

Predictors of postpartum depression among mothers in Wenzhou, China: A cross-sectional study

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Abstract

Background: Postpartum depression (PPD) significantly impacts maternal well-being, infant development, and family functioning. Studies examining interrelationships among multiple predictors using theoretical frameworks in Chinese populations remain limited.

Objective: To determine the prevalence of postpartum depression and examine the associations of biological, psychological, and social factors among postpartum women in Wenzhou, China.

Methods: A predictive correlational cross-sectional study was conducted at a tertiary hospital in Wenzhou from November to December 2024. Using systematic random sampling, 166 postpartum women aged 20-44 years, within 4 weeks to 6 months postpartum, were recruited. Data were collected using validated instruments, including the Edinburgh Postnatal Depression Scale (EPDS), Rosenberg Self-Esteem Scale, Maternal Breastfeeding Evaluation Scale, Revised Dyadic Adjustment Scale, and Stryker Adjustment Checklist. Multiple regression and mediation analyses using the PROCESS macro with bootstrap resampling were performed to identify significant predictors and examine mediating pathways.

Results: The prevalence of PPD (EPDS score ≥ 9) was 21.1%. Multiple regression analysis revealed that breastfeeding satisfaction ($\beta = -0.419, p < 0.001$) and fulfillment of infant gender expectations ($\beta = -0.202, p = 0.006$) were significant predictors, together accounting for 28.4% of the variance in PPD symptoms. Mediation analysis indicated that breastfeeding satisfaction partially mediated the relationship between infant gender expectations and PPD. Pregnancy complications, self-esteem, marital satisfaction, and mother-in-law relationships were not statistically significant predictors in the final model.

Conclusion: Approximately one in five postpartum women in Wenzhou experienced clinically significant depressive symptoms. Fulfilled gender expectations were associated with lower PPD risk, partially mediated by higher breastfeeding satisfaction, supporting the Biopsychosocial Model. These findings highlight the need for routine PPD screening, satisfaction-focused breastfeeding support, culturally sensitive counseling regarding family gender expectations, and family-centered interventions in postpartum care.

Keywords

depression; postpartum; breastfeeding; sex ratio; maternal health; China

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Background

Postpartum depression (PPD) constitutes a major public health concern affecting maternal mental health, infant development, and family functioning (Carlson et al., 2025). Globally, PPD prevalence ranges from 13% to 19%, whereas Chinese studies report rates of 10.1% to 27.4%, depending on region and methodology (Ji & Wang, 2025; Nisar et al., 2020; Wang et al., 2021).

Wenzhou, a major economic hub in Zhejiang Province, presents unique PPD risk factors: high female workforce participation, pronounced traditional gender preferences (sex ratio: 112.86 males per 100 females at birth), and the “zuoyuezi” (坐月子) practice that may provide support or generate stress (Liang et al., 2020; National Bureau of Statistics of China, 2022).

The Biopsychosocial Model (Engel, 1980) recognizes that PPD results from interactions between biological vulnerabilities (pregnancy complications), psychological characteristics (self-esteem, maternal adaptation), and social circumstances (family

relationships, cultural expectations). Recent evidence highlights breastfeeding satisfaction, rather than mere breastfeeding status, as crucial for maternal psychological well-being (Hahn et al., 2025).

While infant gender expectations have been identified as a PPD risk factor in China (Sun et al., 2024), the mechanisms underlying this association remain unexplored. We proposed that breastfeeding satisfaction may serve as a mediating pathway: fulfilled gender expectations could enhance maternal confidence and feeding experiences, thereby reducing depressive symptoms. Although breastfeeding satisfaction has been established as a PPD mediator in Western populations (Hahn et al., 2025), no study has tested this mechanism in Chinese contexts where gender expectations carry some cultural importance.

Our study selected six variables based on the Biopsychosocial Model, deliberately examining specific relational factors and culturally-specific expectations rather than general social support (Wang et al., 2024; Zheng et al., 2024). The study aimed to: (1) determine PPD prevalence among postpartum women in Wenzhou; (2) examine predictive relationships between biopsychosocial factors and PPD; and (3) test breastfeeding satisfaction as a potential mediator between gender expectations and PPD.

