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RECEIVED 30 July 2024

ACCEPTED 10 March 2025

PUBLISHED 26 March 2025

CITATION

Tian X, Bai F-f, Zhao Y-p, Gao Y, Wang Y-t, Liu Y, Zhang C-h, Li M-j and Li J (2025) Immediate memory is associated with alexithymia in Chinese Han first-episode, drug-naïve major depressive disorder. *Front. Psychiatry* 16:1473204. doi: 10.3389/fpsy.2025.1473204

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Immediate memory is associated with alexithymia in Chinese Han first-episode, drug-naïve major depressive disorder

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Background: Alexithymia is defined as a difficulty in identifying and describing one's own emotions. It represents a risk factor for cognitive deficits and is frequently observed in individuals with depressive disorders. However, the relationship between alexithymia and neurocognitive function in major depressive disorder (MDD) is still unknown. This study aimed to explore the association between alexithymia and neurocognition in patients with MDD.

Methods: A total of 134 Chinese Han first-episode drug-naïve patients with MDD were recruited. The 20-item Toronto Alexithymia scale (TAS-20), the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), the 9-item Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder-7 items (GAD-7) was used to assess alexithymia, neurocognitive functioning, and emotion. Multivariable linear regression models were used to estimate the association between alexithymia and neurocognition. Interaction and stratified analyses were conducted according to age, gender, marital and education status.

Results: Among the 134 patients with MDD, 55 participants (41%) had alexithymia. In the fully adjusted model, TAS total score (TAS-T) (β : -0.34, 95% CI: -0.61~-0.07) and difficulty identifying feelings (DIF) (β : -0.8, 95% CI: -1.3~-0.31) were statistically significantly associated with immediate memory.

Conclusions: Higher level of alexithymia, particularly the difficulty identifying feelings facet, is associated with lower scores of immediate memory in patients with MDD.

KEYWORDS

alexithymia, difficulty identifying feelings, neurocognition, immediate memory, major depressive disorder

Introduction

Major depressive disorder (MDD) is a prevalent psychiatric disease with high rates of morbidity, disability, and mortality and has become a worldwide health concern (1). In addition to mood symptoms, individuals with depression often experience impaired cognitive functioning (2). Psychiatrists are increasingly focusing on the cognitive dysfunction of depression, preferring to view it as a stand-alone symptom rather than a secondary phenomenon to the mood symptoms of depression. The diagnostic criteria for MDD in both the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) and the International Classification of Diseases, Eleventh Revision (ICD-11) focus on changes in cognitive function (3, 4). Cognitive dysfunction, which is a common symptom of depressive disorders, not only restricts the patient's ability to perform in multiple areas, but also significantly degrades their overall quality of life. Additionally, it increases the risk of physical illnesses and serves as a factor that negatively impacts the prognosis of depression (5). Therefore, cognitive impairment in patients with depressive disorders is a noteworthy clinical target for attention.

Alexithymia is a deficit in the cognitive processing of emotions with three major facets, (1) difficulty in identifying one's feelings and distinguishing them from bodily sensations; (2) difficulty in describing one's feelings to others; and (3) an externally oriented cognitive style (6). Alexithymia frequently occurs in a variety of somatic and psychiatric disorders (7–12), however, individuals suffering from depression have a higher rate of alexithymia than people with other psychiatric disorders (13). Numerous studies have found that disturbances in neurocognitive functioning are related to the degree of alexithymia (11, 14). Studies in different populations, both healthy and clinical individuals, have found that alexithymia is associated with multiple dimensions of neurocognitive functioning, including language, executive and visuospatial abilities, attention and memory (15, 16). Neuroimaging studies further support the idea that alexithymia can have an impact on cognitive function (17).

Despite the association between alexithymia and depression, as well as cognitive functioning, to the best of our knowledge, no study has investigated the relationship between alexithymia and neurocognitive function in patients with depression. This study aimed to explore the association between alexithymia and neurocognitive function in patients with MDD. Given that neurocognitive function and alexithymia may be influenced by medication exposure and disease progression, only patients with the first episode, drug-naïve MDD were included in the study (18). Because both alexithymia and cognitive functioning were culturally influenced, only the Han Chinese, the largest population in China, were selected for this study (19, 20). Since there were a limited number of studies in this area, our study was exploratory and with no specific hypotheses on which particular domain of neurocognitive function was specifically associated with alexithymia in patients with MDD.

