	0.168	1.183	0.296–4.722	-0.164	0.849	0.367–1.966
25–35	0.396	1.486	0.539–4.093	-0.19	0.827	0.475–1.439
>35						
Income						
<3000	3.321	25.311**	7.710-83.093	1.977	7.221**	2.543–20.502
3001–6000	1.433	4.191**	1.937–8.904	0.222	1.249	0.778–2.005
>6000						
It's the only child						
Yes	0.279	1.322	0.693–2.519	-0.155	0.891	0.583–1.361
No						
Gestational weeks						
14-27weeks	-2.002	0.135**	0.064–0.286	-0.754	0.47**	0.306–0.723
28 weeks and above						
history of adverse childbirth experience						
Yes	0.05	1.052	0.533–2.074	0.653	1.921**	1.250–2.952
No						
Planned pregnancy						
Yes	-0.303	0.739	0.342–1.597	0.027	1.028	0.637–1.658
No						
Parity						
Primipara	0.237	1.267	0.625–2.568	-0.117	0.889	0.567–1.394
Multipara						
EPDS	0.071	1.074**	1.025–1.125	0.13	1.139**	1.106–1.172
APGAR	-0.395	0.674**	0.577–0.787	-0.012	0.988	0.914–1.068

*=p < 0.05;**=p < 0.01. The model used the low-fear group (Class 1) as the reference category.

Coding of regression variables

In the multinomial logistic regression analysis, the independent variables were coded as follows:

(1) Continuous variables

The total EPDS score and the total APGAR score were entered into the model as continuous variables using their original scores.

(2) Categorical variables (dummy coding)

Age: divided into three groups: ≤ 25 years (age = 1), 26–35 years (age = 2), and > 35 years as the reference group.

Income: low income (income = 1), middle income (income = 2), and high income as the reference group.

Only-child status: being an only child (only-child status = 1), with non-only child as the reference group.

Parity: primipara (parity = 1), with multipara as the reference group.

Planned pregnancy: planned pregnancy (= 1), with unplanned pregnancy as the reference group.

Adverse pregnancy or childbirth experience: having an adverse experience (= 1), with no adverse experience as the reference group.

Gestational weeks: 14–27 weeks (gestational weeks = 1), with ≥ 28 weeks as the reference group.

Discussion

This study used latent profile analysis to examine the heterogeneity of fear of childbirth among partners of pregnant women in China and identified three latent profiles: low fear, moderate fear, and high fear. The results showed that partners of pregnant women are not a homogeneous group, but instead demonstrate clear stratification in terms of fear of childbirth. The high-fear group accounted for the largest proportion, suggesting that this group warrants particular clinical attention [15, 5].

Compared with previous latent-profile or latent-trajectory studies on fear of childbirth among pregnant women, the profile structure identified in the present study among their partners shows both similarities and differences. Evidence from prior maternal FOC studies in China is itself heterogeneous. For example, a longitudinal latent-trajectory study of 229 pregnant women in China identified three trajectories of maternal FOC, among which the persistent high-fear trajectory accounted for the majority of the sample (73.8%), far exceeding the proportions of the persistent severe-fear trajectory (12.7%) and the stabilized moderate-fear trajectory (13.5%) [16]. In contrast, another latent profile study of perinatal women identified a four-class solution in which fear-free and low-fear profiles together accounted for the majority of participants, whereas only a minority were classified into higher-fear profiles [17]. This inconsistency across studies may be attributable to differences in the instruments used to assess FOC, the timing of assessment during pregnancy, the use of cross-sectional versus longitudinal designs, and the composition of study samples, such as primiparous versus mixed-parity cohorts. Against this heterogeneous evidence base, the marked predominance of the high-fear profile among partners in the present study (59.66%) suggests that expectant fathers or male partners may represent a population in which fear responses are particularly prone to clustering at the higher end of the severity spectrum. This pattern may reflect the distinct psychosocial position of partners during the perinatal period. Unlike pregnant women, who receive direct medical monitoring, structured prenatal education, and repeated opportunities to process childbirth-related information through antenatal visits, partners are often peripheral to routine perinatal care and may lack

comparable access to information and emotional preparation. This may predispose a larger proportion of them to unresolved and high-intensity fear. Future comparative studies employing the same instrument and profile indicators in both pregnant women and their partners within the same cohort would help clarify whether this apparent divergence reflects a genuine population-specific pattern or is instead an artifact of instrument and sampling differences across studies.

