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Dysfunctional attitude and childhood maltreatment predict future recurrence among young adults with first-onset depression: a prospective cohort study

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Abstract

Background The high prevalence of recurrent depressive episodes (RDE) among patients with major depressive disorder (MDD) has resulted in substantial personal, societal, and financial burdens. Although many studies have explored the factors associated with RDE, most have important methodological limitations. This study aims to examine the factors associated with RDE within two years among young adults with first-episode MDD.

Method A total of 324 patients aged 18 to 30 years with a first episode of MDD completed both the baseline assessment and the two-year follow-up. Personal, psychosocial, and illness-related variables were assessed at baseline. The status of RDE and medication use were evaluated at follow-up. Network analysis and logistic regression were performed to examine variables associated with RDE.

Results The two-year prevalence of RDE among patients with first-episode MDD was 42.28%. The network comparison test indicated no significant differences in network structure or global strength between the recurrence and non-recurrence groups. The edge difference test identified 19 significant differences between the two networks; however, none remained significant after FDR correction. Both network analysis and logistic regression showed that RDE was associated with medication use, followed by the 'vulnerability' subscale of dysfunctional attitudes and childhood emotional abuse.

Conclusions These findings suggest that dysfunctional attitudes, childhood emotional abuse, and medication use may have potential value in understanding the RDE.

Keywords Influence factors, Major depressive disorder, Recurrence of depression, Network analysis

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Introduction

Major depressive disorder (MDD) is a leading cause of disability worldwide [1]. Traditionally, MDD has been regarded as an episodic disorder characterized by good inter-episode functioning [2], with most patients achieving recovery within 12 months of treatment [3]. However, it is now recognized as a chronic and recurrent condition with a relapsing–remitting course, often accompanied by persistent subsyndromal symptoms between major episodes [4]. Individuals who recover from their first depressive episode have more than a 50% likelihood of experiencing one or more subsequent episodes, and this risk increases to approximately 80% among those with two or more previous episodes [5].

Numerous studies have sought to identify the predictive factors of recurrent depressive episodes (RDE). Findings suggested that the elevated risk of RDE may result from a complex interplay among biological factors (such as genetic mechanisms and neural pathways), psychosocial factors (such as childhood maltreatment), and illness-related factors (including comorbid anxiety, rumination, neuroticism, age at onset, residual symptoms, number of prior episodes, and symptom severity) [4, 6–8]. However, previous studies have shown large variations in research design and methodology, which makes the influencing factors of RDE largely unknown [4, 6].

The first major limitation concerns the inappropriate inclusion criteria for participants and the limited representativeness of study samples. Many studies adopted a cross-sectional design, comparing patients experiencing their first depressive episode with those who had RDE [6]. Such inclusion criteria overlook approximately 50% of individuals who may later experience recurrence but are currently classified as first-onset patients, thereby blurring the distinction between first-onset and single-lifetime cases [9]. Although longitudinal studies have the potential to distinguish between single-lifetime and recurrent cases, most cohort studies failed to make this distinction at baseline, resulting in misleading conclusions due to unclear sample definitions [9]. Specifically, investigating predictive factors for future recurrences among patients who have already experienced multiple episodes is less informative, as these individuals share similar susceptibility to recurrence regardless of episode count, and predicting subsequent episodes becomes increasingly difficult as lifetime episodes accumulate [8]. Future research should instead focus on identifying predictors of recurrence following an initial depressive episode [8]. Moreover, most RDE-related studies have been conducted in Europe and the United States, with the majority of longitudinal investigations carried out in the United States (CDS and GHC) and the Netherlands (NESDA and NEMESIS) [6], thereby limiting sample representativeness. There is an urgent need for studies from

other regions to enhance the global representativeness of research samples.

The second limitation of previous research concerns the restricted range of candidate risk indicators and the limited statistical approaches employed. Most studies have focused on specific variables using main-effect or two-factor interaction models [10], whereas few have attempted to construct and evaluate multivariate frameworks that incorporate a broader range of factors [10]. Notably, complex interactions among variables may substantially influence research outcomes. In recent years, network analysis has gained increasing attention in psychiatry for its powerful capacity to visualize and quantify complex interrelationships among variables [11, 12]. By applying network analysis, researchers can identify specific symptoms that are activated by distinct risk factors, thereby facilitating the development of targeted and prioritized intervention strategies.

This study aims to identify potential predictive factors of RDE among patients experiencing their first episode of MDD using data from a prospective cohort and applying network analysis. The findings are expected to provide insights for clinicians and researchers to better understand the mechanisms underlying RDE.

