

Relationship Between Fear of Childbirth and Prenatal Depression: A Moderated Mediation Model

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Background: Fear of childbirth is a common psychological problem among women during the perinatal period. It not only affects the physical and mental health of the mother, but also has an impact on the health of the fetus. Studies have shown that fear of childbirth has a significant positive predictive effect on prenatal depression. However, there are few studies exploring the underlying mechanism between fear of childbirth and depression.

Methods: Childbirth Attitude Questionnaire, Social Support Rating Scale, Rumination Scale and Edinburgh Postpartum Depression Scale were used to measure 2765 Chinese pregnant women.

Results: Fear of childbirth had a positive predictive effect on prenatal depression ($\beta = 0.11$, $t = 15.63$, $P < 0.001$); rumination played a partial mediating role in the influence of fear of childbirth on prenatal depression, with an indirect effect value of 0.05; social support not only moderated the impact pathway of childbirth fear on rumination ($\beta = -0.01$, $t = -2.26$, $P < 0.01$), but also moderated the impact pathway of rumination on prenatal depression ($\beta = -0.01$, $t = -2.12$, $P < 0.01$).

Conclusion: Rumination mediated the relationship between fear of childbirth and prenatal depression, and social support had a moderating effect on the first and second half of the mediation model.

Keywords: prenatal depression, fear of childbirth, social support, rumination, moderated mediation model

Introduction

The period from pregnancy to childbirth is unforgettable for every woman. They have both expectations for individual role transformation and hesitation and helplessness towards the upcoming childbirth, the interweaving of various emotions is more likely to lead to negative emotions. Fear of childbirth is a common psychological issue among women during the perinatal period, characterized by anxiety and fear of unknown adverse events that may arise during or after childbirth.¹ The global incidence rate was approximately 14%.² The fear of childbirth is influenced by various factors, including personal, physiological, social and cultural factors. Fear of childbirth not only affects the mother's physical and mental well-being, but also affects the health of the fetus. Pregnant women with fear of childbirth are more likely to experience preeclampsia, placental abruption, premature birth, increased cesarean section rates and decreased willingness to conceive again.³⁻⁵ American psychologist Ellis proposed the Emotional ABC Theory, which holds that stressor (A) is only the indirect cause of individual negative emotion (C), while the direct cause is individual's unreasonable cognition and belief (B) about the event itself.⁶ Pregnant women may ruminate about the adverse consequences of childbirth during the stressful event of imminent delivery, leading to prenatal depression. Prenatal depression is a common psychological problem during pregnancy, with a prevalence rate of 28.5%.⁷ Prenatal depression not only endangers the physical and mental health and family relationships of pregnant women, but also affects the growth and development of fetuses and children. Pregnant women with severe prenatal depression may even engage in suicide or postpartum infanticide behavior.⁸ Studies have also shown that fear of childbirth had a significant positive predictive effect on prenatal depression,⁹ but few studies have explored the internal mechanism between



fear of childbirth and depression. Therefore, this study was based on the Emotional ABC Theory to elucidate the specific pathways of action between fear of childbirth and prenatal depression.

Rumination is a method of coping with negative emotions that focuses on oneself, mainly manifested as self-reflection, repetition and passive attention to negative emotions.¹⁰ Rumination is divided into invasive rumination and purposeful rumination.¹¹ Intrusive rumination is a negative emotion produced by an individual in the face of negative stressful events; purposeful rumination is the conscious and positive thinking about negative stressful events and their solutions, this form of rumination often needs to be guided and trained to enable the individual to grow positively after a traumatic experience. Studies have shown that rumination can positively predict prenatal depression.¹² Therefore, this study hypothesized that rumination played a mediating role between fear of childbirth and prenatal depression.

The processes may be mediated by social support. Social support refers to the positive emotional support, information sharing, material assistance, and value transmission that come from interpersonal relationships. Studies have shown that social support is closely related to fear of childbirth.¹³ Women with a high level of social support are better able to prepare for childbirth before it occurs, to deal with potential problems during the delivery process, and thus reduce their level of fear of childbirth.¹⁴ When entering the pregnancy stage, the social role of the mother will change, and some social relationships will also change accordingly. At this point, the life care and spiritual encouragement provided by family members become increasingly important, and their role becomes more prominent. Adequate social support can have a protective effect on the mental health and social function of pregnant women, and is an effective positive factor in preventing prenatal depression.¹⁵ Another study indicated that social support can reduce an individual's level of rumination.¹⁶ Therefore, we speculate that social support may play a moderating role on the pathway of fear of childbirth → rumination → prenatal depression.