Economic status was an important associated factor in this study. Compared with the high-income group, low and middle income significantly increased the likelihood of belonging to the moderate-fear group, while low income also significantly increased the likelihood of belonging to the high-fear group. This suggests that financial stress may be an important background factor contributing to fear of childbirth among partners. On the one hand, low-income families may be more sensitive to childbirth-related expenses and more likely to worry about the financial burden of medical costs. On the other hand, financial stress may also limit access to prenatal knowledge and support resources, thereby increasing concerns about uncertainty during childbirth. Previous studies on fear of childbirth among expectant fathers have also found that sociodemographic factors and limited economic resources may be associated with higher levels of fear of childbirth [18, 5].

Regarding obstetric factors, adverse childbirth experience significantly increased the likelihood of belonging to the high-fear group. This indicates that previous negative reproductive events may leave a persistent psychological impact on partners and may be reactivated when they face childbirth again. Previous studies have shown that prior childbirth experiences, obstetric complications, or traumatic childbirth experiences may increase fear of childbirth in subsequent pregnancies [19, 20]. In addition, gestational week showed an inverse association in the regression analysis: compared with late pregnancy (≥ 28 weeks), partners of women at 14–27 weeks of gestation were less likely to belong to the moderate- and high-fear groups. This indicates that partners in late pregnancy are more likely to fall into higher fear profiles. This finding is clinically understandable, as the approaching expected date of delivery may shift partners' concerns about childbirth risks from abstract worries to more concrete real-life pressures. Qualitative and intervention studies on fear of childbirth among expectant fathers have also suggested that fathers often worry about childbirth complications, maternal and infant safety, and the process of medical care [21, 22].

Although age, only-child status, planned pregnancy, and parity were significantly associated with FOC scores in the univariate analyses (Tables 1 and 3), none of these variables remained independently significant in the multinomial logistic regression model. This attenuation suggests that their apparent associations with FOC severity may be largely explained by other, more proximal factors included in the model. For instance, the univariate association between parity and FOC likely reflects the fact that multiparous partners are more likely to have experienced a prior adverse childbirth event, a variable that was independently and robustly associated with membership in the high-fear group after adjustment. Similarly, the apparent effect of age may be confounded by its correlation with income and gestational stage, both of which showed independent associations with FOC profile membership. These findings imply that sociodemographic characteristics such as age, only-child status, and parity may function primarily as distal markers rather than direct psychological determinants of paternal FOC, whereas modifiable psychosocial factors—income-related financial stress, depressive symptoms, and prior adverse childbirth experience—appear to carry more direct explanatory weight. This pattern is consistent with stress-appraisal frameworks of FOC, which posit that background characteristics shape fear primarily through their influence on proximal cognitive and emotional appraisals of childbirth-related threat, rather than through a direct main effect (Lazarus & Folkman, 1984). From a clinical perspective, this suggests that universal screening based on broad

demographic risk markers alone may be insufficient; instead, targeted assessment of economic stress, depressive symptoms, and obstetric history may more efficiently identify partners at genuine risk of high FOC.

Psychosocial factors also played an important role. Depression level, as measured by the EPDS, was a significant risk factor in both the moderate- and high-fear groups, indicating that depressive symptoms among partners are closely associated with fear of childbirth. Depressive mood may weaken emotional regulation ability and coping efficacy, making individuals more likely to interpret childbirth situations in a catastrophic manner. Previous studies have also shown that fear of childbirth among expectant fathers is closely related to negative psychological states such as depression, anxiety, and stress [23, 24].

Family support showed a relatively complex pattern. Higher APGAR scores significantly reduced the likelihood of belonging to the moderate-fear group, but this association did not reach statistical significance in the high-fear group. This suggests that the present data support a protective role of family support in the moderate-fear group, whereas its role in the high-fear group remains unclear. Previous studies and systematic reviews generally support an association between social support and fear of childbirth, but this relationship may be influenced by the source and quality of support, individual psychological status, and the extent to which support needs are recognized [25, 26]. Notably, the distribution of APGAR scores across the three groups showed a non-monotonic pattern: the high-fear group had the highest APGAR score, whereas the moderate-fear group had the lowest. This suggests that the relationship between family support and fear of childbirth may not be a simple linear negative association. One possible explanation is reverse causality, whereby partners with higher fear levels and more obvious emotional distress may receive more attention and support from family members. Another possibility is that the support needs of the moderate-fear group may not have been effectively recognized or met, resulting in a lower subjective sense of support. Studies on fathers' fear of childbirth have also indicated that fathers' support needs, help-seeking barriers, and access to services may influence their psychological experiences and acceptance of interventions [27]. In addition, the relatively small sample size of the moderate-fear group may have contributed to instability in the APGAR estimates.

