

## Retrospective Study

## Relationship between family cohesion/adaptability and postpartum depressive symptoms: A single-center retrospective study

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Depression is the most common mental illness in postpartum mothers, and the etiology of postpartum depression remains poorly understood. Over the past several decades, studies have reported that postpartum depression is caused by multiple factors, such as genetic, psychological, pregnancy, and environmental factors, with the family environment being an important environmental factor. The theory of family cohesion and adaptability put forward by Olson is a classic model that describes the level of family function. However, to date, this model has not been examined regarding its applicability to patients with postpartum depression.

**AIM**

To investigate the relationship between family cohesion and adaptability and the risk of postpartum depressive symptoms.

**METHODS**

We retrospectively analyzed 1446 patients admitted to the postpartum healthcare clinic of the Affiliated Foshan Maternity and Child Healthcare Hospital from April 2021 to December 2021. Patients were grouped according to whether postpartum depression symptoms were reported (symptoms,  $n = 454$ ; no symptoms,  $n = 992$ ). All patients completed the Edinburgh Postpartum Depression Scale and the Chinese version of the Family Cohesion and Adaptability Assessment Scale II. Baseline and clinical data were compared between groups. Univariate regression analysis was used to investigate the association between different types of family cohesion and postpartum depressive symptoms and the association between different family adaptability types and postpartum

depressive symptoms.

## RESULTS

After adjusting for age, education, occupation, gravidity, parity, and mode of delivery, disengaged [adjusted odds ratio (AOR) = 3.36, 95%CI: 1.91–5.91], and separated (AOR = 1.97, 95%CI: 1.34–2.90) family cohesion types showed a higher risk of postpartum depression than the connection type, whereas the enmeshed type (AOR = 0.38, 95%CI: 0.28–0.51) protected against postpartum depressive symptoms. Rigid (AOR = 4.41, 95%CI: 3.02–6.43) and structured families (AOR = 1.88, 95%CI: 1.34–2.63) had a higher risk of postpartum depressive symptoms than flexible families, whereas chaotic families (AOR = 0.35, 95%CI: 0.24–0.51) protected against postpartum depressive symptoms.

## CONCLUSION

Family cohesion and adaptability are influencing factors for postpartum depressive symptoms, with higher family cohesion and adaptability being associated with a lower risk of postpartum depressive symptoms.

**Key Words:** Family cohesion; Adaptability; Postpartum depressive symptoms; Cross-sectional study

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**Core Tip:** Postpartum depression is the most common mental illness in postpartum mothers; studies have reported that postpartum depression is caused by multiple factors. This study analyzed the family environments of 1446 postnatal women, showing that high family cohesion and adaptability prevented the development of postpartum depressive symptoms. Further, we observed a linear relationship between family cohesion, adaptability, and postpartum depressive symptoms, where higher family cohesion and adaptability scores were associated with a risk of postpartum depressive symptoms.

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## INTRODUCTION

Postpartum depression is the most common mental illness in postpartum mothers. In high-income countries, more than 10% of postpartum women experience postpartum depression, and the prevalence is higher in low-income countries[1,2]. Postpartum depression is a leading cause of death for postpartum women, and numerous studies have suggested that postpartum depression in mothers affects the developmental processes of their children, including cognitive and language delays, behavioral problems, unsafe attachment, decreased academic performance, and increased risk of depression in adulthood[3,4]. Postpartum depression places heavy burdens on families and society. Therefore, early detection and intervention of postpartum depressive symptoms are crucial for prevention and treatment.

The etiology of postpartum depression remains poorly understood. Over the past several decades, studies have reported that postpartum depression is caused by multiple factors, such as genetic, psychological[5], pregnancy[6], and environmental factors[7-10]. Guan *et al*[11] found that a poor family environment contributes to the development of postpartum depression, and family communication, emotional responses, and other related factors influence the development of postpartum depression. A study conducted in Japan found that women who live with family members who have a high level of perception and participate in parenting have a low risk of postpartum depression[12]. In addition, Kızıllırmak reported a significant negative correlation between Edinburgh Postnatal Depression Scale (EPDS) scores and the total scores for spousal, emotional, social, and physical support in postpartum women[13]. In terms of marital satisfaction, pregnant women who are unsatisfied with the quality of their marriage are more likely to suffer from postpartum depression[14]. A large retrospective study on the correlation between postpartum depression and domestic violence among Asian mothers found that women who experience domestic violence from their partners are at high risk of developing postpartum depression. Moreover, violence and intimidation by other family members are associated with the incidence of postpartum depression, and domestic violence increases the risk of suicidal ideation in patients with postpartum depression[15].