Figure 1 presents the conceptual framework of this study, illustrating the hypothesized relationships among biopsychosocial factors and PPD, with the mediation pathway highlighted.

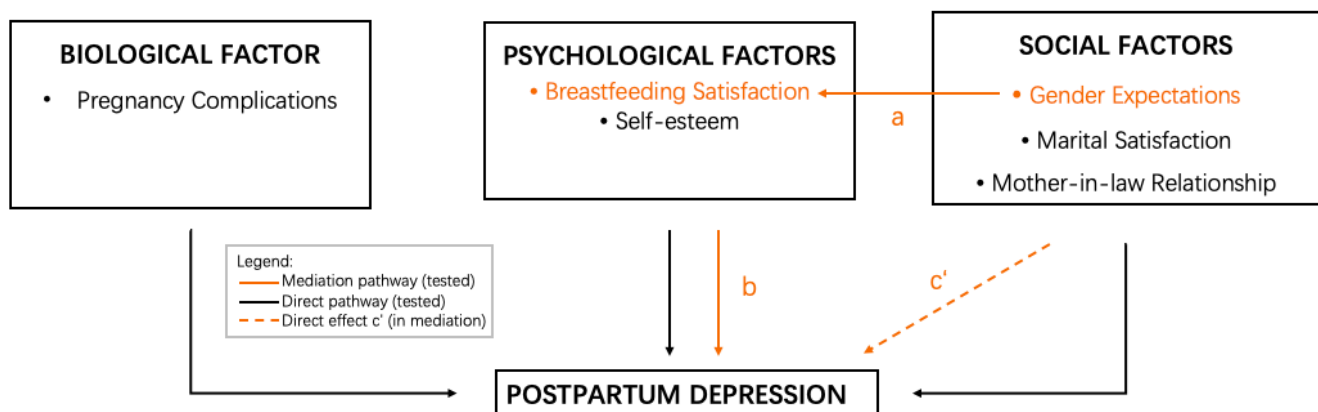


Figure 1 Conceptual framework of the study

Note: This conceptual framework illustrates the hypothesized relationships based on the Biopsychosocial Model. The highlighted pathway (Gender Expectations → Breastfeeding Satisfaction → PPD) represents the hypothesized statistical pattern examined in this study. Arrows indicate hypothesized associations, not verified causal relationships.

Path coefficients: a = association of X with M; b = association of M with Y; c' = residual association of X with Y, controlling for M Indirect effect = $a \times b$

Methods

Study Design

A predictive correlational cross-sectional study was conducted at the Second Affiliated Hospital of Wenzhou Medical University, Nanpu Campus, from November 1 to December 31, 2024. This study was conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies (Von Elm et al., 2007). This tertiary care facility serves as a regional referral center with approximately 8,278 births annually.

Sample/Participants

The target population comprised postpartum women attending routine follow-up visits at the hospital's postnatal clinic. Inclusion criteria were: (1) postpartum period between 4 weeks and 6 months; (2) singleton full-term delivery (≥ 37 weeks of gestation); (3) Chinese ethnicity and fluency in Mandarin or local dialect; (4) minimum high school education to ensure questionnaire comprehension; (5) age between 20 and 44 years; (6) ability to provide informed consent. Exclusion criteria included: multiple pregnancies, preterm births (< 37 weeks), severe medical complications requiring intensive care, infant congenital anomalies or serious health conditions, and diagnosed psychiatric disorders before pregnancy.

Sample size was calculated using G*Power 3.1.9.7 (six predictors, $\alpha = 0.05$, power = 0.80, $f^2 = 0.15$), yielding a minimum of 146 participants; accounting for 10% attrition, 166 were recruited.

Systematic random sampling was employed. During the study period, approximately 1,416 eligible women attended postnatal visits. Using a sampling interval of nine, every ninth woman from the appointment list was approached for participation, with the first participant randomly selected. In cases where a selected woman declined to participate or was later found ineligible, a replacement procedure was implemented by approaching the next eligible woman on the appointment list until the predefined target sample size of 166 was reached.

Instruments

Six standardized instruments were used to assess study variables. For all instruments with Chinese-language versions, previously published and psychometrically validated Chinese versions were administered; no in-house translation was performed for the present study.

