

Associations between family cohesion, adaptability, and functioning of patients with bipolar disorder with clinical syndromes in Hebei, China

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Abstract

Objective: We aimed to investigate the symptoms of inpatients with bipolar disorder (BD) in different types of families, and to explore the correlations between family coherence, family adaptability, and family functioning among inpatients with BD.

Methods: Inpatients with BD in Hebei, China ($n = 61$; mean age = 33.85 ± 10.54 ; 39 males) participated in this study. Participants' symptoms were evaluated using the Bech–Rafaelsen Mania Scale (BRMS) and Hamilton Depression Rating Scale (HDRS) at weeks 1, 4, and 8 after their admission to the hospital. Participants' family type was assessed using the Family Adaptability and Cohesion Scale II–Chinese Version. Family functioning was assessed using Family Assessment Device.

Results: Participants were classified into three family types: balanced ($n = 13$), mid-range ($n = 28$), and extreme ($n = 20$). BRMS scores improved over time in patients from all three family types. Improvement was slightly better with the balanced than the extreme family type. HDRS scores showed an improving trend over time, although this was not significant. Family coherence, adaptability, and functioning were mutually correlated.

Conclusion: The family system and family functioning are important factors that clinicians should keep in mind when treating people with BD.

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Keywords

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Introduction

Bipolar disorder (BD)

Patients with bipolar disorder (BD) experience two main syndromes, mania and depression, and they are at high risk of suicide attempts.¹ Moreover, people with BD may be stigmatized by society, which they may internalize.² As a result, people with BD may have low motivation to treat their condition with formal treatment, including medication, because they believe they do not deserve a happy life. In other words, people with BD have a high degree of disability with respect to personal and social domains, which causes a large burden on society.³

To tackle syndromes and other health outcomes in people with BD, studies have focused on different therapies, including psychoeducation, medication, occupational therapy, psychotherapy, and family therapy.^{4,5} An important issue in treating people with BD is their family system, as family members are usually frontline or primary caregivers, providing direct assistance to the patient. However, family members of people with BD may also be stigmatized.⁶ Because social pressures may incur societal stigma for the family, people with BD may live within an impaired family system with lower functioning. Impairment of the family system or family functioning may worsen BD syndromes.

Family coherence, family adaptability, and family type

Olson and colleagues delineated two aspects of family behaviors: *cohesion* and

adaptability. Those authors organized these two aspects into a circumplex model to illustrate different types of families.⁷⁻⁹ Cohesion indicates the extent to which the family members are emotionally bonded; adaptability refers to the ability of the family system to adjust to situational and developmental stressors. A circumplex model can be plotted with one aspect on the x-axis and another aspect on the y-axis. In the circumplex model, four levels of cohesion (from low to high: disengaged, separated, connected, and enmeshed) and four levels of adaptability (from low to high: rigid, structured, flexible, and chaotic) are defined, and 16 types of family are further classified.⁷⁻⁹ Among the 16 types of family, several family types are clustered, finally resulting in three major types of family: (a) the balanced type of family includes *flexible separateness*, *flexible connectedness*, *structured connectedness*, and *structured separateness*, which are at the center of the circumplex model; (b) the extreme type of family includes *chaotically disengaged*, *chaotically enmeshed*, *rigidly enmeshed*, and *rigidly disengaged*, which are at the margins of the circumplex model; and (c) the mid-range type of family includes family types other than balanced and extreme types.

Olson et al.⁹ described the balanced type of family as an open system, indicating that the family type is *dynamic* and family members are free to move in any direction, as required by the family life cycle or socialization of family members. Nevertheless, movement within the family is within reasonable limits; therefore, the balanced type of family is functional with respect to

individual family development. In contrast, the extreme type of family is the least functional regarding individual and family development. Specifically, this type of family usually encounters conflicts, arguments, or loss of the approval and love of family members.¹⁰ Therefore, the balanced type of family seems to be the best family system for people with BD, followed by the mid-range and extreme family types.