Methods

Data resources and participants

This study was embedded within the Early-Warning System and Comprehensive Intervention for Depression (ESCID) project, conducted in Wuhan, China, to investigate the pathogenesis and recurrence mechanisms of MDD. A total of 599 participants were enrolled in the ESCID study. All participants were diagnosed with moderate to severe MDD according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) and the Mini-International Neuropsychiatric Interview (MINI) by two experienced psychiatrists at Renmin Hospital of Wuhan University. The study employed two waves of data collection, with the baseline survey conducted between April and December 2019. Medication use and depression recurrence were assessed during the second wave of data collection in July 2021.

Recurrent depression refers to the appearance of a new depressive episode after a period of recovery (a sustained period of absence of clinically relevant symptoms) from a previous episode [4, 8, 13]. However, the DSM-5 and ICD-10 do not provide a clear definition of the recovery phase. Therefore, most current studies have adopted the criteria proposed by Frank et al. [4, 14], in which recurrence is defined as the onset of a new depressive episode following a period of full remission lasting at least eight weeks. This definition has been widely accepted by both clinical investigators and practicing clinicians [13]. Therefore, the first inclusion criterion was that patients

were confirmed to be in the recovery phase through clinical interviews.

Additional exclusion criteria included not being in the first episode of MDD, being younger than 18 years or older than 30 years, having comorbid mental disorders, severe physical illnesses, current high suicide risk requiring urgent intervention, or loss to follow-up, as well as a history of craniocerebral trauma, substance dependence, or substance abuse. All participants were informed of their right to withdraw at any time and provided written informed consent. After applying these criteria, a total of 324 participants were included in the study. Detailed exclusion criteria and participant flow can be found in Fig. S1.

The investigation was carried out following the latest version of the Declaration of Helsinki. The Clinical Research Ethics Committee of the Renmin Hospital of Wuhan University reviewed and approved the study protocol (No: WDRY2020- K004).

Variables and measurements

Recurrence of depression

New depressive episodes occurring after recovery were identified through a single chart review at the end of the study observation period using the hospital electronic medical record system. However, not all patients see a doctor or get regular reviews when they experience a new episode. It is possible for RDE to remit spontaneously [9, 15] or through self-management [16]. Additionally, because medical record systems in China are not interconnected, we were unable to obtain information on patients who sought treatment at other medical institutions. To address this limitation, RDE was also assessed by asking participants: “Have you experienced episodes of depression since recovery?” to evaluate the participants’ self-perceived RDE. Additionally, the Chinese Language Patient Health Questionnaire (PHQ-2) was used to assess participants’ depression levels at follow-up, with a cutoff score of three used to identify the RDE [17, 18]. The number of patients with RDE identified using three different methods can be found in Fig. S2.

Those participants who had a documented medical record of recurrent depression, or reported a self-perceived episode, or had a score greater than three on the PHQ-2 were recognized as a recurrent group, while the others were classified as the non-recurrent group.

Socio-demographic questionnaire

A structured questionnaire was designed to collect the sociodemographic information of participants. The questionnaire consisted of six items assessing sex (male/female), handedness (right/left), marital status (unmarried/married), educational level (junior high school or

below, high school to college degree, master’s degree or above), and employment status (employed/unemployed).

Illness-related factors

Medication use, depression, anxiety, somatization, and sleep problems were conceptualized as illness-related factors. Medication use was assessed at follow-up with a single question: “Have you taken medication regularly during the past two months?”. A response of “yes” was scored as 1, while intermittent use or complete cessation of medication was scored as 0. Depression and anxiety were evaluated using the Hamilton Depression Rating Scale (HAM-D-17) [19] and the Hamilton Anxiety Rating Scale (HAMA) [20]. Both assessments were conducted by trained clinicians to ensure the accuracy of the evaluations, and higher total scores indicated greater severity of depressive and anxiety symptoms. The self-rated Patient Health Questionnaire-15 (PHQ-15) was used to evaluate somatic symptoms during the past four weeks [21], with higher scores indicating greater severity of somatic symptoms. The Pittsburgh Sleep Quality Index (PSQI) is a self-rated scale used to assess sleep quality and disturbances over a one-month period. A total PSQI score greater than five indicates poor sleep quality [22]. In the present study, the total PSQI score was used to indicate the severity of sleep problems. The PSQI has demonstrated good reliability and validity in previous studies [23].

Personal factors

Chronotype, personality traits, and dysfunctional attitudes were conceptualized as personal factors. Chronotype was assessed using the total score from the Morningness–Eveningness Questionnaire-5 (MEQ-5). Participants with higher scores were classified as morning types, whereas those with lower scores were classified as evening types [24]. The Eysenck Personality Questionnaire (EPQ) comprises four subscales—psychoticism (P), extraversion (E), neuroticism (N), and lie (L)—which are used to assess participants’ personality traits [25]. Similarly, the Dysfunctional Attitudes Scale (DAS) includes eight dimensions—vulnerability, perfectionism, attraction and exclusion, compulsion, seeking approval, dependence, autonomous attitude, and cognitive philosophy—that are used to assess dysfunctional attitudes predisposing individuals to depression [26]. All three scales have demonstrated good reliability and validity in their Chinese versions [27–29].