Materials and methods

Study design and study population

We conducted this cross-sectional study to explore the association between alexithymia and neurocognition in patients with MDD, following the guidelines of the STROBE statement. Data was collected between January 2021 and July 2022 in China. The study comprised of 134 drug-naïve patients with their first-episode depression. These participants were selected from Tianjin Anding Hospital. The inclusion criteria were as follows: (1) First diagnosed with MDD according to DSM-5; (2) All patients were first-episode without previous pharmacological treatment; (3) aged 18–60 years. Participants were excluded based on the following criteria: (1) ethnic background other than Han; (2) serious physical disease; (3) a history of any mental illnesses other than MDD; (4) pregnancy; and (5) substance abuse. The ethics committee of the Tianjin Anding Hospital approved the study, which was conducted in accordance with the Declaration of Helsinki. All participants signed a written informed consent before assessment.

Data collection

Alexithymia

The 20-item Toronto Alexithymia Scale (TAS-20) was used to measure alexithymia (21). It has demonstrated favorable internal consistency and test-retest reliability in the general population (22), with Cronbach α -coefficients ranging from 0.81 to 0.86 (21). It consists of three dimensions: difficulty in identifying feelings (DIF), difficulty in describing feelings (DDF), and externally oriented thinking (EOT). Each item on the TAS-20 is scored on a five-point Likert, with total scores ranging from 20 to 100. Higher total scores reflect greater alexithymia. Individuals who score 61 or above on the TAS total score (TAS-T) are classified as having alexithymia (23).

Neurocognition

The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) was used to evaluate neurocognitive functions (24). The RBANS is a widely used neuropsychological battery which assesses different domains of cognitive function, including Attention, Language, Visuospatial/construction, Immediate memory, and Delayed memory. RBANS has good validity and reliability in Chinese people (25). The RBANS total score demonstrated strong internal consistency, with a reliability coefficient of 0.806. The Cronbach's α values for each of the RBANS subscales ranged from 0.142 to 0.727 (25).

Psychological assessment

The Patient Health Questionnaire-9 (PHQ-9) was used to assess the severity of depression in the last two weeks. It is a self-rated measure of depression consisting of nine items that align with the criteria for major depression in the Diagnostic and Statistical

Manual of Mental Disorders, Fourth Edition (DSM-IV) (26). PHQ-9 scores range from 0 to 27, with higher scores indicating more severe depression. Depressive symptoms were categorized by severity into five groups: minimal (scores of 0-4), mild (5-9), moderate (10-14), moderately severe (15-19), and severe (20-27) (27). It has been demonstrated as a valid and reliable measure of depression among the Chinese population, with Cronbach α -coefficients ranging from 0.84 to 0.87 (27).

The Generalized Anxiety Disorder-7 items (GAD-7) was used to evaluate the severity of anxiety. GAD-7 is developed by Spitzer and his colleagues to evaluate the severity of anxiety in the last two weeks (28). It is a 7-item self-report scale with a range of scores from 0 to 21, with higher scores indicating greater anxiety severity. It has been discovered to be a reliable and valid tool for screening GAD, as demonstrated in a Chinese population (29). The Cronbach's α coefficient was 0.898, indicating excellent internal consistency (29).

Demographic characteristics (age, gender, marital status, and education) were recorded through a standardized questionnaire. Alexithymia and emotion were assessed by the patients themselves after a detailed explanation by the psychiatrist. Two experienced and trained psychiatrists assessed neurocognitive functions using the RBANS assessment manual. The inter-rater correlation coefficient for the RBANS total score was 0.86.

Statistical analysis

Continuous variables were presented as means and standard deviations (SD) for normal distribution, median and interquartile range (IQR) for non-normal distribution and categorical variables as frequencies and percentages. Differences between groups were analyzed using the student t-test for normally distributed variables, the Mann-Whitney test for skewed distribution variables, and the

chi-square test for categorical variables. Multivariable linear regression models were used to assess the association of alexithymia and neurocognition. Unadjusted and adjusted β with 95% confidence intervals (CIs) were calculated. Model 1 was unadjusted. Model 2 was adjusted for age, gender, marital and education status. Model 3 was further adjusted for PHQ-9 and GAD-7. Given that 29 years was the mean age of the study population and that having ≥ 16 years of education is indicative of higher education, we conducted interaction and stratified analyses based on age grouping (above and below 29 years), gender, marital status (single and married), and education (above and below 16 years). The *P*-value reported was two-sided and statistical significance was defined as a value less than 0.05. All the analyses were performed with the statistical software packages R (<http://www.R-project.org>, The R Foundation) and Free Statistics software versions 1.8 (Beijing Free Kelin Medical Technology Co, Ltd.).