McMaster Model of Family Functioning (MMFF)

In addition to the family types described in the circumplex model,⁷⁻⁹ Epstein, Bishop, and Levin¹⁰ considered the family complex and proposed the McMaster Model of Family Functioning (MMFF) in family studies. In the assumption made by Epstein, Levin, and Bishop,¹¹ the complex of a family is described as follows: “The primary function of today’s family unit appears to be that of a laboratory for the social, psychological, and biological development and maintenance of family members.” Moreover, the MMFF contains the following aspects: (1) parts of the family are mutually related; (2) a certain part of the family cannot be understood without considering the rest of the family; (3) family functioning is more than summing up the parts of the family; (4) the structure and organization of a family are important determinants for the behaviors of individual family members; and (5) shaping of family members’ behavior is related to the transactional patterns of the family.¹²

Based on these assumptions and aspects, the MMFF contains six domains: problem-solving, communication, roles, affective response, affective involvement, and behavioral control.¹³ *Problem-solving* indicates the ability of a family to resolve problems, to maintain effective family functioning. *Communication* indicates the extent to which the family exchanges information.

Roles indicates whether each family member engages in repetitive patterns of behavior-fulfilled family functions. *Affective response* indicates the ability to respond appropriately to various stimuli with respect to both the quality and quantity of feelings. *Affective involvement* indicates to what extent the family shows interest in and pays attention to family members’ activities and hobbies. *Behavioral control* indicates how the family adapts to handle behaviors in situations that could be physically dangerous, involving the expression of psychological needs and drive and including socializing behaviors both inside and outside the family.¹²

Family of people with BD

Among different factors in treating people with BD, family issues may have potential for investigation by health care providers. Studies have shown that the family is one of the most important factors related to syndromes in people with BD. Sullivan and Miklowitz¹⁴ found that adolescents with BD tend to live in a family with poorer coherence and adaptability than the families of their counterparts. Thus, Sullivan and Miklowitz¹⁴ echoed the findings of Belardinelli et al.¹⁵ that family functioning is an element that cannot be ignored when treating people with BD, in addition to other considerations (e.g., the patient–psychiatrist relationship). Other studies have also demonstrated that poor family functioning is related to more severe syndromes and higher risk of relapse among people with BD.¹⁶⁻¹⁸

Literature gap, study objectives, and hypotheses

Substantial evidence indicates that different types of families and family functioning are highly associated with the emotions of an

individual living in that family.^{14,18,19} Specifically, extreme-type families and those with poor family functioning contribute to emotional problems in family members.^{14,18,19} Moreover, associations between family coherence, adaptability, and functioning have been found in Western studies.^{12,13,18} However, such investigations for people with BD in mainland China are scarce. Given the large population in China (approximately 1.4 billion) and a lifetime prevalence of BD of 0.11%,²⁰ we strongly recommend investigating the roles of family type and family functioning for people with BD in mainland China.

The purposes of this study were to understand the following: (1) whether the different types of family have different influences regarding improvement of syndromes among people with BD (i.e., mania and depression), and (2) whether family coherence, family adaptability, and family functioning are mutually correlated. We therefore hypothesized that (1) people with BD living in an extreme type of family have more severe syndromes than those living in a balanced or mid-range type of family, and (2) family coherence, adaptability, and functioning are mutually associated.

Methods

Participants and procedure

Patients with BD who were admitted to the Hebei Province Sixth People's Hospital were recruited using a convenience sampling design between February 2012 and June 2013. The inclusion criteria were as follows: (1) a diagnosis of bipolar I disorder that fulfills the diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision*;²¹ (2) age 16 years or older; (3) an educational level of primary school or above; and (4) willing to

participate in the study and to provide written informed consent. Patients were excluded if they had (1) a serious physical disability, such as amputation or (2) a history of drug dependence.

After obtaining approval of the study protocol from the Institutional Review Board of Hebei Mental Health Center, an attending psychiatrist first screened all eligible participants and invited them to participate in the study, providing them with detailed information of the study. After participants signed an informed consent form, two attending psychiatrists used a background information sheet to interview participants and their family members, to obtain the participants' characteristics. Several attending psychiatrists assessed manic and depressive syndromes in all patients with BD using the Bech-Rafaelsen Mania Scale (BRMS) and Hamilton Depression Rating Scale (HDRS), at weeks 1, 4, and 9 after patients were admitted to the hospital. Family coherence, adaptability, and functioning were assessed when patients were stable. Specifically, when a patient with BD had a BRMS score <5 together with an HDRS score <8 (i.e., remission), a psychiatrist interviewed the patient in a quiet, private room using the Family Assessment Device (FAD) and Family Adaptability and Cohesion Scale II–Chinese Version (FACESII-CV). Patients with BD were instructed to recall how they interacted with their family for the previous 3 months.

