

Somatization Mediates the Structural Relationship of Alexithymia with Anxiety and Depression

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Abstract

Objective: The study of factors affecting anxiety and depression as the most common emotional disorders has always been at the forefront of psychological research. Among different factors, alexithymia and somatization have considerable importance due to their emotional nature with makes them more integrated with anxiety and depression. Several studies have demonstrated a link between these four concepts, but as far as we know, the quality of the relationship has not been addressed yet. The present paper aims to investigate the mediating role of somatization in the structural relationship of alexithymia with anxiety and depression.

Method: A total of 334 college students were recruited through cluster sampling and were asked to complete the Toronto Alexithymia Scale (TAS), Beck Depression Inventory – Second Edition (BDI-II), Beck Anxiety Inventory (BAI), and Somatization Subscale from the Symptom Checklist-90-Revised Questionnaire. Data were analyzed using correlational as well as structural equation modeling.

Results: Based on the correlation analysis, there was significant relationship between alexithymia, somatization, anxiety, and depression. According to the results of regression weights, there is a moderate relationship between alexithymia and somatization (regression weight = 0.44). The relationship between somatization and depression is at moderate level (regression weight = 0.42) and the relationship of somatization with anxiety is at strong level (regression weight = 0.85). The goodness of fit indices for the hypothetical model showed significant coefficients at $P < 0.05$ (CFI = 0.98, RMSEA = 0.059).

Conclusion: Findings indicated the important and influential role of somatization in explaining the relationship of alexithymia with anxiety and depression. Therefore, it seems that emotional components such as difficulty in identifying and expressing emotions as well as regulating mood states are important in the psychopathology of emotional disorders.

Key words: *Anxiety; Alexithymia; Depression; Somatization*

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Article Information:

Received Date: 2020/10/11, Revised Date: 2021/03/15, Accepted Date: 2021/06/07



Anxiety and depression are common emotional disorders in the general population (1) and could pose a heavy cost for societies (2). To reduce these costs, individuals at risk need to be identified early (3). Extensive evidence suggests that depression and anxiety are strongly associated with somatic symptoms (4). The comorbidity of anxiety and depression with somatic symptoms can lead to more significant functional disability, greater use of medical care, and higher costs than other pathologies (5). Somatic symptoms also increase the risk of depression and anxiety up to two times (6).

Somatic symptoms are one of major causes of visiting a health professional, and symptoms such as headaches and musculoskeletal pain are common in the general population (7). When these symptoms and signs cannot be explained through traditional and advanced medical processes, they can cause comorbid psychiatric disorders and impair quality of life (8). Frequently, high rates of comorbidity exist for somatization in depression and anxiety in the literature (9). For example, some researchers (10), concluded that depression and somatization were significantly correlated. Another study (11) showed that about 50% of primary care patients diagnosed with anxiety or depression, also had a somatoform disorder. The results of a recent study (12) also shows in multiple regression models that having a somatoform disorder was most associated with BAI and BDI-II scores.

What has made somatic disorders one of the most debated in psychopathology is the mysterious mechanism behind influence of stress and psychological pressure on physical pathways. The inability to share inner feelings and experiences has been recognized as a major feature of people with psychosomatic problems (13). Irrespective of external factors, emotions are also considered to be the causative factor of internal diseases (14). People with problems in their emotional experiences (such as alexithymia) may misinterpret their emotional arousal as a symptom of physical illness (15). Alexithymia refers to the difficulty in expressing and reflecting emotional states (16). The four main features that define the concept of alexithymia are: 1) difficulty in defining emotions and distinguishing between bodily sensations and emotional arousals; 2) difficulty in describing emotions for others; 3) impaired imaginal ability; and 4) an externally orientated thinking style, with emphasis on external and objective stimuli, rather than on internal emotions (17). According to researchers (18), avoiding emotions and emotional experiences is one of the fundamental dysfunctions in alexithymia. People with alexithymia are susceptible to communicating through their bodily sensations because of their inability to share emotions, and often seek help in primary care settings rather than receiving the psychological treatment they need (19). Studies in line with alexithymia have been particularly popular in

psychosomatic literature because high levels of alexithymia are associated with various psychosomatic illnesses (18). Many studies, there is significant relationship between alexithymia and somatization in clinical and nonclinical samples (20, 21, 22). Researchers found that even when physicians confirm a physical illness, anxiety or depression, all alexithymia components; including difficulty in identifying emotions, difficulty in describing emotions and externally-oriented thinking, are associated with higher somatic symptoms in the general population. Alexithymia's distinct relationship with depression and anxiety has also been a research priority for researchers (23, 24, 25). Studies show that alexithymic individuals have aggravated depressive symptoms (26). Another review study (24) supports the hypothesis that alexithymia can predispose individuals to depression. For instance, a prospective study (27) found that high scores of alexithymia is a significant predictor of depression in the future.