Psychosocial factors

Life events, childhood maltreatment, interpersonal problems, social support, parenting style, family functioning, and family disease burden were conceptualized as psychosocial factors. Recent life events, including both negative and positive events that occurred within the

past year, were measured using the Life Experiences Survey (LES) [15]. Higher scores indicate a greater number of positive or negative life events. The Childhood Trauma Questionnaire–Short Form (CTQ-SF) was used to assess childhood adversity before 16 years of age across five dimensions: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect [16]. Higher scores indicate more severe childhood adversity. Both instruments have been widely used in China and have demonstrated good reliability and validity [30, 31]. The Inventory of Interpersonal Problems–32 (IIP-32) was used to assess distress arising from interpersonal difficulties, with higher scores indicating greater interpersonal problems [32]. The IIP-32 has demonstrated satisfactory reliability and validity [33]. Social support was assessed using the Social Support Rating Scale (SSRS) [34], which comprises three subscales: subjective support, objective support, and utilization of social support. Higher total scores indicate greater levels of social support. Parenting style was evaluated using the Egna Minnen av Barndoms Uppfostran (EMBU) questionnaire [35]. The Chinese version of the EMBU contains 81 items, including six paternal parenting dimensions (emotional warmth and understanding, severe punishment, excessive interference, preference, rejection and denial, and overprotection) and five maternal dimensions (emotional warmth and understanding, overprotection and overinterference, rejection and denial, severe punishment, and preference) [36]. The Family Assessment Device (FAD) is a self-report instrument comprising seven subscales: problem solving, communication, roles, affective responsiveness, affective involvement, behavioral control, and general functioning. In the present study, the total FAD score was used to assess overall family functioning, with higher scores indicating poorer family functioning [37]. Family disease burden was measured using the Family Burden Scale of Disease (FBS), which includes six dimensions: family economic burden, daily life, leisure and recreational activities, family relationships, and the physical and mental health of family members. Higher FBS scores indicate greater family burden [38]. All instruments have demonstrated good reliability and validity in Chinese populations [39–41].

Statistical analyses

Statistical analyses were performed from October 10 to November 15, 2022, using R software (<https://www.r-project.org/>). Descriptive statistics were used to summarize participants' characteristics. Variables were summarized by RDE status and compared between participants with and without RDE using the chi-square (χ^2) test or Mann–Whitney U test, as appropriate. A total of 140 participants have missing values in study variable. Assuming data were missing at random (MAR), multiple

imputation by chained equations was conducted using the mice package in R to handle missing values. Missing data for each variable are presented in Fig. S3. All statistical tests were two-sided, and statistical significance was defined as $p < 0.05$.

Network analysis was conducted to estimate and compare the network structures of the recurrence and non-recurrence groups. To reduce false-positive edges and enhance network interpretability, the least absolute shrinkage and selection operator (LASSO) regularization method [42] was applied to estimate the network structure. This approach penalizes small edge weights by shrinking them toward zero, thereby removing spurious connections. The optimal shrinkage parameter was selected by minimizing the extended Bayesian information criterion (EBIC) [43]. Strength centrality was defined as the sum of the absolute edge weights connected to a given node [12]. In this study, strength was used as the sole centrality index for each network because other indices, such as betweenness and closeness, have been shown to be unreliable in psychological networks [44, 45].

The stability of centrality indices and the accuracy of edge weights were assessed to evaluate the robustness of the estimated network. The stability of centrality indices was evaluated using a node-dropping subset bootstrap procedure [46]. In this procedure, networks comprising 41 nodes were randomly resampled 1,000 times, and the process was repeated for networks containing between 40 and 2 nodes. The stability coefficient (CS-C) was defined as the maximum proportion of cases that could be dropped while maintaining a correlation of at least 0.7 between the original and subset networks with 95% probability [47]. A CS-C value above 0.25 is considered acceptable, whereas values above 0.5 are preferred [47]. In addition, 1,000 nonparametric bootstrap samples drawn from the study population were used to estimate the accuracy of edge weights [46]. Narrower 95% confidence intervals (CIs) indicate greater edge-weight accuracy. The Network Comparison Test (NCT) [48], based on permutation testing with resampling, was used to compare network structure, global strength, and individual edge differences between the two groups. The false discovery rate (FDR) correction was applied following the edge-difference analysis to control for false positives.

The Flow function in the R package qgraph [49–52] was used to identify nodes in the network that were directly associated with RDE at follow-up. In other words, nodes directly connected to RDE were considered potential associated factors, as the associations in the network account for the influence of other variables. To validate the associated factors identified by the network analysis, logistic regression analyses were performed to examine their associations with future RDE.