Results

Basic characteristics of the study participants

This study screened 152 patients with first-episode, drug-naïve MDD, of whom 10 were not included for meeting one of the exclusion criteria. Participants who failed to complete the RBANS assessment ($n=8$) were also excluded. Ultimately, 134 participants were included in the study analysis. Figure 1 presents a flow diagram.

Finally, 134 patients were enrolled in this study, and 55 participants (41%) had alexithymia ($TAS-T \geq 61$). The average age of the participants was 29.1 (10.1) years. Of the participants, 54 (40.3%) were male, 84 (62.7%) were single, and 64 (47.8%) had higher education (years of education ≥ 16). All participants had

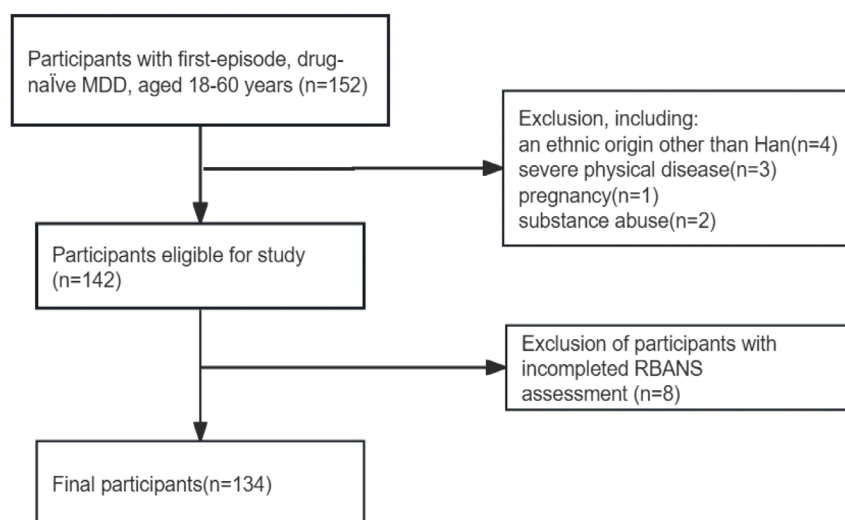


FIGURE 1

Flowchart of participant selection. MDD, major depressive disorder; RBANS, Repeatable Battery for the Assessment of Neuropsychological Status.

PHQ-9 scores of ≥ 5 (The percentages of different severity levels are detailed in [Supplementary Figure 1](#)). Individuals with alexithymia were younger (mean age, 25.6 vs. 31.4 years), more inclined to be single (41 [74.5%] vs. 43 [54.4%]) and had higher PHQ-9 scores. Additionally, a higher proportion of individuals with alexithymia had more severe depression (48 [87.3%] vs. 57 [72.2%]). [Table 1](#) shows the main characteristics of the study subjects.

Associations between alexithymia and neurocognition

The relationship between alexithymia and neurocognition is presented in [Table 2](#). The univariate linear regression analysis showed significant negative associations between TAS-T and language (β : -0.25, 95% CI: -0.49~-0.02) as well as immediate

memory function (β : -0.3, 95% CI: -0.57~-0.04). Additionally, there were negative associations between the DIF subscale and language (β : -0.49, 95% CI: -0.93~-0.06) and immediate memory function (β : -0.64, 95% CI: -1.12~-0.16).

After adjusting for gender, age, marital status and education (Model 2), the associations between TAS-T (β : -0.2, 95% CI: -0.46~-0.05) and language and between DIF (β : -0.4, 95% CI: -0.87~-0.07) and language disappeared. Nevertheless, the negative association between TAS-T and immediate memory and between DIF and immediate memory were still significant in both Model 2 and Model 3. Model 3 was further adjusted for PHQ-9 and GAD-7. In fully adjusted Model 3, the immediate memory score decreased by 0.34 points for each 1-point increase in the total TAS score (Model 3, β : -0.34, 95% CI: -0.61~-0.07) and decreased by 0.8 points for each 1-point increase in the DIF subscale score (Model 3, β : -0.8, 95% CI: -1.3~-0.31).

TABLE 1 Basic characteristics of the study participants.