People with alexithymia may also be more vulnerable to anxiety (23), but there is also evidence to suggest that anxiety or depression can excite a reactive regression to emotional development and thus develop alexithymic features (25). However, most of the data collected in this regard has been relevant to clinical populations (23). Besides, research on nonclinical populations shows that adolescents, as well as adults with alexithymia, have difficulty establishing healthy, and close relationships, as alexithymia may interfere with emotional state management. Therefore, alexithymia may be associated with severe negative emotions such as anxiety, depression, anger (28), and separation anxiety (29). Furthermore, findings suggest that alexithymia anticipates poorer treatment outcomes for anxiety, somatoform disorders (30), and depression (31).

In previous discussions, the relationship between alexithymia, somatization, anxiety, and depression were examined. These variables appear to have complex and multiple relationships with each other. Given the importance of anxiety and depression in the general population and the problems that these disorders impose on health and quality of life in individuals, it is important to determine factors affecting these two disorders. On the other hand, high prevalence of somatization in Asian cultures (32) has affected the identification, diagnosis, treatment, and rehabilitation of somatization-related disorders including anxiety and depression and has caused problems in prevalence and incidence statistics. Regarding the importance of culture in representation of psychological problems, some researchers suggest that these problems are expressed under the influence of cultural factors (33). Patients try to express their symptoms in a selective and socially acceptable manner (34). For example, studies have shown that patients in Asian cultures are more likely to express physical symptoms rather than emotional ones although they are aware of the presence of emotional

symptoms (35). Thus, presence of somatic symptoms and complaints can be a sign of emotional disorders. Beside, somatic symptoms are associated with poor academic performance and therefore lead to more social withdrawal (36) and this leads to more psychological problems because social support is crucial for maintaining psychological and physical health and wellbeing (37). Therefore, studying the relationship between alexithymia, somatization, anxiety and depression in Eastern cultures, specifically in students could be one of the research priorities.

Another issue is to determine the distinct role of alexithymia and somatization in explaining variances of anxiety and depression. Given that both somatization and alexithymia involve a set of intrapersonal problems in experiencing and expressing emotions, it is, therefore, worthwhile to know what role these two well-known pathologies in research literature play concerning anxiety and depression in Eastern cultures, especially Iran. Thus, in the present study, we attempted to explore the direct relationship between alexithymia with anxiety and depression as well as the relationship between these variables with testing the mediatory role of somatization. Our proposed model is that alexithymia is likely to affect anxiety and depression, and this influence is mediated by somatic symptoms (as shown in the hypothesized model).

Materials and Methods

Participants & Procedures

The present correlational study was conducted in faculty of educational sciences and psychology, University of Tabriz in the academic year 2019-2020. A total of 334 students including 159 males (47.6%) and 175 females (52.4%) were selected through cluster sampling (age range = 19-35, mean = 23.28, SD = 3.9). All procedures performed in this study were in accordance with the ethical standards of the institutional research committee (Department of Educational Sciences and Psychology, University of Tabriz). Participants were informed about the aim of the study, their consent was obtained, and they completed all questionnaires. Participants who met our inclusion and exclusion criteria were included in the study. The inclusion criteria were willingness to participate in the study and age range of 18-35. The exclusion criteria were older than 35 years or younger than 18 years of age, diagnosis of any psychiatric disorders, use of medications that affect attention or cognition, diagnosis of any medical illness, addiction to alcohol or other illegal substances, and unwillingness for participation.