Results

Socio-demographic characteristics of participants

Participants' ages ranged from 18 to 30 years (mean $\pm$ SD = 23.42 $\pm$ 2.45). The majority of participants were female (70.68%), right-handed (96.60%), and unmarried (73.77%). Most participants had completed high school or held college degrees (84.26%) and reported being currently unemployed (88.89%). Data are presented in Table S1.

Comparison of study variables between the non-recurrence and recurrence groups

At follow-up, participants with RDE accounted for 42.28% of the total sample. Participants in the recurrence group exhibited a preference for the eveningness chronotype and significantly higher levels of depression, anxiety, somatization, psychoticism, dysfunctional attitudes (vulnerability, attraction and exclusion, perfectionism, and cognitive philosophy), interpersonal problems, negative life events, and childhood emotional abuse compared with those in the non-recurrence group. Conversely, participants without RDE tended to prefer the morningness chronotype and reported higher scores for paternal emotional warmth and maternal preference than those with RDE. Finally, participants in the recurrence group reported a higher rate of regular medication use compared with those in the non-recurrence group (Table 1).

Comparison between RDE network and non-RDE network

Figure 1 illustrates the estimated network structures for the recurrence and non-recurrence groups. The network comparison test (NCT) indicated no significant differences between the two groups in network structure (M-test = 0.19, p = 0.84) or global strength (12.91 vs. 15.51; S-test = 2.59, p = 0.72). However, 19 significant differences in bridge strength were identified between the two networks (Fig. 2a). For instance, physical neglect showed stronger associations with childhood trauma and parenting style among participants with RDE, whereas maternal control and punishment, psychoticism, and interpersonal problems exhibited stronger associations among those without RDE. No edges remained significant after applying FDR correction.

Figure 2b presents the comparison of node strength between the RDE and non-RDE networks. The centrality invariance test revealed a significant difference in node strength between the two networks (S-test = 0.004, p = 0.026). Detailed node-strength centrality values are presented in Table S2. Emotional abuse emerged as the most central node, whereas positive events were the least central in both networks. Although most node centralities were comparable across the two networks, several notable differences were observed. Specifically, physical neglect demonstrated higher strength in the RDE

network than in the non-RDE network, whereas interpersonal problems and negative events exhibited higher strength in the non-RDE network.

Potential factors associated with RDE

To examine variables directly associated with RDE, all participants were included to estimate the RDE association network, and the Flow function was used to adjust the network display for better visualization (Fig. 3). The results indicated that RDE showed the strongest positive association with medication use, followed by dysfunctional attitudes (vulnerability) and childhood emotional abuse. Detailed node-strength centrality values are presented in Table S3. The CS-coefficient of the network was 0.673, indicating good network stability (Fig. S4). Non-parametric bootstrap analyses indicated that all edges in the network were stable (Fig. S5).

To further examine the robustness of the associations identified in the network analysis, forward stepwise regression was performed after conducting univariate analyses. The regression results were consistent with the network analysis, indicating that higher levels of dysfunctional attitudes (vulnerability) and childhood emotional abuse were associated with RDE (Table 2). Regular medication use at endpoint of follow-up was associated with a more than twofold higher occurrence of RDE compared with irregular or discontinued medication use (Table 2).

Discussion

To the best of the researchers' knowledge, this is the first study to examine factors associated with RDE across a wide range of variables, using both network and traditional regression approaches. This is also the first study conducted in an Asia-Pacific population, contributing to a better understanding of the prevalence and correlates of RDE across different regions. Both analytic approaches identified the 'vulnerability' subscale of dysfunctional attitudes, emotional abuse, and medication use at follow-up as variables positively associated with RDE.

In this study, participants with RDE during the previous two years accounted for 42.28% of the total sample, which is comparable to the 42.86% reported at one-year follow-up [53], but lower than the 49% at 15-year follow-up [54], 72% at 20-year follow-up [55], and 56.52% at four-year follow-up [56] reported in other studies. However, researchers should recognize that due to differences in the assessment of recurrence and follow-up procedures, recurrence rates across studies are not directly comparable. Future studies are encouraged to adopt standardized definitions and follow-up protocols to facilitate more reliable cross-study comparisons.

Previous studies have reported a positive association between dysfunctional attitudes and RDE [57, 58]. The present study further supports this finding by showing

Table 1 Comparison of network variables between non-recurrence and recurrence groups (N = 324)