In summary, based on the emotional ABC theory, this study explored the relationship and underlying mechanisms between fear of childbirth and prenatal depression, and assumed that rumination and social support play mediating and moderated roles in the relationship between fear of childbirth and prenatal depression, respectively.

Materials and Methods

Participants

From June 2023 to November 2023, pregnant women in obstetric clinic were selected by convenience sampling method.

Inclusion Criteria

(1) Aged ≥ 18 years Old; (2) Able to Complete Questionnaire Survey Independently; (3) Informed Consent.

Exclusion Criteria

(1) previous history of serious mental disorders; (2) serious obstetric complications and other organic diseases.¹⁷ 2765 participants were ultimately included in this study.

Measures

Childbirth Attitudes Questionnaires (CAQ)

Using the Chinese scholar Wei Juan's localized CAQ scale.¹⁸ The scale involves 4 dimensions and 16 items, and is scored using Likert 4-point to indicate the degree of change from "none" to "high". The higher the score, the more severe the fear of childbirth. The scale has good reliability and validity, with a retest reliability of 0.80 and content validity of 0.92.

Social Support Rating Scale (SSRS)

This scale was developed by Chinese scholar Xiao Shuiyuan,¹⁹ and includes three dimensions: subjective support, objective support and support utilization. It consists of 10 items and has a total score of 0–66 points. The higher the total score, the higher the level of social support. The Cronbach's α coefficient of this scale is 0.89–0.94, and the retest reliability is 0.92.

Ruminative Responses Scale (RRS)

Using version revised by Han Xiu and Yang Hongfei in China,²⁰ there are a total of 22 projects with 3 dimensions: symptom rumination, compulsive thinking and deep reflection. The higher the score, the more severe the tendency towards rumination, with a Cronbach's α coefficient of 0.94, indicating good reliability and validity.

Edinburgh Postpartum Depression Scale (EPDS)

EPDS is the most commonly used PND screening tool, developed by Cox et al, and later localized by Lee et al.²¹ It has been widely used both domestically and internationally. The scale consists of 10 items, including mood, pleasure, self-blame, anxiety, fear, insomnia, coping ability, sadness, crying and self-injury. Using the Likert 4-point scoring system, the total score is 0–30 points, with higher scores indicating more severe depression.

Data Analysis

Data entry and preliminary analysis were performed by SPSS 27.0, and the mediating and moderating effects were tested using SPSS macro program PROCESS.²² Using Model 4 to investigate the mediating effect of rumination on the relationship between fear of childbirth and prenatal depression. If the mediating effect exists, further use Model 59 to examine the moderating effect of social support in the mediating model. The model validation uses 5000 bootstrap corrections, and if the 95% confidence interval (CI) does not include 0, it indicates a significant effect.

Results

Common Method Deviation Test

Harman single factor test was used to extract a total of 9 factors with feature roots greater than 1, and the variance explained by the first factor was 30.49%, less than the critical standard of 40%, indicating that there was no serious common method bias in this study.

Descriptive Statistics

The general data analysis revealed significant differences in fear of childbirth, social support, and rumination among pregnant women of different age groups ($P < 0.05$), but no significant differences in prenatal depression ($P = 0.259$). Detailed results are shown in [Table 1](#). The linear regression results indicate that pregnant women with middle school education have 2.773 lower prenatal depression scores compared to those with primary school education. Pregnant women with high school education exhibit 3.596 lower prenatal depression scores than those with primary school education. University graduates show 4.077 lower prenatal depression scores compared to primary school graduates, while postgraduate graduates have 27.625 higher prenatal depression scores than primary school graduates. Detailed in [Table 2](#).

Correlation Analysis Among Variables

As shown in [Table 3](#), fear of childbirth was negatively correlated with social support and positively correlated with rumination and prenatal depression. Social support was negatively correlated with rumination and prenatal depression. Rumination was positively correlated with prenatal depression.