Postpartum Depression Assessment. The Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987) comprises 10 items assessing past-week depressive symptoms (score range 0–30; cut-off ≥ 9 for clinical significance). The Chinese

version was validated by Lee et al. (1998). In the present study, Cronbach's $\alpha = 0.76$.

Breastfeeding Satisfaction. The Maternal Breastfeeding Evaluation Scale (MBFES) (Leff et al., 1994) assesses breastfeeding satisfaction across three dimensions: maternal enjoyment/role attainment, infant satisfaction/growth, and lifestyle/body image. The Chinese version (C-MBFES) was validated by Yu (2012) as a 29-item adaptation, rated on a 5-point Likert scale (score range 29–145; higher scores indicate greater satisfaction). In the present study, Cronbach's $\alpha = 0.81$.

Self-esteem. The Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965) contains 10 items measuring global self-worth on a 4-point Likert scale (score range 0–30; higher scores indicate greater self-esteem). The Chinese version was compiled by Wang et al. (1999). In the present study, Cronbach's $\alpha = 0.88$.

Marital Satisfaction. The Revised Dyadic Adjustment Scale (RDAS) (Busby et al., 1995) comprises 14 items that measure marital quality across three dimensions: consensus, satisfaction, and cohesion (score range: 0–69; a cut-off of 48 distinguishes distressed couples). The Chinese version (C-RDAS) was validated by Li et al. (2022). In the present study, Cronbach's $\alpha = 0.78$.

Mother-in-law Relationship. The Stryker Adjustment Checklist (SAC) (Stryker, 1955) is a 40-item instrument evaluating the quality of in-law relationships across four dimensions: affection, intimacy, sympathy, and tension. The Chinese version was validated by Chu (1992) at the University of Hong Kong. In the present study, each item of the instrument used was rated on a 0–10 scale (total score range 0–400; higher scores indicate better relationship quality)—Cronbach's $\alpha = 0.76$.

Pregnancy Complications and Additional Measures. Pregnancy complications were documented through medical record review and participant self-report based on ICD-10 criteria (WHO, 1992), including gestational diabetes, hypertensive disorders, anemia, infections, and threatened miscarriage/preterm labor. Infant gender expectations were assessed by asking whether the infant's actual gender matched pre-birth preferences (fulfilled = 1; unmet = 0). Sociodemographic data included age, education, marital status, residence, employment status, insurance coverage, parity, and family structure.

Regarding the instrument permissions and copyright statements, the EPDS (Cox et al., 1987), RSES (Rosenberg, 1965), RDAS (Busby et al., 1995), and ICD-10 (WHO, 1992) are publicly available for non-commercial academic research with appropriate citation. The Chinese versions of the EPDS (Lee et al., 1998), RSES (Wang et al., 1999), and RDAS (Li et al., 2022) are previously published, peer-reviewed Chinese-language versions used in the present study, in accordance with standard scholarly fair-use conventions, with full attribution to the original developers and translators. For the C-MBFES (Yu, 2012), written permission for use in the present study was obtained from Professor Jing Chen of Hainan Medical University. For the SAC, the original instrument (Stryker, 1955) is an unpublished doctoral dissertation at the University of Minnesota, and the Chinese version (Chu, 1992) is openly available through the

University of Hong Kong's institutional repository (HKU Scholars Hub). Both source works are used in the present study solely for non-commercial scientific research with full attribution to the original developer and the developer of the Chinese version. The authors accept full responsibility for the appropriate use and citation of all instruments as reported.

Data Collection

Following ethical approval, eligible women were approached at postnatal visits, provided informed consent, and completed questionnaires in private rooms (~60 minutes). Research assistants clarified questions without influencing responses.