Measures

The somatization subscale of the Symptom Checklist-90-Revised (SCL-90-R)

This measurement was first developed by Derogatis *et al.* (38). The somatization subscale of SCL-90-R (SCL-90-R) was utilized to measure somatic symptoms. This

subscale is a 12-item list of common somatic symptoms and its reliability and validity has been established in different studies (39). Respondents answer 12 questions on a 5-point scale (with 0 being 'not at all' and 4 being 'extremely'). Researchers reported a reliability of 0.80 in the Iranian population (40). Cronbach's alpha coefficient for the physical dimension of SCL-90-R was stated at 0.86 in past studies (20). Our study also showed a high reliability for this subscale with Cronbach's $\alpha = 0.086$.

Toronto Alexithymia Scale (TAS)

The TAS is a 20-item self-report measure of alexithymia which rated on a 5-point Likert scale from strongly disagree to strongly agree. It includes three subscales of difficulty identifying feelings (DIF), difficulty in describing feelings (DDF), and externally-oriented thinking (EOT) (18). The total score is from 20 to 100. Individuals who scored over 60 were considered as individuals with alexithymia, and those with a score under 60 were considered as without alexithymia (41). The reliability of this questionnaire based on Cronbach's alpha in the Iranian sample was 0.74 for DIF, 0.61 for DDF, and 0.50 for EOT (42).

Beck Anxiety Inventory (BAI)

Beck Anxiety Inventory (43) is a 21-item instrument which specifically measures the severity of anxiety symptoms. Items scored in 4-point Likert scale from zero to three and total score can range between 0 and 63. Its internal consistency coefficient was 0.92, and its one-week test-retest validity was 0.75 (44). A validity coefficient of 0.72 and a test-retest reliability coefficient of 0.83 and Cronbach's alpha of 0.92 is reported for the Iranian version (45).

Beck Depression Inventory - Second Edition (BDI-II)

The questionnaire (46) consisted of 21 items that measures symptoms of depression. Each item was scored between zero and three. Internal consistency of 0.73 to 0.92 and an alpha coefficient of 0.86 were reported for the patient group and 0.81 for the non-patient group. Dabson and Mohammadkhani (47) reported an alpha coefficient of 0.92 for the outpatient and 0.93 for student samples.

Results

Investigating statistical pre-assumptions is an important part of structural equation modeling and prevents unrealistic and biased results. One of the important pre-assumptions of this statistical approach is the realization of univariate normality and multivariate normality. Normal univariate normality is usually assessed by examining the skewness and elongation of the observed variables. The skewness of the variables is in the range of 0.02 to 2.31 and their elongation is in the range of -0.31 to 4.91. Chou & Bentler (48) found the ± 3 cut-off point appropriate for skewness. For the tensile cut-off point as well, values above ± 10 are problematic for this index (49). The Relative Multivariate Kurtosis Index calculated to evaluate the assumption of multivariate

normality was 1.08. It is believed that multivariate normality is achieved if the value of this index is not more than 3 (50). The correlation matrix between the observed variables can show multiple linearities. Correlation coefficients above 0.85 cause difficulty in estimating the model correctly (51). The correlation coefficients are in the range of 0.01 to 0.70. Preliminary investigations showed that the data are suitable for using structural equation modeling and maximum likelihood estimation.

The correlation matrix between the current research variables, along with their mean and standard deviation, is shown in Table 1. As this table shows, all correlations are significant.

Before conducting structural equation modeling analysis, appropriate markers should be selected for latent research variables. In the present study, for the alexithymia variable, subscales of this scale (emotion identifying, emotion description, and logical orientation) were selected as observable variables. For somatization, anxiety and depression, due to lack of subscales, exploratory factor analysis was performed by fixing on 3 factors with varimax rotation to select the variables. Then, the power of the extracted factors was evaluated by confirmatory factor analysis. The results of the measurement model with standard coefficients, non-standard coefficients, and significance level are reported in Table 2.

Before evaluating the structural model, the fit indices were calculated for the measurement model (confirmatory factor analysis). The measurement model specifies the relationship of the observed variables to the current variables. This model is evaluated using confirmatory factor analysis. The fitting indices of the

measurement model presented in Table 3 show the fitting of this model very well. Therefore, the visible variables have the capability to operate the current variables.

Structural Model: Direct effects

A hypothetical structural model with standardized coefficients was presented (Figure 1). Also, the evaluation of the structural model showed that this model was suitable. The fit indices for this model are shown in Table 2. As the table shows, all the indicators were within the appropriate fit of the model. Information on direct effects is also given in Table 4.