Mediation Effect Test

Standardize continuous variables using fear of childbirth as the independent variable, rumination as the mediating variable, prenatal depression as the dependent variable, education level, average monthly household income, and marital quality as control variables. The results showed that fear of childbirth had a significant positive prediction effect on rumination ($\beta = 0.39$, $t = 22.66$, $P < 0.001$), fear of childbirth had a significant positive prediction effect on prenatal depression ($\beta = 0.31$, $t = 18.32$, $P < 0.001$), and rumination had a significant positive prediction effect on prenatal depression ($\beta = 0.30$, $t = 17.76$, $P < 0.001$), as shown in [Table 4](#). The Bootstrap test results showed that the direct effect value of fear of childbirth \rightarrow prenatal depression was 0.12, the indirect effect value of fear of childbirth \rightarrow rumination \rightarrow

Table 1 Effects of General Demographic Data on Pregnant Women’s Fear of Childbirth, Social Support, Rumination, and Prenatal Depression

Variable	n (%)	Fear of Childbirth	Social Support	Rumination	Prenatal Depression
Age					
18-24	96(3.5)	28.00(19.00,35.00)	42.00(35.00,47.00)	27.00(22.00,40.00)	6.00(3.00,8.75)
25-29	1101(39.8)	28.00(22.00,33.00)	44.00(38.00,49.00)	29.00(23.00,40.00)	5.00(2.00,8.00)
30-34	1163(42.1)	27.00(20.00,32.00)	44.00(39.00,49.00)	31.00(24.00,41.00)	5.00(3.00,7.00)
≥35	405(14.6)	23.00(17.00,30.00)	46.00(41.00,51.00)	29.00(24.00,39.00)	5.00(3.00,7.00)
H		79.87	34.43	8.83	4.02
P		<0.001	<0.001	0.032	0.259
Education					
Primary school	4(0.4)	32.00(20.00,48.00)	34.00(28.00,43.00)	35.00(24.00,52.00)	7.00(6.00,11.00)
Middle school	90(3.3)	23.00(18.00,29.25)	42.00(37.75,47.25)	28.50(22.00,41.00)	6.00(4.00,9.00)
High school	173(6.3)	26.00(18.00,31.00)	44.00(38.5,50.00)	29.00(22.00,40.50)	6.00(3.00,8.00)
Bachelor or college degree	1995(72.2)	28.00(21.00,32.00)	44.00(39.00,49.00)	30.00(24.00,40.00)	5.00(2.00,7.00)
Postgraduate	196(17.9)	27.00(21.00,32.00)	44.00(39.00,50.00)	30.00(24.00,41.00)	5.00(2.00,7.00)
H		18.92	20.40	9.96	26.93
P		<0.001	<0.001	0.041	<0.001
Income					
<5000	256(9.6)	27.00(20.00,33.00)	43.00(37.00,48.00)	30.00(23.00,40.00)	6.00(3.00,8.50)
5000-10,000	1345(48.6)	28.00(21.00,32.00)	44.00(39.00,49.00)	30.00(23.00,41.00)	5.00(2.00,8.00)
>10,000	1155(41.8)	26.00(20.00,32.00)	45.00(39.00,50.00)	29.00(24.00,39.00)	5.00(2.00,7.00)
H		2.32	22.01	0.92	17.35
P		0.313	<0.001	0.631	<0.001
Quality of marriage					
Good	2662(96.3)	27.00(20.00,32.00)	44.50(39.00,50.00)	29.00(23.00,40.00)	5.00(2.00,7.00)
Normal	98(3.5)	31.00(24.00,37.25)	38.00(32.00,42.00)	40.00(33.75,45.00)	9.00(6.00,11.00)
Bad	5(0.2)	48.00(24.50,58.00)	34.00(31.00,38.00)	54.00(39.50,78.50)	10.00(7.00,17.00)
H		23.71	79.08	52.37	84.00
P		<0.001	<0.001	<0.001	<0.001

Table 2 Linear Regression Analysis of Covariates

Variable	Fear of Childbirth			Social Support		
	β	SE	P	β	SE	P
Education						
Primary school	0			0		
Middle school	-9.190	2.882	0.001	8.592	2.355	<0.001
High school	-6.788	2.786	0.015	10.151	2.293	<0.001
Bachelor or college degree	-5.772	2.709	0.033	10.610	2.230	<0.001
postgraduate	74.291	25.008	0.003	-82.573	20.580	<0.001
Income						
<5000	0			0		
5000-10,000	0.173	0.604	0.774	1.521	0.496	0.002
>10,000	-0.293	-0.612	0.632	2.420	0.503	<0.001
Quality of marriage						
Good	0			0		
Normal	4.790	0.918	<0.001	-7.068	0.750	<0.001
Bad	15.145	3.994	<0.001	-9.800	3.262	0.003

(Continued)

Table 2 (Continued).