Variables	Nodes	Reference Name	First episode MDD (N = 324)		Z
			non-recurrence (n = 187)	recurrence (n = 137)	
Medication use	MU	Medication use	33(17.6%)	49(35.8%)	13.733***
Depression	HAMD	Depression	16.7±7.56	18.91±7.75	-2.840**
Anxiety	HAMA	Anxiety	15.25±8.1	17.88±8.68	-2.931**
Sleep quality	PSQI	Sleep quality	9.05±3.77	10.26±4.09	-2.756**
Somatization	PHQ15	Somatization	11.58±5.45	13.19±5.84	-2.431*
Chronotype	MEQ5	Chronotype	12.86±3.23	11.91±3.54	-2.357*
Personality	P	EPQ-Psychoticism	50.88±9.6	53.91±11.06	-2.544*
	E	EPQ-Extraversion	46.44±10.9	46.46±11.18	-0.158
	N	EPQ-Neuroticism	62.75±10.8	65.11±8.9	-1.741
	L	EPQ-Lying	42.83±9.45	41.57±9.7	-1.216
Dysfunctional attitudes	Dis1	DAS-Vulnerability	19.6±3.2	20.99±3.3	-3.711***
	Dis2	DAS-Attraction and exclusion	21.71±4.85	23.2±5.01	-2.605**
	Dis3	DAS-Perfectionism	22.05±5	23.51±5.37	-2.435*
	Dis4	DAS-Compulsion	18.33±4.17	18.84±4.11	-1.393
	Dis5	DAS-Seeking approval	19.88±5.22	20.63±5.37	-1.316
	Dis6	DAS-Dependence	20.98±4.54	21.72±4.84	-1.7
	Dis7	DAS-Autonomy attitude	23.67±5.26	24.82±5.28	-1.812
	Dis8	DAS-Cognitive philosophy	17.28±4.24	18.39±4.13	-2.542*
Life events	PE	LES-Positive events	8.36±14.39	7.82±11.39	-0.126
	NE	LES-Negative events	36.98±44.81	48.25±60.36	-2.142*
Childhood trauma	EA	CTQ-Emotional abuse	9.04±4.06	10.85±5.39	-2.879**
	PA	CTQ-Physical abuse	7.13±3.12	7.41±3.54	-0.308
	SA	CTQ-Sexual abuse	5.65±1.43	6.34±2.98	-1.184
	EN	CTQ-Emotional neglect	12.52±5.58	13.52±5.66	-1.56
	PN	CTQ-Physical neglect	8.18±3.32	8.58±3.99	-0.305
Social support	SS	SSRS-Subjective support	8.58±2.79	8.72±3.04	-0.575
	OS	SSRS-Objective support	16.84±3.69	16.4±3.47	-0.907
	US	SSRS-Utilization of support	6.65±1.81	6.45±1.9	-1.192
Interpersonal Problems	IP	Interpersonal problems	13.51±5.59	15.17±5.41	-2.838**
Memories of parental rearing	FI	EMBU-Emotion warmth (Father)	43.74±9.68	41.6±10.23	-2.038*
	FI _i	EMBU-Punishment (Father)	18.32±6.3	18.85±6.8	-0.331
	FI _{III}	EMBU-Control (Father)	19.45±3.83	19.55±3.99	-0.286
	FI _{IV}	EMBU-Preference (Father)	9.99±3.88	9.23±3.71	-1.799
	FI _V	EMBU-Rejection (Father)	9.95±3.38	10.22±3.79	-0.356
	FI _{VI}	EMBU-Overprotection (Father)	10.28±2.79	10.71±2.92	-1.43
	MI	EMBU-Emotion warmth (Mother)	48.21±11.3	45.76±12.54	-1.76
	MI _i	EMBU-Control and overprotection (Mother)	35.73±7.42	36.89±7.85	-1.438
	MI _{III}	EMBU-Rejection (Mother)	13.58±4.51	14.8±5.56	-1.635
	MI _{IV}	EMBU-Punishment (Mother)	13.63±4.69	14.2±5.47	-0.666
	MI _V	EMBU-Preference (Mother)	10.66±3.11	9.88±3.22	-2.281*
Family function	FF	Family function	27.29±5.67	28.61±6.18	-1.826
Family burden of disease	FB	Family burden of disease	5.72±6.04	6.5±6.61	-0.987

Note: Bolded values: $p < 0.05$; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

that the ‘vulnerability’ subscale of dysfunctional attitudes is positively associated with RDE. Strong dysfunctional attitudes may interfere with information processing and contribute to negative cognitive biases, which are associated with depressive symptoms [59]. Individuals scoring high on the ‘vulnerability’ subscale of dysfunctional attitudes tend to report lower help-seeking attitudes and

higher levels of self-criticism [60], which are correlated with greater vulnerability to depression [61, 62]. The findings of this study provide a new dimensional perspective for future research to further explore the association between DAS and RDE.