The theory of family cohesion and adaptability put forward by Olson is a classic model that describes the level of family function[16,17]. Family cohesion reflects the robustness of family members' emotional ties and refers to the ability of family members to support each other, unite, and overcome difficulties when dealing with family difficulties. Family adaptability reflects the flexibility of families to deal with changes and is based on the ability to change family power structures or roles in the process of family development. However, to date, this model has not been examined regarding families of patients with postpartum depression. In this study, we conducted a cross-sectional survey among postpartum women in China to explore the effects of family cohesion and adaptability on postpartum depressive symptoms and provide a reference for treatment.

## MATERIALS AND METHODS

### Participants

We retrospectively analyzed 1446 patients admitted to the postpartum healthcare clinic of the Affiliated Foshan Maternity and Child Healthcare Hospital from April 2021 to December 2021. According to whether postpartum depression symptoms were reported, patients were divided into a postpartum depression symptoms group and a no postpartum depression symptoms group. The inclusion criteria were: (1) Postpartum women of Han ethnicity (self-reported) in China aged 18–45 years; (2) no cognitive, intellectual, or behavior disorders; (3) voluntary participation in the study and ability to independently complete the questionnaires; (4) no serious complications during pregnancy and childbirth and no postpartum child death; and (5) an Apgar score of 8–10. The exclusion criteria were: (1) Postpartum women with major traumatic stress events in the last month, such as spouse death, divorce, and domestic violence; (2) severe or unstable somatic disease; and (3) previous diagnosis of schizophrenia, depression (including postpartum depression), bipolar disorder, obsessive-compulsive disorder, generalized anxiety disorder, panic attacks, or epilepsy.

### Postpartum depressive symptoms

The EPDS was used to measure postpartum depressive symptoms. The EPDS was developed in 1987 and is used specifically for screening for postpartum depression. The scale has good reliability and validity. The total score of the scale ranges from 0 to 30, where a higher score indicates greater severity of depression. The Chinese version of the EPDS has been shown to have good reliability and validity [18]. In the Chinese version, the demarcation of depressive symptoms is divided into nine points.

### Family adaptability and cohesion

Family cohesion and adaptability were measured using the Family Cohesion and Adaptability Scale (FACES II-CV). FACES II-CV was developed by Olson in 1982 and translated into Chinese by Fei *et al* [19]. The scale evaluates the cohesion and adaptability of families across a total of 30 items, which are scored on a 5-point Likert scale. A higher score indicates better family cohesion and adaptability. Family cohesion is divided into four types based on the total subscale score: disengaged (< 55.9), separated (55.9–63.9), connected (63.9–71.9), and enmeshed (> 71.9). Family adaptability is divided into four types: rigid (< 44.7), structured (44.7–50.9), flexible (50.9–57.1), and chaotic (> 57.1). We only used the section on actual family status, and Cronbach's alpha for this section was 0.93.

### Covariates

Age[20], occupation[20], education[21], mode of delivery[22,23], gravidity, and parity[24] have previously been reported to be associated with postpartum depressive symptoms. Therefore, we included them as covariates in this study. The occupation was divided into "unit head", "professional and technical personnel", "clerks", "business and service personnel", "unemployed/housewife", and "other". Educational level was defined by participants' highest level of education, and responses included "junior high school or below", "senior high school", and "college or university". The mode of delivery was divided into "vaginal delivery" and "cesarean section".

### Statistical analysis

The cohesion and adaptability of women with and without postpartum depressive symptoms are represented as mean  $\pm$  SD and were compared using the Student's *t*-test. Age, occupation, educational level, mode of delivery, gravidity, and parity are described using frequency and rate and were compared using  $\chi^2$  tests. Logistic regression was performed to assess the association between postpartum depressive symptoms, family cohesion, and adaptability, and odds ratios (ORs) and 95% CIs were calculated. In model 1, the associations between family cohesion, adaptability, and postpartum depressive symptoms were assessed without adjusting for covariates. Subsequently, variables that were significant in the univariate analysis or those that have been reported in previous studies as confounding factors were adjusted for in model 2. A two-tailed  $P < 0.05$  was considered significant. All analyses were performed using Statistical Analysis System software (version 9.2; SAS Institute, Inc.,

Cary, NC, USA).