Data Analysis

Data were analyzed using SPSS version 22.0, with a significance level of 0.05. Descriptive statistics (frequencies, percentages, means, and standard deviations) characterized sample demographics and study variables. Normality was assessed using Kolmogorov-Smirnov tests and visual inspection of histograms. Pearson correlation coefficients were used to examine bivariate relationships among continuous variables. Point-biserial correlations were used for dichotomous variables. Multiple regression analysis using the enter method identified significant predictors of PPD. Regression assumptions were verified: linearity (scatterplots), normality (P-P plots, Kolmogorov-Smirnov tests), homoscedasticity (residual plots), independence (Durbin-Watson statistic), and multicollinearity (tolerance values >0.1 , VIF <10). A reduced model containing only significant predictors was subsequently tested to achieve parsimony.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of Burapha University (IRB No: G-HS065/2567, Date: October 15, 2024) and the Ethics Committee of the Second Affiliated Hospital of Wenzhou Medical University (IRB No: 2024LYJ337, Date: October 20, 2024). All procedures adhered to the principles of the Declaration of Helsinki. Participants provided written informed consent after receiving comprehensive study information. Confidentiality was maintained through numerical coding, with identifying information stored separately from research data. Medical records were reviewed to verify obstetric information and pregnancy complications. All data were immediately coded numerically and stored securely. Participants with EPDS scores ≥ 20 were discretely referred to mental health services with their consent.

Results

Participants' Characteristics

A total of 166 postpartum women participated (mean age 33.74 ± 5.75 years). Most were married (92.8%), with mixed residential distribution (urban 30.7%, suburban 36.2%, rural 33.1%). Notably, 47.6% of male spouses were only children, and 83.0% of participants experienced pregnancy complications, reflecting the tertiary hospital setting (Table 1).

Table 1 Socio-demographic and obstetric characteristics of study participants ($n = 166$)

Characteristics	<i>n</i>	%
Age (years)		
20–34	86	51.8
35–44	80	48.2
Education Level		
Junior High School or Below	19	11.4
High School/Technical School	80	48.2
College/University	44	26.5
Graduate Studies or Above	23	13.9
Marital Status		
Married	154	92.8
Unmarried	10	6.0
Divorced or Separated	2	1.2
Residence		
Urban	51	30.7
Suburban	60	36.2
Rural	55	33.1
Work Status During Pregnancy		
Stay at Home	43	25.9
Full-time Work	82	49.4
Work Before Pregnancy, Stay Home After	41	24.7
Insurance Coverage		
No Insurance	3	1.8
Urban Employee Basic Medical Insurance	66	39.8
Urban Resident Basic Medical Insurance	97	58.4
Parity		
Primiparous	69	41.6
Multiparous	97	58.4
Pregnancy Complications		
Yes	138	83.0
No	28	17.0
Infant Gender Expectations		
Fulfilled	99	59.6
Unmet	67	40.4
Breastfeeding Status		
Exclusive Breastfeeding	88	53.0
Mixed Feeding	78	47.0

Prevalence of Postpartum Depression

The mean EPDS score was 6.18 ($SD = 5.55$). Using the Chinese cut-off of ≥ 9 , PPD prevalence was 21.1% ($n = 35$) (Table 2).

Descriptive Statistics

Breastfeeding satisfaction and marital satisfaction were moderate-to-high, while mother-in-law relationship scores showed considerable variability (Table 3).

Bivariate Correlational Analysis

Breastfeeding satisfaction showed the strongest correlation with PPD ($r = -0.500$, $p < 0.001$), followed by gender expectations ($r = -0.369$, $p < 0.001$). Notably, gender expectations and breastfeeding satisfaction were positively

correlated ($r = 0.400$, $p < 0.01$), supporting the hypothesized mediation pathway. Other variables did not correlate significantly with PPD (Table 4).

Association Between Gender Expectations and PPD

Chi-square analysis was performed using dichotomized EPDS scores (PPD positive: EPDS ≥ 9 ; PPD negative: EPDS < 9). A significant association was observed between gender expectations and PPD classification ($\chi^2 = 28.106$, $df = 1$, $p < 0.001$, $\phi = -0.411$). Among PPD-positive women, 97.1% reported unmet expectations versus 47.3% in the PPD-negative group. The effect size ($\phi = -0.411$) indicates a moderate-to-strong association, supporting the relationship between unmet gender expectations and elevated PPD risk.

Table 2 Distribution of Edinburgh Postnatal Depression Scale Scores ($n = 166$)

EPDS score category	<i>n</i>	%
0–3 (Minimal symptoms)	72	43.4
4–8 (Mild symptoms)	59	35.5
9–12 (Moderate symptoms)	16	9.6
13–19 (Major depression)	9	5.4
≥ 20 (Severe depression)	10	6.0
PPD prevalence (EPDS ≥ 9)	35	21.1

Note: Mean EPDS score = 6.18 ($SD = 5.55$). Range = 0–25.