Instruments

Background information sheet. The background information sheet included the following variables: sex, age, ethnicity, educational level, marital status, living area, onset age, reason for admission, and family structure.

Bech–Rafaelsen Mania Scale (BMRS). The BMRS was first developed in 1978²² and was translated into Chinese, with satisfactory psychometric properties; the internal consistency (Cronbach's α) is 0.70 and concurrent validity using the Global Assessment Scale is -0.71 .²³ The Chinese BMRS adds two items to the original BMRS, consisting of 13 items with a scale between 0 (*no symptoms*) and 4 (*severe symptoms*). All items are assessed by a psychiatrist with standardized training in using the BMRS. A higher score on the BMRS indicates that the patient has more severe syndromes.

Hamilton Depression Rating Scale (HDRS). The HDRS was first developed in 1960²⁴ and has been translated into Chinese, with satisfactory psychometric properties; internal consistency (Cronbach's α) is 0.71 and concurrent validity using the Global Assessment Scale is -0.49 .²⁵ The Chinese HDRS consists of 24 items under a seven-factor structure: anxiety/somatization (6 items), weight (1 item), cognitive disturbance (6 items), diurnal variation (1 item), retardation (4 items), sleep disturbance (3 items), and hopelessness (3 items). Fourteen items are rated on a scale between 0 (*none*) and 4 (*very severe*), and 10 items are rated on a scale between 0 (*none*) and 2 (*severe*). All items are assessed by a psychiatrist who has received standardized training in using the HDRS; a higher score on the HDRS indicates a patient with more severe syndromes.

Family Adaptability and Cohesion Scale II–Chinese Version (FACESII-CV). The FACESII was developed based on the circumplex model of marital and family systems proposed by Olson et al.⁸ The FACESII was subsequently translated into a Chinese version, which contains two dimensions: coherence and adaptability; each comprising 30 self-reported items. All items are rated between

1 (*almost never*) and 5 (*almost always*); a higher score indicates better coherence or higher levels of adaptability. The validity and reliability of the FACESII-CV have been examined; its internal consistency is acceptable (Cronbach's $\alpha=0.73$ to 0.85) and the test–retest reliability is also satisfactory ($r=0.84$ to 0.91). The FACESII-CV is significantly correlated to the Family Environment Scales ($r=0.39$ to 0.68).²⁶ In addition, the three types of family (balanced, mid-range, and extreme) can be classified using the FACESII-CV, where the balanced type is the most ideal family type, followed by the mid-range and extreme family types.²⁷

Family Assessment Device (FAD). The FAD contains 60 self-reported items based on the MMFF^{13,28} and measures the perceptions of respondents in seven domains of family functioning: problem-solving (6 items), communication (9 items), roles (11 items), affective responsiveness (6 items), affective involvement (7 items), behavior control (9 items), and general functioning (12 items). All items are rated between 1 (*strongly disagree*) and 4 (*strongly agree*), with a higher score indicating worse family functioning. The validity and reliability of the Chinese FAD have been examined; its internal consistency is fair to excellent (Cronbach's $\alpha=0.53$ to 0.94), and its test–retest reliability is adequate ($r=0.53$ to 0.81). The Chinese FAD can significantly differentiate clinical (e.g., marital problems in the family, family counseling received, relationship problems among family members) and nonclinical samples.²⁹

Statistical analysis

We analyzed the characteristics of participants, including patients with BD and their families, using mean and standard deviation (SD) for continuous data or frequency and percentage for categorical data. The three

types of family (balanced, mid-range, and extreme) were classified using the FACEII-CV; two-way analysis of variance (ANOVA) was applied to examine whether interaction occurred between the type of family functioning and time in the BRMS or HDRS scores. Simple main effects analysis was further conducted if a significant interaction effect was observed. Pearson correlation coefficients were calculated to investigate the associations between family coherence and adaptability and between domains of family functioning. A quadratic equation model was applied to examine the associations between family coherence and family functioning, and between family adaptability and family functioning.