According to this structural model, alexithymia as an exogenous variable, with a standard coefficient of 0.44 ($t = 6.38$) on the physical mediator variable as well as with standard coefficients of 0.11 ($t = 2.55$) and 0.34 ($t = 5.14$) affected the dependent variables of anxiety and depression. On the other hand, the mediator variable with standard coefficients of 0.85 ($t = 11.44$) and 0.42 ($t = 6.17$) affected the endogenous variables of anxiety and depression.

Structural Model: Indirect effects

The Bootstrap test was used to evaluate the mediating effects. The significance of this test can be assessed both by referring to the significance level and by examining the Bootstrap boundary. The mediating effect is significant if the boundaries of Bootstrap are also significant; both negative and positive. The results of this test are shown in Table 5. As Table 5 shows, the alexithymia pathway to somatization-mediated anxiety and depression was significant with the standard coefficients of 0.37 and 0.18, respectively, at $P < 0.05$. Therefore, somatization had a mediating effect on the relationship of alexithymia with anxiety and depression.

Table1. Descriptive Statics and Correlation Matrix between Somatization, Alexithymia, Anxiety and Depression

Variables	1	2	3	M	SD	Skewness	Kurtosis
1 Alexithymia				48.68	11.18	0.33	-0.33
2 Somatization	0.290**			9.06	7.43	1.06	0.67
3 Anxiety	0.380**	0.698**		9.16	8.50	1.44	1.89
4 Depression	0.418**	0.483**	0.445**	10.36	9.27	1.34	1.88

*P < 0.05
**P < 0.01

Table 2. Non-Standard Coefficients, Standard Coefficients and T-Values of the Observable Variables in the Measurement Model of Alexithymia, Somatization, Anxiety and Depression

Variables	Non-Standard Coefficients	Standard Coefficients	T-value
Alexi			
DIF	5.77	0.93	14.98
DDF	2.52	0.59	10.17
EOT	1.37	0.35	6.06
SOM			
SOM 1	3.46	0.77	15.44

SOM 2	1.43	0.62	11.73
SOM 3	1.57	0.73	14.42
ANX			
ANX 1	2.70	0.84	17.75
ANX 2	2.06	0.74	14.95
ANX 3	2.93	0.76	15.26
DEP			
DEP 1	5.09	0.88	18.40
DEP 2	2.06	0.80	16.16
DEP 3	1.43	0.67	12.85

Notes: ALX = Alexithymia; SOM = Somatization; ANX = Anxiety, DEP; Depression; SOM1, SOM2, SOM3 = Parcels of SOM; ANX1, ANX2, ANX3 = Parcels of ANX; DEP1, DEP2, DEP3 = Parcels of DEP.

Table 3. Fitting Indices of the Measurement and Structural Model of Alexithymia, Somatization, Anxiety and Depression

	Chi-Square	DF	X2/Df	RMSEA	SRMR	GFI	CFI	NFI	IFI
Measurement Model	103.06	48	2.14	0.060	0.043	0.95	0.98	0.97	0.98
Structural Model	104.10	49	2.12	0.059	0.043	0.95	0.98	0.97	0.98

Table 4. Indicators of Direct Routes of the Model of Alexithymia, Somatization, Anxiety and Depression

T-Values	Standard Coefficients	Direct Route
6.38	0.44	som
2.05	0.11	anx
5.14	0.34	dep
11.44	0.85	anx
6.17	0.42	dep

Notes: alx = Alexithymia; som = Somatization; anx = Anxiety, dep; Depression

Table 5. Bootstrap Test Results for Intermediating Effect

Independent Variable	Intermediate Variable	Dependent Variable	Standard Coefficient	Standard Er.	Lower Bound	Upper Bound	Significancy
Alexithymia	Somatization	Anxiety	0.374	0.065	0.201	0.534	0.001
Alexithymia	Somatization	Depression	0.184	0.049	0.062	0.312	0.001