Table 3 Descriptive statistics of study variables ($n = 166$)

Variables	$M \pm SD$	Possible Range	Actual Range	Level
Breastfeeding Satisfaction	105.95 $\pm$ 16.05	29-145	68-135	Moderate-High
Self-esteem	19.49 $\pm$ 5.886	0-30	6-29	Moderate
Marital Satisfaction	54.05 $\pm$ 5.497	0-69	34-67	Moderate-High
Mother-in-law Relationship	262.25 $\pm$ 65.47	0-400	106-371	Moderate
Postpartum Depression (EPDS)	6.18 $\pm$ 5.55	0-30	0-25	Mild-High

Table 4 Pearson correlation matrix among study variables ($n = 166$)

Variables	1	2	3	4	5	6	7
1. Pregnancy-Related Complications	1.000						
2. Infant's Gender Expectations	-0.204**	1.000					
3. Breastfeeding Satisfaction	-0.090	0.400**	1.000				
4. Self-esteem	0.150	0.009	-0.006	1.000			
5. Marital Satisfaction	0.024	-0.042	-0.001	-0.043	1.000		
6. Mother-in-law Relationship	-0.045	-0.127	0.065	0.040	-0.014	1.000	
7. Postpartum Depression	0.137	-0.369**	-0.500**	0.082	-0.057	-0.107	1.000

Note. ** $p < 0.01$

Analysis of Pregnancy Complications and PPD

Given the ceiling effect of dichotomous complications (83.0% positive), differentiated analysis was conducted. ANOVA revealed significant differences, $F_{(3, 162)} = 6.184$, $p = 0.001$. Post-

hoc comparisons indicated that delivery complications were associated with higher PPD symptoms compared to gestational complications (Table 5).

Table 5 PPD symptoms by pregnancy complication category: One-way ANOVA with LSD Post-Hoc comparisons ($n = 166$)

Group / Comparison	n	%	M	SD	95% CI	Mean Difference	SE	p
Neither type	29	17.5	5.62	6.16	[3.28, 7.96]			
Gestational only	57	34.3	4.02	1.82	[3.54, 4.50]			
Delivery only	65	39.2	8.03	6.50	[6.42, 9.64]			
Both types	15	9.0	7.47	6.66	[3.78, 11.16]			
Total	166	100.0	6.18	5.55	[5.33, 7.03]			

ANOVA: $F_{(3, 162)} = 6.184$, $p = 0.001$

LSD Post-Hoc Comparisons

Delivery only vs. Gestational only	[2.11, 5.92]	4.01	0.96	<0.001
Delivery only vs. Neither type	[0.07, 4.75]	2.41	1.19	0.044
Both types vs. Gestational only	[0.41, 6.49]	3.45	1.54	0.027

Note. Only statistically significant pairwise comparisons are shown. Gestational complications include gestational diabetes mellitus, pregnancy-induced hypertension, and anemia. Delivery complications include prolonged labor, emergency cesarean section, and postpartum hemorrhage. EPDS = Edinburgh Postnatal Depression Scale; M = mean; SD = standard deviation; CI = confidence interval; LSD = least significant difference.

Multiple Regression Analysis

Multiple regression analysis was conducted with all six predictor variables (pregnancy complications, infant gender expectations, breastfeeding satisfaction, self-esteem, marital satisfaction, mother-in-law relationships) entered simultaneously. The overall model was statistically significant, $F_{(6, 159)} = 11.239$, $p < 0.001$, accounting for 29.8% of variance in PPD symptoms ($R^2 = 0.298$, $Adjusted R^2 = 0.271$). However, only two variables emerged as statistically significant predictors: breastfeeding satisfaction ($\beta = -0.419$, $p < 0.001$) and infant gender expectations ($\beta = -0.202$, $p = 0.006$). The remaining predictors did not achieve statistical significance: pregnancy complications ($\beta = 0.082$, $p = 0.237$), self-esteem ($\beta = 0.073$, $p = 0.301$), marital