Variables	Total (n = 134)	Non-alexithymic (n = 79)	Alexithymic (n = 55)	p
Gender, n (%)				0.31
Male	54 (40.3)	29 (36.7)	25 (45.5)	
Female	80 (59.7)	50 (63.3)	30 (54.5)	
Marital Status, n (%)				0.018
Single	84 (62.7)	43 (54.4)	41 (74.5)	
Married	50 (37.3)	36 (45.6)	14 (25.5)	
Education, year, n (%)				0.797
<16	70 (52.2)	42 (53.2)	28 (50.9)	
≥ 16	64 (47.8)	37 (46.8)	27 (49.1)	
Depression severity, n (%)				0.037
mild-moderate	29 (21.6)	22 (27.8)	7 (12.7)	
moderately severe-severe	105 (78.4)	57 (72.2)	48 (87.3)	
Age, year	29.1 $\pm$ 10.1	31.4 $\pm$ 10.9	25.6 $\pm$ 7.6	< 0.001
TAS total score	58.5 $\pm$ 9.9	51.8 $\pm$ 6.3	68.1 $\pm$ 5.2	< 0.001
DIF	22.0 $\pm$ 5.5	18.7 $\pm$ 3.7	26.7 $\pm$ 4.1	< 0.001
DDF	16.0 $\pm$ 3.3	14.2 $\pm$ 2.5	18.7 $\pm$ 2.3	< 0.001
EOT	20.5 $\pm$ 3.6	18.9 $\pm$ 3.3	22.7 $\pm$ 2.7	< 0.001
RBANS total score	91.9 $\pm$ 14.9	92.7 $\pm$ 15.3	90.8 $\pm$ 14.5	0.485
Attention	109.7 $\pm$ 14.5	110.9 $\pm$ 13.1	108.1 $\pm$ 16.3	0.285
Language	95.3 $\pm$ 14.0	96.2 $\pm$ 14.5	94.1 $\pm$ 13.2	0.388
Visuospatial	88.7 $\pm$ 17.7	88.4 $\pm$ 17.8	89.1 $\pm$ 17.8	0.817
Immediate Memory	85.9 $\pm$ 15.4	87.3 $\pm$ 16.3	84.0 $\pm$ 14.1	0.232
Delayed Memory	91.1 $\pm$ 14.1	91.3 $\pm$ 15.0	90.8 $\pm$ 12.9	0.867
PHQ-9	18.2 $\pm$ 5.0	17.3 $\pm$ 5.3	19.4 $\pm$ 4.4	0.017
GAD-7	13.0 $\pm$ 5.0	12.5 $\pm$ 5.2	13.7 $\pm$ 4.6	0.159

TAS, Toronto Alexithymia scale; DIF, difficulty identifying feelings; DDF, difficulty describing feelings; EOT, externally oriented thinking; RBANS, Repeatable Battery for the Assessment of Neuropsychological Status; PHQ-9, Patient Health Questionnaire-9 items; GAD-7, Generalized Anxiety Disorder-7 items.

The severity of depression was categorized based on PHQ-9 total scores: mild (5-9), moderate (10-14), moderately severe (15-19), and severe (20-27).

TABLE 2 Multivariable liner analysis evaluating the association between alexithymia and cognitive score.