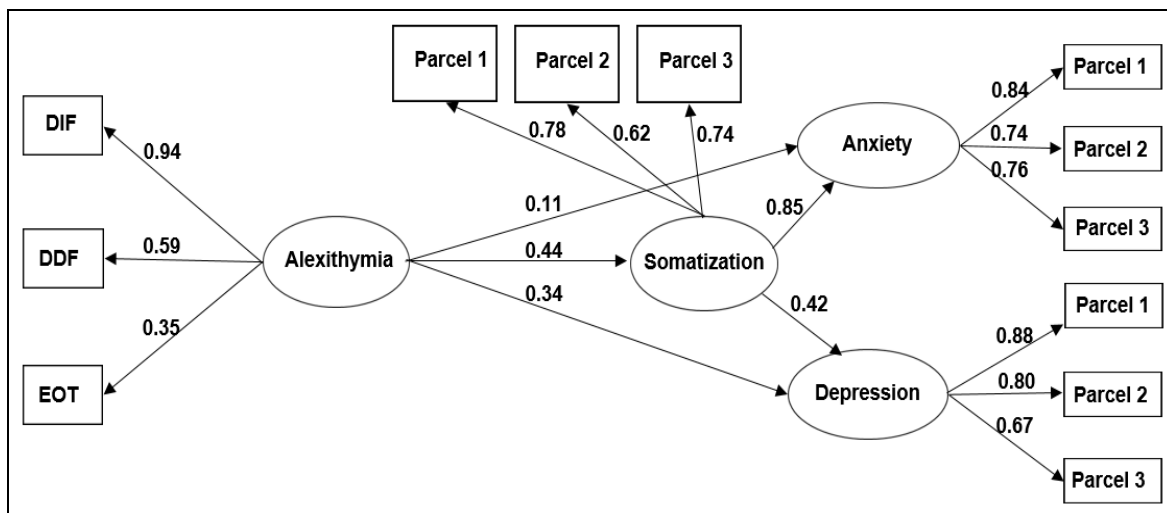


Figure 1. Structural Model of Alexithymia, Somatization, Anxiety and Depression; with Standard Coefficients Note. DIF = Difficulty Identifying Feelings; DDF = Difficulty Describing Feelings; EOT = Externally Oriented-Thinking; SOM1, SOM2, SOM3 = Parcels of SOM; ANX1, ANX2, ANX3 = Parcels of ANX; DEP1, DEP2, DEP3 = Parcels of DEP

Discussion

The purpose of the present research was to study the structural relationship of alexithymia with anxiety and depression, considering somatization as a mediating variable. Moreover, the other critical point of the present study was to get a uniform picture of how alexithymia, depression, anxiety, and somatization coexist. Our findings support the proposed model and the idea that alexithymia can directly affect anxiety and depression. Moreover, it can indirectly affect these variables through somatization. The correlation of somatization with anxiety was more than its correlation with depression. The presented model also shows that the direct effect of alexithymia on anxiety and depression is less than its effect through somatization (somatic symptoms).

As noted in the introduction, different findings suggest a positive association between somatization, anxiety and depression. This was also confirmed in the present study, and our results are in line with findings of other researchers in this area (5, 9, 12). In contrast, a number of studies have not found any association between alexithymia, somatization, anxiety and depression. For instance, Lundh and Simonsson-Sarnecki showed that there is no correlation between alexithymia as measured by TAS-20 and somatic complaints (52). In line with some previous studies on clinical samples (53, 54), our findings also suggest that alexithymia, somatization, anxiety and depression are overlapping but distinct constructs. Nevertheless, there is a main distinguishing point in our study. The majority of previous studies have focused on clinical samples, and, to the best of our knowledge, this is the first study that examined the relationship between alexithymia, somatization, anxiety and depression in an academic population.

Previous studies have highlighted some reasons for the association of somatization with anxiety and depression.

Given the known biological mechanisms underlying the association of emotional disturbances (such as anxiety and depression) with physical complaints that include the HPA circuit maladjustment and serotonergic pathways (51), individuals with somatization are also impaired along these pathways. Furthermore, physical symptoms (such as pain) can be exacerbated by the increased psychosocial consequences for the individual such as increased attentional bias/pain perception (55), and periods of social withdrawal, and increased risk of subsequent emotional distress (56). Social responses and contextual reinforcements in the context of cultural psychology studies can also be a good justification for this relationship. Therefore, in non-Western cultures (including Iran), psychological symptoms and signs are not considered often and more attention is paid to physical problems. It is therefore conceivable that individuals with Eastern cultural background are more likely to express their emotional problems through physical symptoms (32).