satisfaction ($\beta = -0.057$, $p = 0.413$), and mother-in-law relationships ($\beta = -0.089$, $p = 0.198$). A parsimonious reduced model containing only the two significant predictors was subsequently evaluated. This model remained highly significant, $F_{(2, 163)} = 32.296$, $p < 0.001$, accounting for 28.4% of variance in PPD symptoms ($R^2 = 0.284$, $Adjusted R^2 = 0.275$). Both predictors remained statistically significant: breastfeeding satisfaction ($\beta = -0.419$, $p < 0.001$) and infant gender expectations ($\beta = -0.202$, $p = 0.006$) (Table 6).

The predictive equation was: $EPDS = 18.076 - 2.099(Gender Expectations) - 0.134(Breastfeeding Satisfaction)$. Regression assumptions were satisfied (VIF = 1.190; Durbin-Watson = 1.953).

Table 6 Multiple regression analysis for predictors of postpartum depression ($n = 166$)

Predicting Variables	B	SE	β	t	p	95% CI	Zero-order r	Partial r
(Constant)	18.076	2.679		6.748	<0.001	[12.786, 23.365]		
Infant's Gender Expectations	-2.099	0.753	-0.202	-2.787	0.006	[-3.586, -0.612]	-0.369	-0.213
Breastfeeding Satisfaction	-0.134	0.023	-0.419	-5.796	<0.001	[-0.179, -0.088]	-0.500	-0.413

$R^2 = 0.284$, $Adjusted R^2 = 0.275$, $F_{(2, 163)} = 32.296$, $p < 0.001$

Note. CI = Confidence Interval; B = Unstandardized regression coefficient; SE = Standard error; β = Standardized regression coefficient

Mediation Analysis

To clarify the mechanisms underlying the observed relationships between predictor variables and PPD, and consistent with the interactional assumptions of the Biopsychosocial Model, mediation analyses were conducted using the PROCESS macro (Hayes, 2018). Bias-corrected 95% confidence intervals for indirect effects were estimated using 5,000 bootstrap resamples.

Breastfeeding Satisfaction as Mediator of the Gender Expectations-PPD Relationship

The analysis revealed that breastfeeding satisfaction significantly mediated the relationship between gender

expectations and PPD. Fulfilled expectations were associated with higher breastfeeding satisfaction (Path a: $B = 13.09$, $p < 0.001$), which predicted lower PPD (Path b: $B = -0.18$, $p < 0.001$). The indirect effect was significant ($ab = -2.37$, 95% CI [-3.66, -1.35]), accounting for 55.7% of the total effect, indicating partial mediation (Table 7).

The alternative model testing pregnancy complications → breastfeeding satisfaction → PPD was not supported (indirect effect 95% CI included zero).

Table 7 Mediation analysis results ($n = 166$)

Panel A: Infant Gender Expectations → Breastfeeding Satisfaction → PPD						
Path	<i>B</i>	<i>SE</i>	<i>β</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
a (X → M)	13.09	2.31	0.400	5.66	<0.001	[8.52, 17.66]
b (M → Y)	-0.18	0.02	-0.520	-7.74	<0.001	[-0.23, -0.14]
c (Total effect)	-4.27	0.81	-0.378	-5.27	<0.001	[-5.86, -2.67]
c' (Direct effect)	-1.89	0.76	-0.167	-2.49	0.014	[-3.39, -0.39]
Effect	<i>Estimate</i>	<i>Boot SE</i>	95% <i>Bootstrap CI</i>			
Indirect effect (a × b)	-2.37	0.59	[-3.66, -1.35]*			
Proportion mediated	55.7%					
Model <i>R</i> ² = 0.374, <i>F</i> _(2, 163) = 48.78, <i>p</i> < 0.001						

Note. PROCESS Model 4. X = independent variable; M = mediator (breastfeeding satisfaction); Y = dependent variable (EPDS total score). Bootstrap resamples = 5,000. CI = confidence interval. B = unstandardized regression coefficient. SE = standard error. *The indirect effect is statistically significant when the bootstrap CI excludes zero.