Variable	Attention		Language		Visuospatial		Immediate Memory		Delayed Memory	
	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P
	Model 1		Model 1		Model 1		Model 1		Model 1	
TAS total	-0.16 (-0.41~0.1)	0.22	-0.25 (-0.49~-0.02)	0.04*	-0.1 (-0.41~0.21)	0.54	-0.3 (-0.57~-0.04)	0.03*	-0.14 (-0.39~0.1)	0.25
DIF	-0.36 (-0.82~0.1)	0.12	-0.49 (-0.93~-0.06)	0.03*	-0.25 (-0.82~0.31)	0.38	-0.64 (-1.12~-0.16)	0.01*	-0.29 (-0.74~0.16)	0.20
DDF	-0.35 (-1.12~0.43)	0.38	-0.57 (-1.31~0.17)	0.13	-0.3 (-1.25~0.64)	0.53	-0.64 (-1.46~0.17)	0.12	-0.09 (-0.85~0.66)	0.81
EOT	-0.08 (-0.78~0.62)	0.82	-0.34 (-1.01~0.33)	0.31	0.09 (-0.77~0.94)	0.84	-0.33 (-1.07~0.41)	0.38	-0.35 (-1.03~0.33)	0.31
	Model 2		Model 2		Model 2		Model 2		Model 2	
	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P
	Model 2		Model 2		Model 2		Model 2		Model 2	
TAS total	-0.14 (-0.41~0.12)	0.29	-0.2 (-0.46~0.05)	0.12	-0.09 (-0.4~0.23)	0.59	-0.33 (-0.59~-0.07)	0.02*	-0.13 (-0.38~0.12)	0.30
DIF	-0.33 (-0.82~0.16)	0.19	-0.4 (-0.87~0.07)	0.10	-0.28 (-0.87~0.31)	0.35	-0.77 (-1.25~-0.29)	0.002*	-0.3 (-0.76~0.16)	0.21
DDF	-0.31 (-1.11~0.5)	0.46	-0.38 (-1.16~0.4)	0.34	-0.25 (-1.22~0.73)	0.62	-0.7 (-1.51~0.12)	0.10	-0.01 (-0.77~0.76)	0.98
EOT	-0.1 (-0.79~0.59)	0.78	-0.32 (-0.99~0.35)	0.35	0.14 (-0.69~0.98)	0.74	-0.24 (-0.94~0.46)	0.51	-0.3 (-0.95~0.35)	0.37
	Model 3		Model 3		Model 3		Model 3		Model 3	
	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P
	Model 3		Model 3		Model 3		Model 3		Model 3	
TAS total	-0.13 (-0.4~0.14)	0.36	-0.23 (-0.49~0.03)	0.09	-0.13 (-0.45~0.2)	0.45	-0.34 (-0.61~-0.07)	0.01*	-0.11 (-0.37~0.14)	0.38
DIF	-0.31 (-0.82~0.2)	0.24	-0.47 (-0.96~0.02)	0.07	-0.38 (-1~0.23)	0.23	-0.8 (-1.3~-0.31)	0.002*	-0.26 (-0.73~0.22)	0.30
DDF	-0.28 (-1.1~0.54)	0.50	-0.4 (-1.19~0.39)	0.32	-0.29 (-1.28~0.69)	0.56	-0.7 (-1.52~0.12)	0.10	0.02 (-0.75~0.78)	0.96
EOT	-0.06 (-0.76~0.64)	0.87	-0.35 (-1.03~0.32)	0.31	0.09 (-0.76~0.93)	0.84	-0.26 (-0.96~0.45)	0.48	-0.3 (-0.95~0.36)	0.38

Modal 1: No adjustment.
Modal 2: Adjusted for gender, age, marital status and education.
Modal 3: Adjusted for gender, age, marital status, education, PHQ-9 and GAD-7.
TAS, Toronto Alexithymia scale; TAST, TAS total score; DIF, difficulty identifying feelings; DDF, difficulty describing feelings; EOT, externally oriented thinking; PHQ-9, Patient Health Questionnaire-9 items; GAD-7, Generalized Anxiety Disorder-7 items; CI, confidence interval.
*P<0.05.

Subgroup analyses

Figures 2A, B displays the results of the stratified and interaction analyses investigating the associations between the TAS total score and immediate memory, as well as between the DIF score and immediate memory. In the stratified analysis, results were consistent with those observed in the multivariable linear regression analysis. No significant interactions were found within any subgroups, including gender, age, marital status and education level (all *P* for interaction>0.05).

Discussion

This cross-sectional study examined the association between alexithymia and neurocognitive function in Chinese Han first-episode, drug-naïve MDD. The results revealed a negative association between alexithymia and immediate memory. This negative association remained significant after adjusting for covariates including age, gender, marital and education status and emotion and remained stable across subgroups. This suggests that level of alexithymia was negatively associated with immediate memory independent of demographic factors and emotions in first-episode, drug-naïve MDD. Interestingly, when comparing individuals with and without alexithymia, we did not observe

a significant difference in immediate memory performance. The reasons may be as follows: First, the immediate memory performance of the alexithymia group was indeed lower than that of the non-alexithymia group. However, the relatively small sample size limited the ability to detect significant differences. Second, we observed a negative association between alexithymia as a continuous variable and immediate memory. This association may not be significant when alexithymia is treated as a categorical variable because it reduces statistical power. Third, the alexithymia group had a relatively younger age distribution and a higher proportion of participants with higher education. These demographic characteristics may have influenced memory performance, thereby masking the true relationship between alexithymia and immediate memory. In contrast, our regression and stratified analyses accounted for multiple covariates and potential confounders, which allowed us to more accurately identify the independent impact of alexithymia on memory performance.