Results

After excluding eligible participants who had missing data ($n = 14$), 61 patients with BD completed the 8-week study. We then analyzed the data from these 61 patients. All participants had a diagnosis of bipolar I disorder and Han ethnicity, with mean age 33.85 years ($SD = 10.54$; 39 males). Nearly half of participants had an educational level of junior high school (49.2%), more than half were currently married (57.4%), and most lived in rural areas (65.6%). The mean age of onset was 27.02 ($SD = 9.76$) years, and the average number of years since onset was 7.25 ($SD = 6.54$) years. Table 1 indicates participants' family characteristics and other personal characteristics.

The BRMS and HDRS scores of all participants improved during the 8 weeks in the hospital; however, significant improvements were found in BRMS scores ($p < 0.001$ between weeks 1 and 4, between weeks 1 and 8, and between weeks 4 and 8) but not in HDRS scores, after applying Bonferroni adjustment. BRMS scores showed no significant differences among participants according to the type of family. Participants in a balanced-type

Table 1. Participant characteristics.

	n (%)
<i>Patient characteristics</i>	
Age (y), mean \pm SD	33.85 \pm 10.54
Sex (Male)	39 (63.9)
Educational level	
Primary	12 (19.7)
Junior high	30 (49.2)
Senior high or above	19 (31.1)
Marital status	
Currently married	35 (57.4)
Single or divorced	26 (42.6)
Living area	
Urban	14 (23.0)
Suburban	7 (11.5)
Rural	40 (65.6)
Onset age	
18 years or younger	10 (16.4)
Between 18 and 25 years	20 (32.8)
25 years or older	31 (50.8)
Type of bipolar disorder	
Bipolar I	61 (100.0)
Phase at baseline	
Mania	50 (82.0)
Depression	10 (16.4)
Euthymia	1 (1.6)
Psychosis (Yes)	16 (26.2)
Physical disease (Yes)	11 (18.0)
<i>Family characteristics</i>	
No siblings (Yes)	4 (6.6%)
Father deceased (Yes)	16 (26.2)
Mother deceased (Yes)	11 (18.0)
Parents divorced (Yes)	5 (8.2)

family had marginally significantly lower HDRS scores than those in a mid-range type of family.

A significant interaction between the different types of family and time after admission was found in BRMS scores ($p = 0.037$) but not in HDRS scores ($p = 0.32$). Simple main effects were analyzed to explore which type of family had better improvement across time. The results showed that participants all had significant improvement in BRMS scores regardless of the type of family to which they belonged; however, improvement in participants with the

extreme family type between weeks 4 and 8 after admission ($p=0.03$) was slightly worse than in those with other types of family ($p<0.001$; Table 2).

The correlations between domains of family functioning were all moderate and significant ($r=0.427$ to 0.783), except for the correlation between problem-solving and affective involvement ($r=0.219$). Additionally, family coherence was positively correlated with family adaptability ($r=0.791$; $p<0.01$; Table 3). Curve associations were found between family coherence and family functioning ($R^2=0.199$ and 0.448 ; $p<0.01$) and between family adaptability and family functioning ($R^2=0.181$ and 0.497 ; $p<0.01$), except for the affective involvement domain in family functioning ($R^2=0.087$ and 0.066 ; $p=0.07$ and 0.14 , respectively).

Discussion

To the best of our knowledge, this is the first study conducted in mainland China seeking to understand how family type interacts with syndromes in a person with BD. Our results somewhat echo Olson's statement that the balanced type of family functions better than the extreme type of family.⁷⁻⁹ Specifically, although manic syndromes in people with BD from a balanced type of family showed more improvement than those from an extreme type of family, participants in both family types had significant improvement in manic syndromes ($p<0.001$ in balanced type, $p=0.03$ in extreme type). We also found no significant differences among the three types of family with respect to depression in participants. Nevertheless, we observed that all participants in the balanced family type scored 0 in the HDRS at the three measurement time points (i.e., weeks 1, 4, and 8 after hospital admission). In contrast, participants in the other two types of family scored 8.39 (SD = 15.41) and 4.40

(SD = 10.80) in the first week after admission, which dropped to 1.43 (SD = 3.66) and 0.75 (SD = 2.29) in week 8 after admission. This indicates that the balanced type of family somewhat outperforms the extreme type of family.