## RESULTS

### **Characteristics and postpartum depressive symptoms of participants**

As shown in [Table 1](#), the age range of participants was 19–49 years, with an average age of  $30 \pm 4.30$  years. Postpartum depressive symptoms were reported in 454 postpartum women for a prevalence rate of 31.4%. There were no significant differences between women with and without postpartum depressive symptoms in age ( $\chi^2 = 2.07$ ,  $P = 0.354$ ), education level ( $\chi^2 = 2.65$ ,  $P = 0.448$ ), mode of delivery ( $\chi^2 = 0.177$ ,  $P = 0.674$ ), gravidity ( $\chi^2 = 4.004$ ,  $P = 0.261$ ), or parity ( $\chi^2 = 6.107$ ,  $P = 0.107$ ). However, there was a significant difference in occupation between the two groups ( $\chi^2 = 11.26$ ,  $P = 0.046$ ).

### **Family cohesion and adaptability of postpartum women**

The total scores for family cohesion and adaptability were significantly lower in the postpartum depressive symptoms group than in the group without postpartum depressive symptoms ( $P < 0.001$ ; [Table 2](#)).

### **Association between different types of family cohesion and postpartum depressive symptoms**

As shown in [Table 3](#), the results of the univariate regression analysis showed that different types of family cohesion were associated with postpartum depressive symptoms (model 1,  $P < 0.001$ ). In model 2, after adjusting for age, educational level, occupation, gravidity, parity, and mode of delivery, the disengaged type [adjusted OR (AOR) = 3.36, 95%CI: 1.91–5.91] and separated type (AOR = 1.97, 95%CI: 1.34–2.90) had a higher risk of postpartum depressive symptoms than the connection type, whereas the enmeshed type (AOR = 0.38, 95%CI: 0.28–0.51) was a protective factor of postpartum depressive symptoms.

### **Association between different family adaptability types and postpartum depressive symptoms**

The results of the univariate regression analysis showed that different family adaptability types were associated with postpartum depressive symptoms ([Table 4](#), model 1,  $P < 0.001$ ). After adjusting for age, educational level, occupation, gravidity, parity, and mode of delivery, rigid (AOR = 4.41, 95%CI: 3.02–6.43) and structured families (AOR = 1.88, 95%CI: 1.34–2.63) had a higher risk of postpartum depressive symptoms than flexible families, whereas chaotic families (AOR = 0.35, 95%CI: 0.24–0.51) protected against postpartum depressive symptoms.

## DISCUSSION

We found that the prevalence of postpartum depressive symptoms was 31.6%, which is consistent with previous studies[15]. This indicates that postpartum depressive symptoms are an important perinatal mental health problem among. Furthermore, the levels of family cohesion and adaptability in the postpartum depressive symptoms group were significantly lower than those in the non-postpartum depressive symptoms group, which suggested that, when families are in the transition period between pregnancy and birth, high levels of cohesion and adaptability can enable family members to join forces, adjust strategies, and jointly help the mother cope with the various difficulties involved in raising children and the increase in costs. This, in turn, reduces the psychological pressure on women and lowers the risk of postpartum depressive symptoms. Previous studies have similarly found that higher family cohesion and adaptability reduce the prevalence of psychological disorders. For example, a survey conducted in 100 patients with terminal illnesses admitted to a palliative care ward in South Korea found that higher family adaptability reduced anxiety and depression in patients, whereas higher family cohesion resulted in lower rates of depression[25]. In a study of family cohesion and adaptability in youth at high clinical risk for psychosis, the youth and their mothers were reported to have lower adaptability and cohesion than their healthy control counterparts[26]. Moreover, a study on anger traits and somatization in junior college students in Shanghai, China, found that a high level of family cohesion and adaptability played a protective role, reducing the effects of anger characteristics on physical symptoms. They suggested that intervention measures that combine family cohesion, adaptive training, and depression treatment may be effective for patients with a high level of anger characteristics [27]. Taken together, we suggest that, to prevent and treat postpartum depressive symptoms, mental health workers specializing in women's mental health should focus on improving maternal family cohesion and adaptability.

Olson's theory of families, called "The Circumplex Model", suggests that family cohesion and adaptability have a curvilinear relationship with psychological and behavioral disorders. Excessively high or low cohesion and adaptability in the family are considered dysfunctional, and moderate cohesion and adaptability in the family model are regarded as beneficial[16,28]. Inadequate cohesion