Variable	Rumination			Prenatal Depression		
	β	SE	P	β	SE	P
Education						
Primary school	0			0		
Middle school	-10.309	-3.133	0.001	-2.773	1.148	0.016
High school	-10.065	3.051	<0.001	-3.596	1.116	0.001
Bachelor or college degree	-9.769	2.966	0.001	-4.077	1.085	<0.001
Postgraduate	93.255	27.378	<0.001	27.625	10.016	0.006
Income						
<5000	0			0		
5000-10,000	0.296	0.661	0.654	-0.516	0.242	0.033
>10,000	0.130	0.670	0.846	-0.821	0.245	<0.001
Quality of marriage						
Good	0			0		
Normal	8.319	0.993	<0.001	3.605	0.364	<0.001
Bad	25.992	4.321	<0.001	6.481	1.582	<0.001

Table 3 Mean, Standard Deviation and Correlation Analysis of Each Variable

	M	SD	Fear of Childbirth	Social Support	Rumination	Prenatal Depression
1. Fear of childbirth	27.65	8.99	I			
2. Social support	43.93	7.41	-0.33**	I		
3. Rumination	32.35	9.83	0.42**	-0.22**	I	
4. Prenatal Depression	5.26	3.61	0.47**	-0.36**	0.47**	I

Note: ** $p < 0.01$.

Table 4 Mediation Effect Test

	Rumination			Prenatal Depression		
	β	t	95% CI	β	t	95% CI
Education	0.01	0.77	-0.33,0.76	-0.08	-5.03***	-0.64,-0.28
Income	0.01	0.68	-0.35,0.73	-0.02	-1.35	-0.30,0.06
Quality of marriage	0.15	8.55***	2.03,3.24	0.17	10.85***	0.92,1.32
Fear of childbirth	0.39	22.66***	0.39, 0.47	0.31	18.32***	0.11, 0.14
Rumination				0.30	17.76***	0.10, 0.12
R ²		0.20			0.35	
F		169.82			296.07	

Note: *** $p < 0.001$.

prenatal depression was 0.05, and the total effect value was 0.17. The 95% CI for indirect effects did not include 0, indicating that rumination played a partial mediating role in the impact of fear of childbirth on prenatal depression.

Moderating Effect Test

In the original mediation model, social support was included as a moderating variable in the equation, and the results are shown in Table 5. Social support had a significant negative predictive effect on rumination ($\beta = -0.09$, $t = -3.5$, $P < 0.001$), while fear of childbirth had a significant positive predictive effect on prenatal depression ($\beta = -0.09$, $t = -3.56$, $P < 0.001$). The interaction term between fear of childbirth and social support was significant in predicting rumination ($\beta = -0.01$, $t = -2.26$,

Table 5 Moderated Mediation Effect Test

Predictive Variables	Model 2: Rumination			Model 3: Prenatal Depression		
	β	t	95% CI	β	t	95% CI
Education	0.29	1.04	-0.26,0.83	-0.41	-4.54***	-0.59,-0.23
Income	0.25	0.89	-0.29,0.79	-0.08	-0.88	-0.26,0.10
Quality of marriage	2.34	7.38***	1.72,2.96	0.89	8.55***	0.69,1.10
Fear of childbirth	0.40	20.01***	0.36, 0.44	0.11	15.63***	0.10, 0.12
Social support	-0.09	-3.56***	-0.14, -0.04	-0.08	-9.37***	-0.09, -0.06
Fear of childbirth×Social support	-0.01	-2.26**	-0.01, -0.001	0.01	1.92	0, 0.01
Rumination				0.11	17.20***	0.09, 0.12
Rumination×social support				-0.01	-2.12**	-0.01, -0.001
R2		0.01			0.01	
F		5.10			4.49	

Note: ** $p < 0.01$, *** $p < 0.001$.

$P < 0.01$), but not in predicting prenatal depression ($\beta = 0.01$, $t = 1.92$, $P = 0.05$). The interaction term between rumination and social support was significant in predicting prenatal depression ($\beta = -0.01$, $t = -2.12$, $P < 0.01$). As shown in Figure 1.

According to the mean and standard deviation of social support, social support was divided into three levels: low, medium and high. Further simple slope analysis showed that when social support was at low, medium and high levels, the effect values of fear of childbirth on rumination were 0.44 ($P < 0.001$), 0.40 ($P < 0.001$) and 0.36 ($P < 0.001$), respectively, indicating that with the increase of social support level, the positive effect of fear of childbirth on rumination was weakened. Similarly, when the level of social support was low, medium and high, the effect values of rumination on prenatal depression were 0.12 ($P < 0.001$), 0.11 ($P < 0.001$) and 0.09 ($P < 0.001$), respectively, indicating that the positive effect of rumination on prenatal depression decreased with the increase of social support level.