Consistent with previous studies, childhood emotional abuse shows a strong association with mental disorders

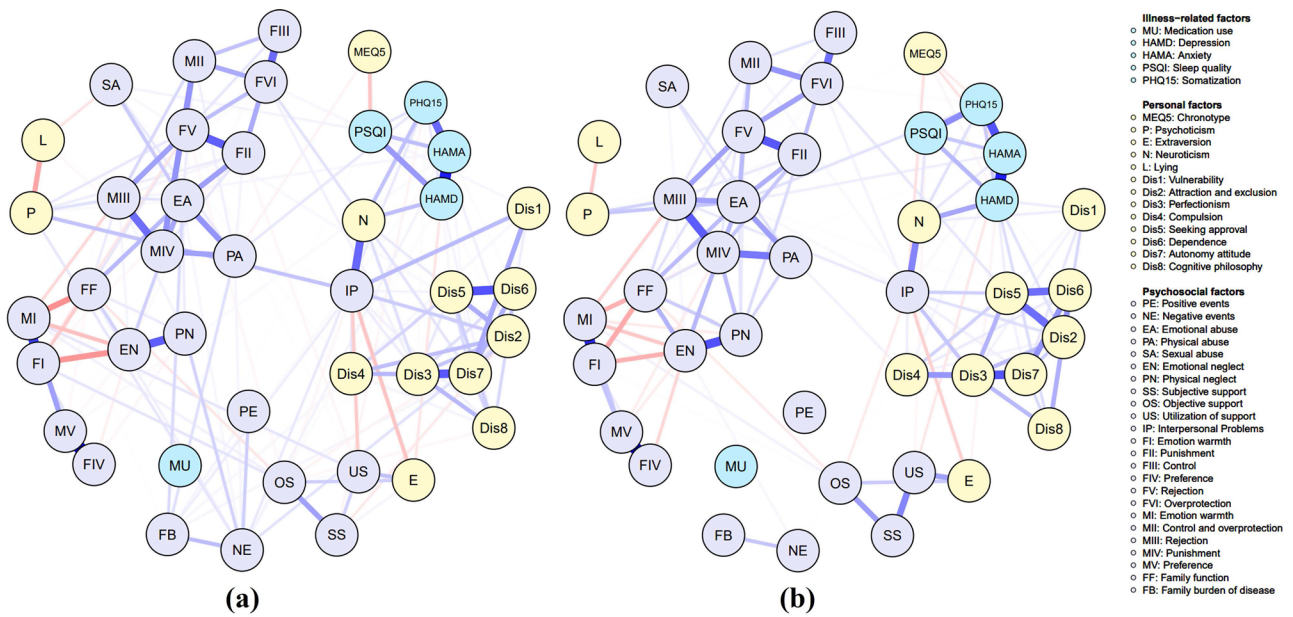


Fig. 1 Networks showing the associations among study variables: (a) non-RDE participants and (b) RDE participants. Blue edges denote positive connections between items and red edges denote the negative associations. The thickness of an edge reflects the magnitude of the correlation