Studies have shown that alexithymia is associated with impaired cognitive processing of emotional information and with deficits in learning and memory. This is particularly the case when it comes to emotional information and contexts (30). A small sample of older adults reported a negative correlation between story and figure recall and alexithymia (31). Similarly, in a study conducted on young adults, it was found that those with high levels of alexithymia had a decreased immediate recall ability but unimpaired long-term

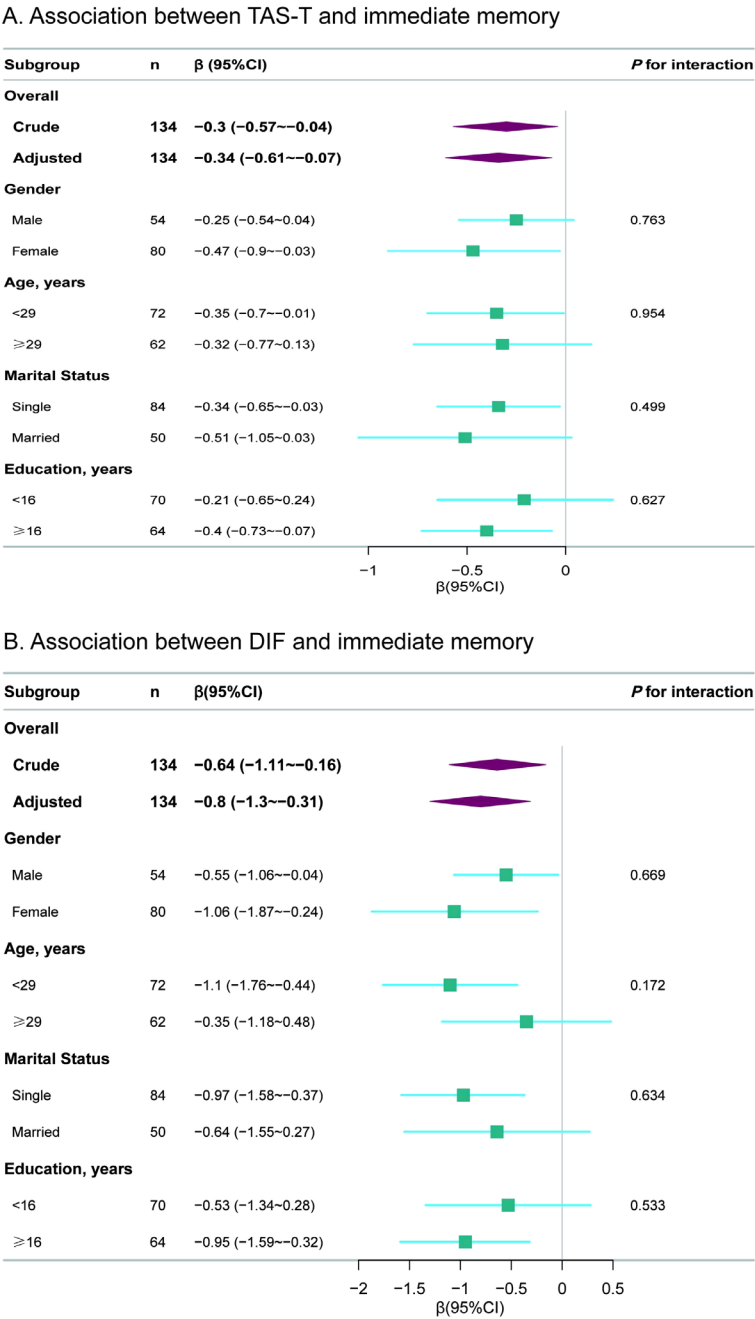


FIGURE 2 Subgroup analyses for the associations of TAS total and DIF subscale scores with immediate memory. (A) Association between TAS-T and immediate memory (B) Association between DIF and immediate memory. TAS, Toronto Alexithymia scale; TAS-T, TAS total score; DIF, difficulty identifying feelings; CI, confidence interval. The *p*-value for interaction represents the likelihood of interaction between the variable and the TAS total score or the DIF subscale score. Each stratification was adjusted for gender, age, education, marital status, PHQ-9 and GAD-7.