In general, possible causes for the comorbidity of somatization, anxiety and depression have been summarized (57). As patients with somatization suffer chronically from somatic symptoms and the majority of them have physical disabilities, they develop depression and anxiety. The underlying process behind this could be: (a) neurophysiological dysfunction and dysregulation of autonomic nervous system may cause panic disorder, depression and somatic symptoms; (b) defects of serotonin metabolism that may constitute a common underlying process of somatoform and depressive disorders; and (c) a common familial origin, whether genetic, social or both.

The important relationship that emerged in the proposed model was the significant correlation between alexithymia and somatization, which is in line with the findings of previous studies (19, 20). A significant

association between alexithymia and somatoform disorder symptoms or somatic symptoms has been reported in clinical and nonclinical samples (20). It is assumed that people with alexithymia, because of the problems they face, focus on their bodily sensations, which are associated with emotional arousal, which enhance somatosensory experiences and lead to misinterpretation of bodily sensations as a sign of physical illness (e.g., somatization). Therefore, because of their inability to successfully regulate emotions, it is assumed that these individuals exhibit intensified responses in the autonomic nervous system and neuroendocrine system, thereby providing the conditions for development of physical illnesses (43).

In the presented model, as research literature confirms (e.g., 20, 24, 27, 28), alexithymia showed a significant correlation with anxiety and depression. For example, Eizaguirre *et al.* argued that alexithymia, anxiety and depression are positively correlated in patients with eating disorder (58). A strong association between alexithymia and depression was found in the general population by Honkalampi *et al.* (25). Karukivi *et al.* (23) showed that alexithymia is correlated with anxiety among adolescents. Alexithymia's impact on anxiety is mainly mediated by the inability to identify emotions and to some extent through difficulty in describing emotions (26). People with anxiety sensitivity may suppress their emotions to avoid the unpleasant experience of anxiety-related physical senses (58). On the other hand, some researchers (59) suggest that depression symptoms make patients reluctant to express their feelings for fear of being rejected by others, which may, in turn, increase the patient's capacity to recognize and describe their emotional states (32).

Other studies (24) support the idea that presence of alexithymia would make individuals vulnerable to depression. However, to the best of our knowledge, no research has been done on university students that demonstrated somatization mediating the association of alexithymia with depression and anxiety. The assumed model in the present study was significant and had good fit indices. Alexithymia is a common emotional syndrome in various countries, including a series of fundamental impairments in emotion regulation. These characteristics generally have some genetic basis and have been observed in different populations. Therefore, it is conceivable that alexithymia syndrome has a positive and significant relationship with anxiety and depression (58); results that the present study has revealed. However, some contextual factors, including the culture and ways of representing disorders in different cultural contexts, may interfere with relationship of alexithymia, anxiety and depression. One of the most important variables related to culture is somatization, which has been identified as the most common finding in cultural studies of emotional disorders (32).

Somatization means difficulty in describing emotional states and expressing them physically. This difficulty indicates that there is an impairment in describing and expressing emotional states (60). However, given that, somatization is common in specific populations (non-Western cultures) and is rare in other cultures (61), therefore, our hypothesis was that somatization plays a role in the relationship between alexithymia, anxiety and depression. As seen in the results section, this role has been identified as influencing the severity of the relationship between alexithymia, anxiety and depression. Somatization seems to exacerbate the association between alexithymia, depression and anxiety in non-western cultures.

Limitation

The present study has some limitations. Firstly, the questionnaire was used as the evaluation tool, and since participants' perceptions of the questions may have been distorted and their perceptions of their psychological status may also be distant from reality, it is suggested that other assessment methods be applied to the current topic. The second limitation is the cross-sectional design of the study that prevents causal conclusions. Another limitation is lack of control over probable intrusive variables such as cognitive, personality structures, family and educational patterns that can influence the results. Therefore, longitudinal studies addressing these issues by controlling confounding variables can partially alleviate the current constraint. This study can be conducted on non-student populations to achieve more definite results.

Conclusion

This study showed that somatization mediates the relationship between alexithymia, anxiety and depression. Also, since alexithymia and somatization are both culturally related and include difficulties in describing and expressing emotion, somatization seems to exacerbate the effects of alexithymia on anxiety and depression.

Acknowledgment

We are grateful to all those who contributed to this project. The project was carried out at University of Tabriz. However, the researchers did not receive any financial support for the research, authorship, and publication of this article. All authors have read the final version of the article and have agreed to it.

Conflict of Interest

None.

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