**Table 1 Characteristics of participants with and without postpartum depressive symptoms (n = 1446)**

Characteristics	With postpartum depressive symptoms (n = 454)		Without postpartum depressive symptoms (n = 992)		$\chi^2$	P value
	n	Percent	n	Percent		
<b>Age (yr)</b>					2.07	0.354
18–28	181	39.9	365	36.8		
29–34	217	47.8	481	48.5		
Over 35	56	12.3	146	14.7		
<b>Educational level</b>					2.65	0.448
Junior high school or below	67	14.8	122	12.3		
Senior high school	90	19.8	208	21.0		
College	131	28.9	315	31.8		
University and above	166	36.6	347	35.0		
<b>Occupation</b>					11.26	0.046
Leadership	6	1.3	26	2.6		
Professional and technical personnel	82	18.1	222	22.4		
Clerks	96	21.1	225	22.7		
Business and service personnel	107	23.6	237	23.9		
Unemployed / housewife	150	33.0	262	26.4		
Others	13	2.9	20	2.0		
<b>Mode of delivery</b>					0.177	0.674
Vaginal delivery	239	52.6	534	53.8		
Cesarean section	215	47.4	458	46.2		
<b>Gravidity</b>					4.004	0.261
1	201	44.3	389	39.2		
2	141	31.1	354	35.7		
3	71	15.6	154	15.5		
≥ 4	41	9.0	95	9.6		
<b>Parity</b>					6.107	0.107
1	269	59.3	521	52.5		
2	159	35.0	412	41.5		
≥ 3	26	5.7	59	6.0		

**Table 2 Family cohesion and adaptability scores of postpartum women (n = 1446) (mean ± SD)**

FACES II-CV	With postpartum depressive symptoms (n = 454)	Without postpartum depressive symptoms (n = 992)	t value	P value
Cohesion	66.78 ± 9.88	74.03 ± 8.60	14.16	< 0.001
Adaptability	48.62 ± 8.48	55.11 ± 7.39	14.77	< 0.001

FACES II-CV: Family Cohesion and Adaptability Scale.

leads to alienation and poor communication among family members, whereas excessive cohesion leads to family members lacking a sense of boundary and self-space. Furthermore, families with insufficient adaptability have more rigid family rules and an inability to adapt to environmental changes, whereas an excessive level of adaptability leads to confusion around family rules and a lack of organizational

**Table 3 Association between types of family cohesion and postpartum depression (n = 1446)**

Types of family cohesion	n	Rate	Model 1			Model 2		
			COR	95%CI	P value	AOR	95%CI	P value
Connected	410	28.40%	1.00			1.00		
Disengaged	78	5.40%	3.82	2.27-6.43	< 0.001	3.36	1.91-5.91	< 0.001
Separated	180	12.40%	2.03	1.42-2.89	< 0.001	1.97	1.34-2.90	< 0.001
Enmeshed	778	53.80%	0.4	0.31-0.53	< 0.001	0.38	0.28-0.51	< 0.001

Model 1: Univariate regression model, without adjusting for covariates; Model 2: Multivariate regression model, adjusted for age, occupation, educational level, gravidity, parity, and delivery mode. COR: Crude odds ratio; AOR: Adjusted odds ratio.

**Table 4 Relationship between types of family adaptability and postpartum depressive symptoms (n = 1446)**

Type of family adaptability	n	Rate	Model 1			Model 2		
			COR	95%CI	P value	AOR	95%CI	P value
Flexible	282	19.5%	1.00			1.00		
Rigid	428	29.6%	4.07	2.91-5.70	< 0.001	4.41	3.02-6.43	< 0.001
Structured	526	36.4%	1.83	1.35-2.48	< 0.001	1.88	1.34-2.63	< 0.001
Chaotic	210	14.5%	0.37	0.26-0.52	< 0.001	0.35	0.24-0.51	< 0.001

Model 1: Uncorrected model: univariate regression model, uncorrected confounding factors; Model 2: Corrected model: multivariate regression model, adjusted for age, occupation, education, gravidity, parity, and mode delivery. COR: Crude odds ratio; AOR: Adjusted odds ratio.

guidance, which is not conducive to the physical or mental health development of family members[29]. However, this model has also been questioned and criticized by some scholars, and several studies have reported inconsistent results. In a study conducted in South Korea on the correlation between adolescent behavioral problems and family cohesion and adaptability, results showed that the relationship between family cohesion, adaptability, and adolescent behavioral problems was linear rather than curvilinear. The study found that higher scores of family cohesion and adaptability were associated with a lower incidence of adolescent behavioral problems[30]. In addition, in a study on the relationship between psychological stress and family cohesion and adaptability in infertile couples, results showed that the relationship between family cohesion, adaptability, and psychological stress was also linear rather than curvilinear. They found that higher scores of family cohesion and adaptability were associated with less psychological pressure in couples with infertility[31].