recognition of the words for neutral memoranda in a neutral context (32). Vermeulen found that alexithymia inhibited short-term memory but not long-term retrieval, regardless of whether the information was emotional or not (33). Conversely, some studies have found that individuals with higher levels of alexithymia may exhibit preserved or even improved memory for emotionally provocative words (34). Recent studies have explored the relationship between alexithymia and neurocognitive function

across various patient populations. However, the specific associations between alexithymia and cognitive function vary across diseases, likely attributable to differences in disease pathology, heterogeneity of cognitive tests used, and sample characteristics. For instance, a recent meta-analysis found that the prevalence of alexithymia in Parkinson’s disease (PD) is significantly higher than in the general population and is associated with cognitive impairment (35). Studies on PD have shown that alexithymia correlates with

deficits in the visuospatial domain and executive function, rather than memory functions (36). Similar findings were observed in HIV patients, where alexithymia correlated with deficits in visuospatial and executive functions but not memory impairments (37). A meta-analysis of eight studies revealed a moderate to large effect size for the association between alexithymia and schizophrenia (38). In schizophrenia, the EOT dimension of alexithymia has been linked to deficits in working memory (11, 39). In contrast, study on multiple sclerosis (MS) found that alexithymia correlated with depression and anxiety but not with cognition (40), suggesting that its primary impact on emotional regulation rather than cognition. Our study revealed a statistically significant negative association between level of alexithymia and immediate memory in patients with MDD. These findings underscore the significant role of population-specific factors in shaping the relationship between alexithymia and cognitive function. Further investigations across diverse populations are warranted to provide a more comprehensive understanding of this complex relationship.

Research has shown that alexithymia, which refers to the difficulty in identifying and describing one's own emotions, is related to decreased empathic behaviors (41, 42). Alexithymia appeared to underlie difficulties in key cognitive processes essential for empathy, specifically in sharing the emotional state of others (43). This lack of empathy results from difficulties in perceiving emotions, leading to misinterpretation of social cues and ultimately resulting in a lack of understanding of others' emotions (44). Studies have shown that individuals suffering from MDD experience diminished feelings of compassion (45). Furthermore, recent evidence has shown that the presence of alexithymia contributes to a deficit in empathy in depression (46). Previous literature has suggested that the motivation to empathize with others can guide attention and memory (47). Although the underlying mechanism cannot be tested in the present study, it is possible that the ability of empathy to raise emotional arousal can enhance the encoding of information (48). Consequently, "DIF", a core feature of alexithymia in patients with major depressive disorder (MDD), may be significantly associated with memory deficits, potentially mediated by reduced empathic ability.

Alexithymia, an impairment of affective and cognitive emotional processing, may reflect changes in brain regions important for cognitive function. A study on general population sample showed that the TAS-20 total score and DIF were both associated with less gray matter volumes of bilateral dorsal anterior cingulate cortex (ACC) (49). ACC is an essential area of the cerebral cortex for cognitive deficits production (5, 50). Recent evidence has shown that the human anterior cingulate and orbitofrontal cortex regions are linked to Meynert' septal nuclei and basal forebrain nucleus, which contain cholinergic neurons that project to the hippocampus and neocortex respectively (51). The impairment of the ACC system has been proposed as a cause for hippocampal episodic memory storage impairment (51). Additionally, volume reductions in the ACC have been observed in early-onset mood disorders with some specificity (52). Alexithymia is also strongly related to chronic

stress, which is associated with brain structural and neuroendocrine alterations which may act as a mechanism for deficits in memory function (16). In particular, brain regions such as the hippocampus and prefrontal cortex, which are crucial for declarative memory functioning, especially short-term memory, have each been found to be affected by chronic stress (53, 54). Overall, further research is needed to understand the mechanisms underlying the association between alexithymia and memory impairment in patients with MDD, including neuroimaging and basic science research.

The expression and experience of emotions are inherently influenced by culture (19). For example, Western cultures encourage the expression of emotions more than Eastern cultures. Given that alexithymia is primarily characterized by difficulties in emotion identification and communication, it is influenced by culture (55). Previous research has shown that Asian groups exhibit higher levels of alexithymia compared to their European American counterparts (55). Moreover, different cultural backgrounds can exert a significant impact on specific neurocognitive processes (20), such as attention (56) and memory (57). Research in the field of neuroscience has also confirmed these findings (58, 59). Different cultural environments and diverse patterns of social interaction can profoundly influence memory development (60). Given the influence of culture on alexithymia and cognitive functioning, the present study chose a specific population, the Han Chinese, as the subject of the study and found negative associations between alexithymia and immediate memory in this population. Nevertheless, future studies with larger sample sizes and diverse populations are needed to further clarify the association between alexithymia and cognitive functioning in different cultural contexts.