This study also found that the mean EPDS scores were generally high across all three groups, especially in the high-fear group. This finding suggests that although the EPDS has been used to some extent among fathers or male partners, the high mean scores observed in this sample should still be interpreted with caution. On the one hand, this may reflect a relatively heavy psychological burden among partners in this study. On the other hand, it also suggests that the cross-group applicability of this scale in male partner populations requires further validation. Evidence syntheses on the assessment of perinatal mental health among fathers, co-parents, and partners have also pointed out that psychological screening tools for men or non-birthing partners require cautious interpretation in terms of applicability, acceptability, and threshold values [28]. Future studies may consider using depression screening tools specifically designed for men or combining screening with clinical interviews to improve assessment accuracy.

Overall, this study indicates that depression level is an important risk factor for fear of childbirth among partners of pregnant women, that family support has a protective effect in the moderate-fear group, and that the relationship between family support and fear is more complex in the high-fear group. Future research should adopt longitudinal designs to dynamically examine the interactions among partners' fear, support needs, and family support, thereby providing evidence for screening and intervention among high-risk groups [28, 27].

Strengths and limitations

Strengths

This study applied a person-centered analytic approach (latent profile analysis) to capture the heterogeneous nature of childbirth fear among partners, moving beyond a uniform, score-based categorization. The selection and interpretation of predictors were informed by an integrative perspective that considered medical, psychological, and contextual factors, thereby enabling a multidimensional analysis. Furthermore, the study was conducted with a sufficiently large sample, which provided the statistical power necessary for stable latent class estimation and subsequent regression modeling.

Limitations

This study has several limitations that should be acknowledged. First, family support was not statistically significant in the high-fear group, whereas it showed a significant negative association in the moderate-fear group. The non-monotonic pattern of APGAR scores may be influenced by the relatively small sample size of the moderate-fear group or differences in partners' support needs. Second, the mean EPDS scores were relatively high, suggesting that this scale may have certain limitations when applied to male partners; therefore, the results should be interpreted only as a psychological screening reference. Third, this study adopted a cross-sectional design, which precludes causal inference. A reverse causal relationship may exist between family support and fear of childbirth. In addition, the LPA used a classify-analyze two-step approach, which did not account for latent class classification errors. Future studies may apply 3-step or BCH methods to conduct sensitivity analyses. Finally, this study was conducted in two hospitals within one province, and the generalizability of the findings to other regions or cultural contexts requires further validation.

Conclusions

This study identified three latent profiles of childbirth fear among partners of pregnant women in China through latent profile analysis, with the high-fear profile being the most prevalent (59.66%), followed by the low-fear profile (27.98%) and the moderate-fear profile (12.37%). Key factors associated with profile membership included depressive symptoms, income, adverse childbirth experiences, gestational stage, and family support. Compared with the low-fear group, lower income, higher depressive symptoms, lower family support, and late gestational stage were associated with membership in the moderate-fear group; lower income, higher depressive symptoms, prior adverse childbirth experiences, and late gestational stage were associated with membership in the high-fear group. Family support showed a protective association only for the moderate-fear group and was not significantly associated with high-fear membership. These findings highlight the heterogeneity and complexity of childbirth fear among partners and provide empirical evidence for identifying at-risk individuals. Future research should adopt multicenter longitudinal designs to further clarify the pathways through which these factors operate and to develop culturally tailored perinatal support models.

Implications for clinical practice and future research

Clinical practice should incorporate routine screening for fear of childbirth among partners, with particular attention to those with low household income, late gestational age, a history of adverse childbirth experience, or elevated depressive symptoms. Care should be tiered according to profile membership: high-fear partners may benefit most from individualized psychological counseling targeting comorbid depressive symptoms, whereas moderate-fear partners—characterized by financial strain and lower perceived family support—may require additional practical and family-based support rather than psychological intervention alone. Future research should

adopt longitudinal, multicenter designs to clarify causal pathways among depression, family support, and fear of childbirth, and should employ dyadic assessments of partners and pregnant women to examine the role of doctor–patient communication and maternal fear levels. Development and validation of localized, tiered intervention protocols for high-risk partners are also warranted to improve perinatal family mental health.