Given that the literature describes the complexity of families,¹¹⁻¹³ we further investigated the correlations between different domains of family functioning among our participants. Our results anticipated that the two dimensions (coherence and adaptability) in determining family type were significantly correlated to most domains of family functioning, as described in the MMFF. This indicates that to assess family functioning for an individual with BD, a comprehensive and thorough assessment is needed. Nevertheless, our findings might be affected by several covariates. First, patients with BD who have a longer duration of illness may have greater levels of adaptability within their family. Second, the improved BMRS and HDRS scores in our study might be owing to treatments that our participants were receiving during hospitalization rather than their family features. Additionally, given that our participants had relatively high BMRS and HDRS scores at baseline, these scores were likely to decrease owing to human nature or self-recovery. Third, family functioning in the present study might be affected by the characteristics of our participants, that is, their current state of illness and global functioning. Specifically, families caring for patients with BD who have greater functional impairments could have worse family functioning.

Implications

We found that manic syndromes were substantially improved in participants who received inpatient treatment, which supports the importance of inpatient treatment in the acute stage. People with BD and their

Table 2. Bech–Rafaelsen Mania Scale (BRMS) and Hamilton Depression Rating Scale (HDRS) scores among people with bipolar disorder in different types of family.

	Mean ± SD			F (p)		
	Balanced type ^a (n = 13)	Mid-range type ^a (n = 28)	Extreme type ^a (n = 20)	Type	Time	Interaction
	BRMS score				2.11 (0.13)	218.08 (<0.01) ^b
First week after admission	29.92 ± 4.94	21.07 ± 13.58	25.50 ± 12.04			
Fourth week after admission	8.69 ± 2.75	6.89 ± 5.37	7.75 ± 5.90			
Eighth week after admission	1.92 ± 3.93	1.39 ± 2.47	4.10 ± 5.97			
HDRS score				3.26 (0.046) ^d	3.67 (0.028) ^e	1.20 (0.32)
First week after admission	0.00 ± 0.00	8.39 ± 15.41	4.40 ± 10.80			
Fourth week after admission	0.00 ± 0.00	4.46 ± 9.08	1.25 ± 3.13			
Eighth week after admission	0.00 ± 0.00	1.43 ± 3.66	0.75 ± 2.29			

^aDefined using Family Adaptability and Cohesion Evaluation Scale II–Chinese Version (FACEII-CV).

^bPost-hoc comparisons using Bonferroni adjustment showed significant differences between weeks 1 and 4, weeks 1 and 8, and weeks 4 and 8 after admission (all *ps* < 0.001).

^cSimple main effects analysis showed the following. (1) The balanced type of family showed significant differences between weeks 1 and 4, weeks 1 and 8, and weeks 4 and 8 after admission (all *ps* < 0.001). (2) The mid-range type of family showed significant differences between weeks 1 and 4, weeks 1 and 8, and weeks 4 and 8 after admission (all *ps* < 0.001). (3) The extreme type of family showed significant differences between weeks 1 and 4 (*p* < 0.001), weeks 1 and 8 (*p* < 0.001), and weeks 4 and 8 after admission (*p* = 0.03).

^dPost-hoc comparisons using Bonferroni adjustment showed marginally significant differences between balanced type and mid-range type families (*p* = 0.052); no significant findings were identified in other comparisons (*p* = 0.92 [balanced vs. extreme types] and 0.38 [mid-range vs. extreme types]).

^eNo significant differences between different time points were found using Bonferroni adjustment: *p* = 0.29 (week 1 vs. week 4 after admission); 0.11 (week 1 vs. week 8 after admission); and 0.41 (week 4 vs. week 8 after admission).

Table 3. Explained variance of family coherence or family adaptability according to family functioning using quadratic equation modeling.