In this study, we observed a negative association between alexithymia and verbal function in the unadjusted model. However, this association was no longer significant after adjusting for covariates. This finding aligns with the alexithymia-language hypothesis proposed by Hobson, which suggests that language deficits lead to impaired emotional awareness and, consequently, alexithymia (61). Studies in both clinical and healthy populations have supported this hypothesis, indicating that higher levels of alexithymia are associated with poorer verbal function (62, 63). The language difficulties observed in alexithymia may reflect a lack of early social language learning opportunities. Longitudinal studies have also demonstrated that language development in childhood can influence the manifestation of alexithymia in adolescence (64). However, some studies have reached the opposite conclusion (65). Given the considerable heterogeneity in sample characteristics, clinical presentations, and methodologies across studies, the relationship between alexithymia and language remains uncertain (66). According to the language hypothesis, individuals with language deficits are more likely to exhibit higher levels of alexithymia compared to those with normal language function. However, not all individuals with alexithymia exhibit significant language impairments (60). This may explain why the association between alexithymia and verbal function was attenuated after controlling for various demographic characteristics in our study.

Limitations

There are several limitations to our study that need to be acknowledged. Firstly, owing to the cross-sectional design of our study, it is impossible to establish any causality between the variables. Secondly, although our sample size is not small when compared to previous studies in this area, it still remains a limiting factor of our research. Thirdly, the emotion scales we used in our study, PHQ-9 and GAD-7, are self-assessment questionnaires. However, emotion evaluation was used as a covariate in this study to test the stability of the results. In future studies if emotion seen as an observed variable, including other assessment scales such as Hamilton Rating Scale for Depression (HAMD) and Hamilton Anxiety Rating Scale (HAMA) would provide a more comprehensive evaluation of emotions. Fourthly, despite the application of regression models and stratified analyses, complete elimination of residual confounding effects stemming from unmeasured or unknown factors cannot be guaranteed. For instance, there may be other psychological variables that might influence cognitive processes or the relationship between alexithymia and memory deficits. Fifthly, our study population included individuals with varying severities of depression, which may have influenced the association between alexithymia and cognitive function. Future studies should consider stratifying analyses by depression severity to better understand these complex relationships. Sixthly, it may be difficult to generalize the findings to the entire population of depressed patients because alexithymia is closely related to culture, and only Chinese Han patients were selected in this study. Furthermore, different subtypes of MDD may exert distinct impacts on cognitive function (67). Our study did not investigate the comorbid symptoms of depression to differentiate between subtypes. Therefore, it would be an interesting direction for future research to explore the relationship between alexithymia and cognitive function across different subtypes of MDD. Nevertheless, our study represents the first attempt to explore the relationship between alexithymia and neurocognition in patients with MDD, which could contribute to a deeper understanding of the cognitive impairment in MDD. Despite these limitations, future research should focus on well-designed and larger sample longitudinal studies to validate our findings.

Conclusions

In conclusion, higher level of alexithymia, particularly the difficulty identifying feelings facet, is associated with lower immediate memory scores among Chinese Han population with depression. More attention should be paid to altered cognitive functioning in patients with MDD who suffer from alexithymia, especially those with difficulty in identifying feelings. Future studies would further explore the mechanisms of the association between alexithymia and neurocognitive functioning.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the ethics committee of the Tianjin Anding Hospital. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

XT: Formal analysis, Writing – original draft. FB: Formal analysis, Investigation, Writing – original draft. YZ: Formal analysis, Investigation, Writing – original draft. YG: Investigation, Writing – original draft. YW: Investigation, Writing – original draft. YL: Investigation, Writing – original draft. CZ: Investigation, Writing – original draft. ML: Project administration, Writing – original draft. JL: Funding acquisition, Project administration, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research and/or publication of this article. This work was supported by grants from Foundation of Tianjin Health Commission for Young Scholars (Grant number: KJ20025) and Tianjin Key Medical Discipline (Specialty) Construction Project (Grant number: TJYXZDXK-033A). We thank all the participants in this study.

Acknowledgments

We are grateful to all participants in this study and all the clinical physicians and research staff that contributed to the clinical assessments. We also gratefully thank Dr. Jie Liu of Department of Vascular and Endovascular Surgery, Chinese PLA General Hospital and Dr. Jinbao Ma of Department of Drug-resistance tuberculosis, Xi'an Chest Hospital for the contribution to the statistical support and comments regarding the manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsy.2025.1473204/full#supplementary-material>

SUPPLEMENTARY FIGURE 1

Percentages of different depression severity levels according to PHQ-9 total score.

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