Examination of Alternative Mediation Pathway

Given theoretical considerations suggesting that biological factors may influence PPD through psychological mechanisms, we also examined whether breastfeeding satisfaction mediated the association between pregnancy complications and PPD. This hypothesized mediation model was not empirically supported. Pregnancy complications were not significantly associated with breastfeeding satisfaction (Path a: $B = -3.78$, $SE = 3.28$, $t = -1.15$, $p = 0.250$, 95% CI [-10.25, 2.69]), and consequently, the indirect effect failed to achieve statistical significance ($ab = 0.77$, $SE = 0.62$, 95% Bootstrap CI [-0.41, 2.04]). The total effect of pregnancy complications on PPD was similarly non-significant ($B = 1.85$, $SE = 1.13$, $p = 0.103$, 95% CI [-0.38, 4.08]). These findings indicate that pregnancy complications were not associated with PPD through breastfeeding satisfaction within this sample.

Discussion

The 21.1% PPD rate aligns with regional estimates in China (10.1% -27.4%) and slightly exceeds global rates, confirming PPD as a public health concern in urban centers. About one in five postpartum women experience significant depressive symptoms, highlighting the need for systematic attention.

Breastfeeding Satisfaction as Primary Predictor and Key Mediator

Breastfeeding satisfaction emerged as the strongest predictor, and mediation analysis revealed it accounted for over half the association between gender expectations and PPD (Table 6). This extends previous research by demonstrating not merely

independent associations, but an interconnected statistical pathway. This finding aligns with emerging evidence highlighting the complex bidirectional relationship between breastfeeding experiences and maternal mental health (de Avilla et al., 2020; Hahn et al., 2025).

Beyond its direct predictive role, mediation analysis revealed that breastfeeding satisfaction statistically accounted for the association between gender expectations and PPD. This finding extends previous research by demonstrating not merely that both factors are independently associated with PPD, but that they are interconnected through a statistical pathway. This mediating role aligns with recent longitudinal evidence from China showing that breastfeeding self-efficacy mediates the relationship between perinatal depression and exclusive breastfeeding (Liu et al., 2025).

Several mechanisms may explain this association: (1) successful breastfeeding enhances maternal self-efficacy and role confidence; (2) oxytocin and prolactin release possess mood-regulating properties; (3) breastfeeding satisfaction may reflect broader maternal adaptation success; and (4) women with fulfilled family expectations may approach breastfeeding with greater confidence, enhancing their subjective experience.

Importantly, our findings emphasize satisfaction rather than mere breastfeeding status as the critical factor. This distinction has important clinical implications, as it suggests that the quality of experience matters more than adherence to the feeding method. Previous studies focusing solely on breastfeeding initiation or duration may have overlooked this nuanced relationship (Dressler et al., 2025). While our study did not directly compare satisfaction across different feeding methods (exclusive breastfeeding, mixed feeding, formula feeding), the

focus on subjective satisfaction aligns with contemporary understanding that maternal perception of feeding success may be more psychologically relevant than objective feeding parameters (Hahn et al., 2025).

Cultural Significance of Gender Expectations

Infant gender expectations emerged as a significant correlate ($\beta = -0.202$), with women whose expectations were fulfilled scoring approximately 2.10 points lower on the EPDS. When examining both direct and indirect effects through breastfeeding satisfaction, the total effect was 4.27 points (95% CI [-5.86, -2.67])—a clinically meaningful difference representing approximately 0.77 standard deviations of EPDS scores. This finding reflects the continuing influence of traditional gender preferences in Chinese society, despite decades of modernization and policy changes.

Categorical analysis substantiated this association, with nearly all PPD-positive women (97.1%) reporting unmet expectations. This moderate-to-strong effect size provides robust evidence for the relationship between unmet gender expectations and elevated PPD risk.

The one-child policy's demographic legacy (47.6% of spouses were only children) creates unique pressures regarding gender and lineage continuation. The psychological impact of unmet gender expectations may manifest through multiple pathways: personal disappointment, perceived failure in fulfilling family obligations, reduced family support, and, in extreme cases, explicit criticism or rejection.