	Mean \pm SD	R ²	
		Family coherence	Family adaptability
1 Family coherence ^a	63.67 \pm 10.46	–	–
2 Family adaptability ^a	43.60 \pm 9.25	0.791 ^{*,c}	–
3 Problem-solving ^b	13.15 \pm 2.77	0.436 [*]	0.497 [*]
4 Communication ^b	20.13 \pm 3.77	0.379 [*]	0.410 [*]
5 Roles ^b	25.74 \pm 3.48	0.260 [*]	0.243 [*]
6 Affective responsiveness ^b	13.90 \pm 3.43	0.377 [*]	0.333 [*]
7 Affective involvement ^b	16.84 \pm 3.31	0.087	0.066
8 Behavioral control ^b	21.21 \pm 3.37	0.199 [*]	0.181 [*]
9 General functioning ^b	25.92 \pm 5.50	0.448 [*]	0.413 [*]

^aMeasured using Family Adaptability and Cohesion Scale II–Chinese Version (FACEII-CV).

^bMeasured using Family Assessment Device (FAD).

^cStatistics reported using Pearson correlation coefficient.

* $p < 0.01$.

families, however, are under the pressure of stigma,^{2,6} which may prevent them from seeking adequate and appropriate treatments in a psychiatric setting. Therefore, we recommend promoting the importance of inpatient treatment for people with BD (and their family) during the acute stage. In addition, we observed a trend in depression levels, which were lower in people with BD who had a balanced type of family than in those who had other family types. Similar findings were observed in mania levels; improvements in manic syndromes were better in people with BD from a balanced type of family than in those from an extreme-type family. Therefore, clinicians should pay greater attention to the family type of patients with BD; intervention for the family system may be needed in some circumstances. Moreover, per our results, health care providers should consider family therapy in patients with BD who accept such intervention.

Limitations

There are several limitations in this study. First, our results were analyzed using a

sample of inpatients with BD in Hebei, China; thus, the generalizability of our findings is restricted. Specifically, our results cannot be generalized to outpatients or those who reside outside of Hebei. Second, as our participants were all inpatients, the impact of family functioning or the family system might be reduced because the participants did not live with their family during the study period. Thus, their exposure to the family was decreased. Future studies are warranted to corroborate our findings using people with BD who are living with their family, to ensure exposure to the family. Third, we did not collect the BRMS and HDRS scores of our participants on admission. Therefore, we were unable to detect the changes of BRMS and HDRS scores between admission and after treatment. In other words, our nonsignificant findings between different types of family may be owing to treatment effects in the first week; however, we do not have sufficient evidence to support this conclusion; further studies are needed to clarify whether this postulation is correct.

Fourth, all family-related information (e.g., family coherence) was collected using self-reports from patients with BD. Therefore, the opinions of family members about our participants are lacking. Future studies are encouraged to collect information from both patients and their family members. Following this limitation, future studies should collect information on socioeconomic status and educational level of family members because such information is important to family structure, family adaptability, and family coherence. Fifth, the family functioning of our participants was measured when they were stable (i.e., in remission). Therefore, our results cannot be generalized to patients with BD during an acute crisis because family functioning might differ between periods of acute crisis and remission. Last, our sample size was relatively small, especially because we classified participants into three types of family. As a result, we only had 13 participants in the balanced type of family. The small sample size may jeopardize the statistical power of our findings.³⁰ Future studies including a larger sample for each type of family are therefore needed.

Conclusion

The family system and family functioning are important factors that all clinicians should keep in mind when treating people with BD. Clinicians are encouraged to understand which type of family is best for their patients with BD and to provide family treatment whenever possible and feasible. However, other covariates might contribute to the findings of the present study; longer BD duration could lead to greater levels of family adaptability. Therefore, studies using a robust study design to investigate the effects of the family system and family functioning are warranted.

List of abbreviations

BD – Bipolar disorder
BMRS – Bech–Rafaelson Mania Scale
HDRS – Hamilton Depression Rating Scale
FACESII-CV – Family Adaptability and Cohesion Scale II–Chinese Version
FAD – Family Assessment Device
MMFF – McMaster Model of Family Functioning
ANOVA – Analysis of variance

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Authors' contributions

Author responsibilities were as follows: XZ and CYL drafted the paper. XZ, MZ, and CYL performed the statistical analysis; JL, LS, XX, QD, YZ, HL, WL, XZ, and KL contributed to the results interpretation. XZ, ZS, and KL conceptualized the research design. All authors critically reviewed the manuscript during the writing process, and all authors approved the final version of the manuscript.

Availability of data and material

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

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

Ethics approval and consent to participate

The present study protocol has been approved by the Institutional Review Board of Hebei Mental Health Center.

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