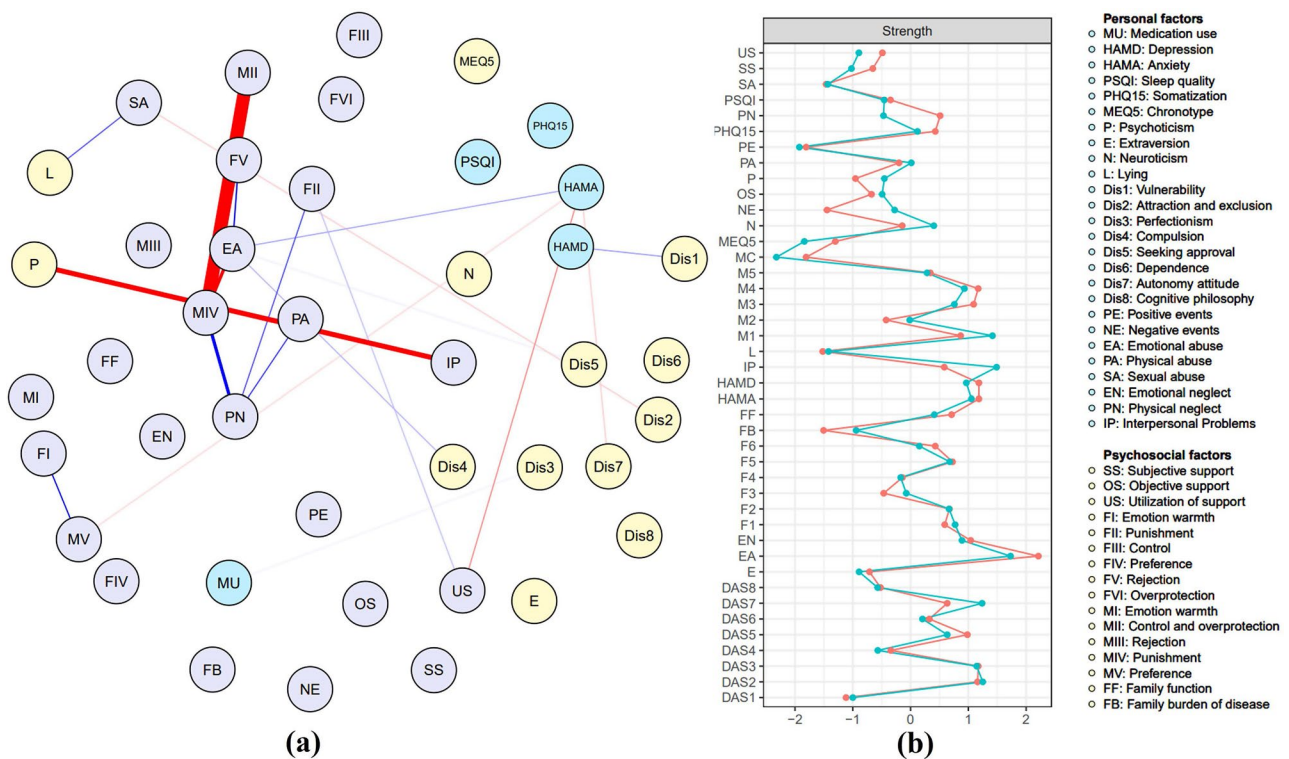


Fig. 2 Significant bridge differences and comparison of centrality strength of the nodes between non-RDE network and RDE network. (a) reference group was patients with non-RDE. Blue edges denote increased connections between items when compared with those in the reference network and red edges denote decreased connections. (b) blue line represents centrality strength of nodes in non-RDE network, while red line represents RDE network

[63, 64] and RDE [6, 65]. A meta-analysis reported that individuals with a history of childhood maltreatment had approximately twice the likelihood of experiencing recurrent or persistent depressive episodes compared with

those without such a history [65]. Evidence further suggests that different types of abuse may be differentially associated with depression [66, 67]. Two meta-analyses also showed that emotional abuse had the strongest