We observed a linear relationship between family cohesion, adaptability, and postpartum depressive symptoms, where higher family cohesion and adaptability scores were associated with a lower risk of postpartum depressive symptoms. We speculate that this difference is related to the specific physiological stage of the postpartum period. Postpartum women often have poor self-functioning and are dependent on their surrounding environment[32,33]. Moreover, pregnant women in China often follow the custom of "confinement"[34,35], where postpartum women are taken care of at home for one month after giving birth and are not permitted to do housework or leave the house. High levels of cohesion and adaptability enable family members to offer crucial help to pregnant women, reducing psychological pressure and preventing the development of postpartum depression. The present findings are in line with the abovementioned studies. The findings here of a linear relationship rather than a curvilinear relationship between family cohesion, adaptability, and psychological and behavioral disorders may be related to the study population. Previous studies reporting curvilinear relationships were mainly conducted in general populations[16,36], whereas those reporting linear relationships were mainly focused on specific groups, such as adolescents, couples with infertility, and postpartum women. These groups often have weaker self-functioning and high dependence on their external environment and require significant support from their families to meet their needs to maintain psychological balance and prevent psychological and behavioral problems.

### Limitations

The sample size of the present study was large, and we controlled for potential confounding factors. For example, interviews were conducted in the hospital by trained nurses, and a scale specifically developed for speakers of Mandarin was used for assessment, which offered reliability of the results.

However, the study also had limitations. For example, this was a single-center study. Furthermore, we used the EPDS to assess depressive symptoms without using the Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) interviews to confirm diagnoses of depression. Indeed, research has suggested that self-reporting methods produce higher EPDS scores[37]. In addition, although we adjusted for several confounding factors, we did not control for other factors related to postpartum depressive symptoms, such as breastfeeding[38-40], intimate partner violence[5,15], and marital relationships[41,42]. We aim to include these factors in future studies using a hierarchical approach.

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## CONCLUSION

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The present research showed that high family cohesion and adaptability prevented the development of postpartum depressive symptoms. For familial treatment of postpartum depression, family therapists may need to consider the physical and mental characteristics, customs, and cultures of postpartum women and appropriately adjust and enhance family cohesion and adaptability as much as possible to help prevent pregnant women from developing postpartum depression.

## ARTICLE HIGHLIGHTS

### **Research background**

Postpartum depression is the most common mental illness of mothers after childbirth, and the family environment is an important environmental factor affecting postpartum depression. Olson's theory of family cohesion and adaptability is a classic model to describe the level of family function. However, this model has not been tested in families of patients with postpartum depression.

### **Research motivation**

The main focus was to explore the relationship between family cohesion/adaptability and postpartum depression symptoms. The key problem to be solved was how to investigate family cohesion and adaptability and postpartum depression symptoms and how to study the relationship between them. This research has great significance for future explorations into reducing the risk of postpartum depression.

### **Research objectives**

The purpose of this study was to explore the relationship between family cohesion and adaptability and the risk of postpartum depressive symptoms.

### **Research methods**

The clinical data of 1446 postpartum women with and without depressive symptoms were analyzed retrospectively. The Edinburgh Postpartum Depression Scale and the Chinese version of the Family Cohesion and Adaptability Scale II were used to evaluate depressive symptoms and family cohesion, respectively. Univariate regression analysis was used to evaluate the correlation between family cohesion and postpartum depression symptoms.

### **Research results**

The prevalence of depression in postpartum women was 31.4%, and the family cohesion scores of this population were low. Univariate regression analysis showed that the risk of postpartum depression in detached and separated families was higher than that in connected families, while cohesion was a protective factor for postpartum depression. In addition, rigid and structured families had a higher risk of postpartum depression than flexible families, while chaotic families could prevent postpartum depression.

### **Research conclusions**

This study showed that the prevalence of depression in postpartum women was 31.4%, and the family cohesion scores of this group were low. The higher the scores of family cohesion and adaptability, the lower the risk of postpartum depressive symptoms. Disordered families and cohesive families can prevent postpartum depression.

### **Research perspectives**

Future research should investigate differences in family cohesion and adaptability in different types of families and their influence on postpartum depression according to the age, education, and the annual income of postpartum women.

## FOOTNOTES

**Author contributions:** Zhang GR contributed to the study conception and design, drafting manuscript, data analysis and interpretation; Li PS contributed to the study conception, critical revision of article for important intellectual content; Jia YB contributed to the study conception and design, critical revision of article for important intellectual content.

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**Informed consent statement:** This is a retrospective study that used anonymous clinical data. According to institutional policies, informed consent was not required from patients in this study.

**Conflict-of-interest statement:** All authors declare no conflicts of interest.

**Data sharing statement:** The data for this study can be obtained from the corresponding author upon request.

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