Abbreviations

AIC

Akaike information criterion

aBIC

adjusted Bayesian information criterion

APGAR

Family APGAR Index

BIC

Bayesian information criterion

BLRT

bootstrap likelihood ratio test

C-FFCS

Chinese version of the Fathers' Fear of Childbirth Scale

CI

confidence interval

EPDS

Edinburgh Postnatal Depression Scale

FOC

fear of childbirth

LMR-LRT

Lo–Mendell–Rubin adjusted likelihood ratio test

LPA

latent profile analysis

OR

odds ratio

RMB

renminbi.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Yanbian University (Approval No. 20251216; 16 December 2025). Written informed consent was obtained from all participants before enrollment.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Authors' information

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Author Contribution

Wenqian Zhu and Jingying Wu contributed equally to this work. Wenqian Zhu contributed to the conceptualization, methodology, investigation, data curation, and preparation of the original manuscript. Jingying Wu contributed to the investigation, data curation, formal analysis, and preparation of the original manuscript. Mengmeng Wang contributed to the investigation, data curation, and review and editing of the manuscript. Zhiqi Li contributed to the investigation, resource coordination, and project administration. Lihua Jin contributed to the conceptualization, methodology, supervision, project administration, and critical revision of the manuscript. All authors read and approved the final manuscript and agreed to be accountable for all aspects of the work.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Figures

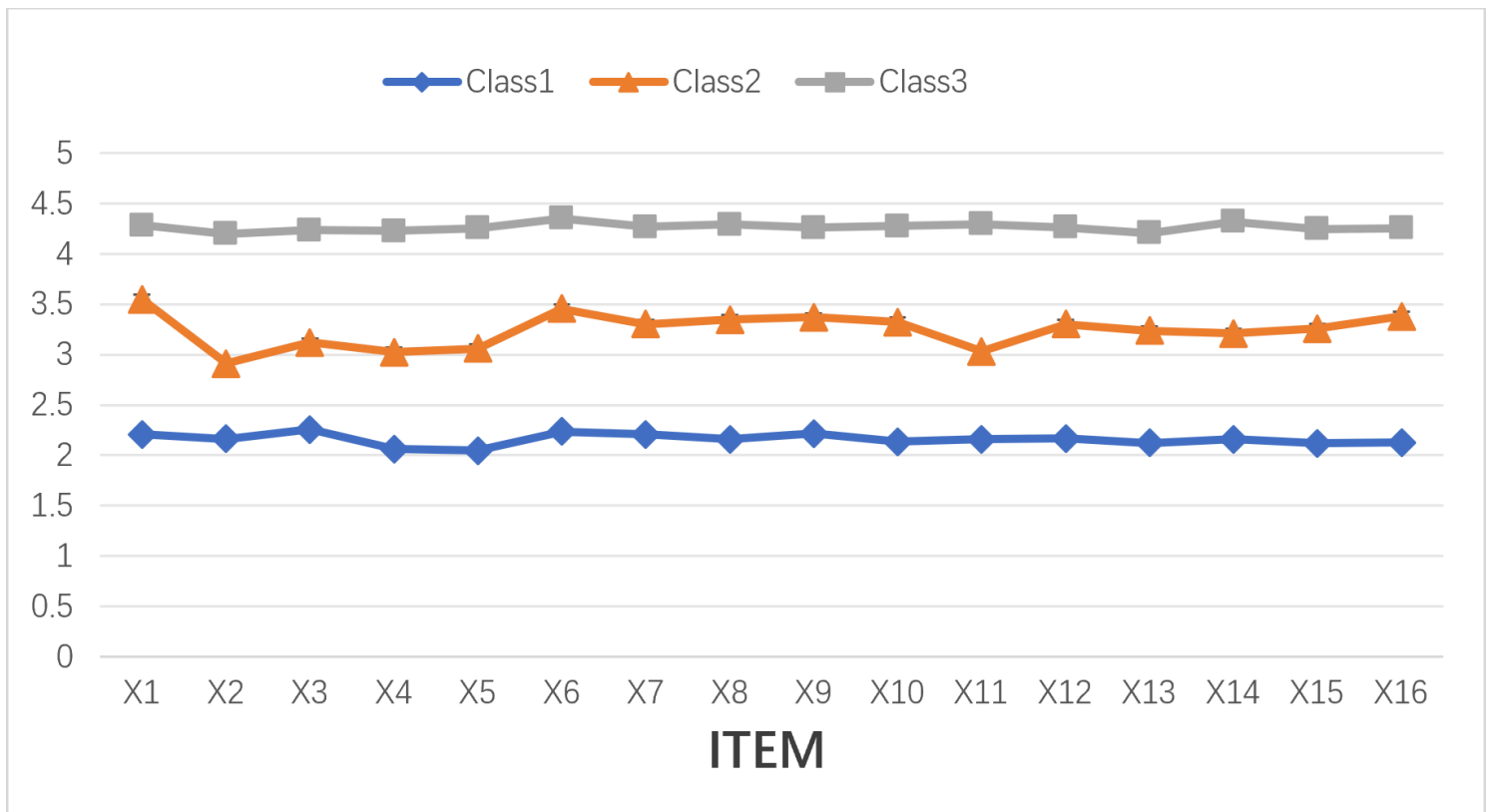


Figure 1

Latent profiles of fear of childbirth