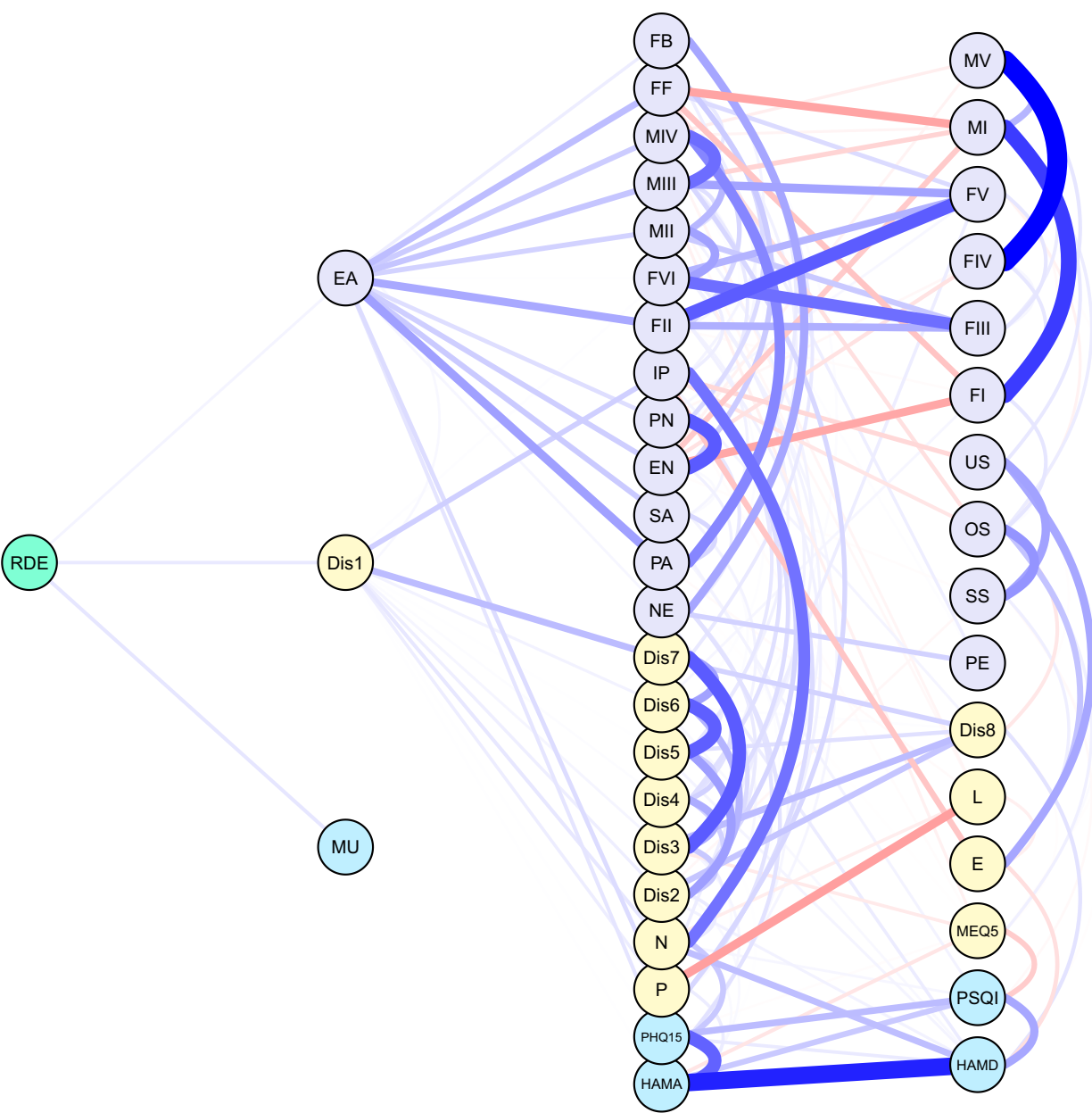


Fig. 3 Flow network of study variables and RDE

Table 2 Multivariate logistic regression of RDE

	B	SE	Wald	OR (95% CI)	P
Medication use	1.053	0.275	14.695	2.87(1.67,4.91)	<0.001
DAS-Vulnerability	0.126	0.038	10.815	1.13(1.05,1.22)	0.001
CTQ-Emotional abuse	0.062	0.026	5.786	1.06(1.01,1.12)	0.016
Constant	−3.764	0.797	22.330	0.02(0.00,0.00)	<0.001

Note: Bolded values: <0.05; CI: confidence interval; OR: odds ratio. Reference group of medication use is participants with irregular medication use

association with depression [68, 69], highlighting its potential unique relationship with depressive symptoms. Considering that individuals with MDD may experience multiple forms of maltreatment [70], network analysis

suggested a possible association in which emotional abuse may function as a bridging variable linking RDE with other types of maltreatment. The present findings provide preliminary evidence supporting further exploration of associations between specific subtypes of childhood maltreatment and RDE. Future studies should further investigate the associations between childhood maltreatment and RDE from multiple perspectives, including subtype specificity, cumulative risk, latent class, and dimensional models [71].

Interestingly, individuals reporting regular medication use within the past two months at follow-up showed a more than twofold higher occurrence of RDE compared

with those with irregular or discontinued medication use. This pattern may reflect a reverse association, in which regular medication use is more common following the recurrence of depressive symptoms. Patients may resume medication either in response to perceived symptom recurrence or after receiving a clinical diagnosis of RDE from health-care providers. This suggests that patients are able to recognize symptom changes and may adopt self-management strategies to regulate their condition. Developing patient-centered management strategies and encouraging patients to take an active role in their recovery may help reduce the recurrence of depressive episodes [72, 73].

Limitations

This study has several limitations. First, the use of self-report questionnaires and retrospective assessments of early life stress may have introduced response or recall bias. In addition, although multiple approaches were employed to identify RDE during follow-up, some recurrence cases might still have been missed. The combined use of multiple methods to identify RDE may also have increased the likelihood of false positives. Therefore, future studies should adopt more standardized and objective strategies to detect depressive recurrence. Second, the representativeness of the sample is limited because this was a single-center study based on convenience sampling and included only Asian participants. Future multicenter studies including participants from diverse ethnic and cultural backgrounds are needed to further validate these findings. Third, as discussed in the introduction, it remains difficult to distinguish individuals who will experience RDE from those who will remain free of recurrence; therefore, inclusion of a control group without lifetime recurrence would strengthen future research, as this limitation is common in existing studies. Finally, this study focused solely on psychosocial and illness-related factors associated with RDE and did not include biological variables.

Conclusions

This study found that the two-year prevalence of RDE among patients with first-episode MDD was 42.28%. The 'vulnerability' subscale of dysfunctional attitudes, childhood emotional abuse, and medication use were significantly associated with RDE within two years.

Supplementary information

The online version contains supplementary material available at <https://doi.org/10.1186/s12888-025-07579-5>.

Supplementary Material 1

Acknowledgements

Sincere thanks are given to Sharon R. Redding (EdD, RN, CNE) for assistance in editing.

Author contributions

All authors contributed to the study and approved the final version of the manuscript. Concept and design: HH, DL, FW, BXY; Data collection: LK, SM, CY; Statistical analysis: HH, DL; Data interpretation: LK, SM, CY, YY; Manuscript preparation and critical revision: HH, YY, FW, WZ, DL, HZ, XQW, BXY.

Funding

This work was supported by grants from the National Natural Science Foundation of China (grant number:72174152); Wuhan University Innovation and Entrepreneurship Projects for College Students (202510486138).

Data availability

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

Declarations

Ethical approval

The protocol for this research was approved by the Clinical Research Ethics Committee of Renmin Hospital of Wuhan University (No: WDRY2020- K004). The procedures used in this study adhere to the tenets of the Declaration of Helsinki. All participants gave their written informed consent before their inclusion in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 21 February 2024 / Accepted: 29 October 2025

Published online: 12 December 2025

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