Discussion

In this study, a moderated mediation was constructed based on the emotional ABC theory to explore the relationship between fear of childbirth and prenatal depression. The results showed that there was a significant positive correlation between fear of childbirth and prenatal depression, which was consistent with the previous study.⁹ The negative impact of fear of childbirth is far greater than physical pain, so medical personnel must pay attention to the early psychological and emotional screening of pregnant women and develop individualized psychological intervention measures. Providing prenatal health education to pregnant women can reduce their fear of childbirth, increase their confidence in childbirth, and improve delivery experience.²³ Medical staff should increase the investment and publicity of prenatal education, and carry out prenatal training in various forms, such as pregnant women's schools, educational brochure, hospital official account, WeChat messaging service, to give pregnant women professional delivery knowledge and skills training, so as to help pregnant women better prepare for the delivery process.

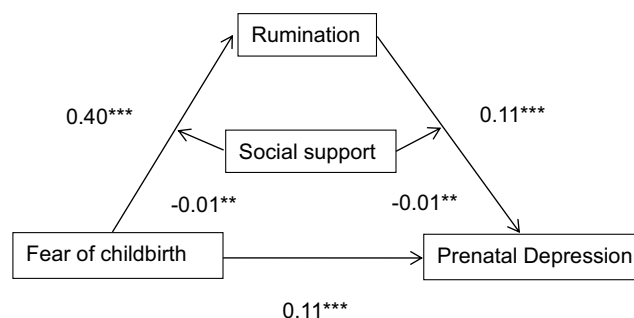


Figure 1 A moderated mediation model.

Note: ** $p < 0.01$, *** $p < 0.001$.

Rumination played a partial mediating role between fear of childbirth and prenatal depression. Pregnant women lack knowledge related to childbirth and are unable to make reasonable use of external support systems to adopt positive and effective coping methods, which makes them repeatedly focus on their negative emotions and bad life events, making them more prone to psychological disorders.²⁴ Fear of childbirth, as a negative psychological emotion, may induce rumination in individuals, thereby increasing their level of depression. In order to stop the vicious cycle between rumination and depression, there are many intervention methods for rumination, such as mindfulness-based cognitive therapy,²⁵ expressive writing,²⁶ rumination cognitive behavioral therapy,²⁷ all of which reduce the degree of rumination by changing the way of thinking, thus reducing the level of depression.

The results of this study also indicated that social support had a moderating effect on the front and back halves of the mediation model. Social support Information comes from medical staff and care from family, as a protective factor, can use external resources to cope with the impact of individuals' own rumination and reduce the negative impact of rumination on individuals. The stage from pregnancy to childbirth is a turning point for all women's identity changes. From daughters to mothers, they not only have the joy of becoming mothers soon, but also may develop some misconceptions. The support and help from husbands, friends, and medical staff are the key factors for them to pass through this stage safely. Therefore, it is recommended that medical staff patiently listen to the subjective feelings of pregnant women, guide their families to understand and accompany pregnant women, and welcome the arrival of small lives with a positive attitude together. High social support can alleviate the negative impact of rumination on depression. However, the moderated effect of social support on fear of childbirth and prenatal depression is not significant, which seems to contradict reality. We speculate that the possible reason is that the delivery event is an objective fact, and external support cannot completely eliminate inner fear, leading to negative emotions. In the future, high-quality, multicenter, and longitudinal studies are needed to confirm this result.

Limitations

There are several limitations to this study. Firstly, adopt convenient sampling method, and all collected data was self-reported and may have biases. Secondly, it is a cross-sectional study that does not allow causal reasoning. Thirdly, the research subjects in this study were Chinese women, which may not be globally representative.

Conclusion

This study has enriched the relevant research on fear of childbirth and prenatal depression, and found that rumination played a mediating role between fear of childbirth and prenatal depression, and social support played a moderation effect in the pathway of fear of childbirth → rumination → prenatal depression.

Data Sharing Statement

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

Ethical Approval

The studies involving human participants were reviewed and approved by the Ethics Committee of the Women's Hospital of Nanjing Medical University, Nanjing Women and Children's Healthcare Hospital, Jiangsu, China (No.2022KY-137-01). The study was conducted in accordance with the Helsinki Declaration and Chinese regulations, ensuring ethical standards were maintained throughout the research process. The patients/participants provided their written informed consent to participate in this study.

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We acknowledge the support of the Special Fund of Jiangsu Province Science and Technology. This study mainly explored the relationship and mechanism among fear of childbirth, rumination, social support, and prenatal depression. It is a cross-sectional study. The published article is a protocol of an intervention study on perinatal depression. The research time, theme, background, methods, results, and discussions of these two articles are different.

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Disclosure

The authors report no conflicts of interest in this work.

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