Our mediation analysis provides novel insight into one specific pathway: unmet gender expectations were associated with lower breastfeeding satisfaction, which in turn was associated with increased PPD risk. This suggests that the cultural stress of gender disappointment may manifest partly through disrupted maternal-infant feeding experiences. Women experiencing family disappointment about infant gender may receive less support during breastfeeding, feel less confident in their maternal role, or experience the feeding relationship as less satisfying due to the overshadowing context of unmet expectations. This interconnection between cultural factors and psychological experiences exemplifies the complex pathways posited by the Biopsychosocial Model.

The gender preference issue in China represents a complex intersection of traditional Confucian values, family lineage concerns, and practical considerations about elderly care and family economics (Rong et al., 2023). Our findings suggest that despite surface-level modernization, deeply rooted cultural values continue to influence maternal psychological well-being in meaningful ways.

Non-significant Predictors: Statistical and Methodological Considerations

The lack of significance for several theoretically important variables warrants careful interpretation. With 166 participants, the study was powered to detect medium effects but may have missed smaller ones. Marital satisfaction showed limited variance (range 34–67, out of a possible 0–69). The dichotomous pregnancy complications variable suffered a ceiling effect (83.0%); however, differentiated analysis revealed delivery-related complications were specifically associated with

elevated PPD. We acknowledge that unmeasured factors, including hormonal fluctuations and maternal role adaptation, limit the comprehensiveness of our model.

Implications for Nursing and Midwifery Practice

These findings support: (1) routine EPDS screening at multiple postpartum contacts; (2) prioritizing maternal satisfaction over adherence to specific feeding methods in lactation support; (3) culturally-sensitive assessment of gender expectations; and (4) differentiated risk assessment with enhanced surveillance for women experiencing delivery complications. At the policy level, healthcare institutions should integrate mental health screening into routine postpartum care and develop family-centered programs engaging partners and extended family in supporting maternal mental health. These findings suggest that interventions addressing breastfeeding satisfaction may benefit populations in which cultural expectations create maternal stress, supporting calls for culturally adaptable perinatal mental health guidelines (American College of Obstetricians and Gynecologists, 2023; WHO, 2022).

Study Strengths and Limitations

Strengths include theoretical grounding in the Biopsychosocial Model, validated instruments, examination of mediation pathways (addressing a limitation of previous Chinese studies), and systematic sampling with adequate power. Several limitations must be acknowledged. The cross-sectional design precludes causal inference; we cannot determine temporal ordering between breastfeeding satisfaction and depression. A retrospective assessment of gender preference is subject to recall bias, as the current emotional state may influence reported pre-birth preferences. Single-site recruitment from an urban tertiary hospital (83.0% complication rate) limits generalizability. Finally, the 28.4% variance explained indicates that important factors, including hormonal fluctuations and sleep quality, were unmeasured. Future research should employ longitudinal designs with prospective measurement of gender expectations to establish temporal relationships and address recall bias. Intervention studies testing breastfeeding support programs and structural equation modeling examining multiple mediators simultaneously would advance understanding.

Conclusion

This study identified breastfeeding satisfaction and fulfilled gender expectations as significant correlates of PPD among postpartum women in Wenzhou, with breastfeeding satisfaction partially mediating the gender expectations-PPD association. The 21.1% prevalence and delivery-specific complication effects underscore PPD as a substantial public health concern. Findings support routine screening, satisfaction-focused breastfeeding support, and culturally-sensitive assessment in postpartum care. Given the cross-sectional design, intervention effectiveness requires experimental validation.

Declaration of Conflicting Interest

No conflict of interest to declare.

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Author Contribution

Yufan Huang and Punyarat Lapvongwatana conceptualized the study. Yufan Huang also developed the methodology, conducted the investigation, collected the data, performed the formal analysis, and wrote the original draft. Punyarat Lapvongwatana additionally contributed to the methodology, writing (review and editing), supervision, and project administration. Tatirat Tachasuksri contributed to the methodology, formal analysis, writing (review and editing), and supervision. All authors have read and approved the final manuscript.

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Data Availability

The datasets generated and analyzed during the current study are not publicly available due to privacy and ethical restrictions, but are available from the corresponding author upon reasonable request.

Declaration of Use of AI in Scientific Writing

The authors declare that no generative artificial intelligence (AI) or AI-assisted technologies were used in any aspect of the preparation of this manuscript, including but not limited to writing, data analysis, or figure generation.

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