Presenting a Model of Psychological Vulnerability Based on Alexithymia in Multiple Sclerosis Patients: The Mediating Role of Anxious Thoughts

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ABSTRACT

Among the stress-inducing events that impact an individual's psychological well-being, chronic illnesses such as multiple sclerosis (MS) are significant. These patients not only face physical challenges but also encounter numerous psychological issues that further exacerbate their illness and contribute to their psychological vulnerability. The current study aimed to determine the indirect effect of Alexithymia on the psychological vulnerability of MS patients, mediated by anxious thoughts. The study method was descriptive-correlational. The population consisted of members of the MS Society of Tehran in 2022. A total of 312 patients were selected using convenience sampling (n = 312). Data collection tools included the Toronto Alexithymia Scale (Bagby, Parker, & Taylor, 1994), the 25-Item Symptoms Checklist by Nejarian and Davoudi (2001), and the Wells Anxious Thoughts Questionnaire (1994). Data analysis using structural equation modeling indicated that the model of psychological vulnerability based on Alexithymia with the mediating role of anxious thoughts fits well. Also, the effect of Alexithymia on psychological vulnerability ($\beta = 0.371$; $p < 0.001$), the effect of anxious thoughts on psychological vulnerability ($\beta = 0.463$; $p < 0.001$), and the effect of Alexithymia on anxious thoughts ($\beta = 0.367$; $p < 0.001$) were positive and significant. The findings of this study could guide the development of comprehensive therapeutic models for patients with MS and their emotional issues.

Keywords: Psychological Vulnerability, Alexithymia, Anxious Thoughts, Multiple Sclerosis

1. Introduction

Among the stress-inducing events that impact an individual's psychological well-being, chronic illnesses such as multiple sclerosis (MS) are significant.

Individuals with chronic diseases like MS face not only physical challenges but also numerous psychological issues that exacerbate their condition (1) and lead to psychological vulnerability. Stein (2010) defines psychological vulnerability as a pattern or syndrome of psychological or

behavioral manifestations occurring in an individual, reflecting an underlying psychological dysfunction that has significant clinical outcomes, such as disability (e.g., impairment in one or more important areas of functioning) or distress (e.g., a painful symptom) (2). The syndrome of psychological vulnerability could be a predictable response to a general stressor, an absence or a culturally validated response to a specific event, fundamentally stemming from a neuropsychological role (3). Although symptomatic and immune-modifying treatments are currently available for MS, they are not fully controlled by current therapies, and new treatment methods are emerging (4). The uncertainty of treatment outcomes and the progression of disability, as well as the side effects of implemented treatments, significantly prevent the psychological adjustment of MS patients to their condition and impact their mental health (5). Previous studies provide clear evidence that the mental health of MS patients is significantly worse compared to the general population (6). Wood et al. (2013) also showed in their research that anxiety, depression, and fatigue co-occur in individuals with MS (7).

According to many researchers in psychological sciences, stressful events play a significant role in the onset of psychosomatic disorders. Severe emotional stress increases an individual's vulnerability to illness and slows recovery from disease (8, 9). Therefore, the prominent role of emotion regulation and Alexithymia in MS can be highlighted. In recent years, Alexithymia has been recognized as a personality factor that plays a significant role in psychosomatic diseases (10, 11). Studies have also shown a relationship between Alexithymia and various mental disorders including post-traumatic stress disorder (12), panic disorder (13), and depression (14). Concerning the relationship between Alexithymia and psychological vulnerability, Besharat and colleagues showed that Alexithymia is positively and significantly associated with psychological and physical vulnerability in the general population (15, 16). Barghi Irani et al. (2014) indicated that difficulty in describing and recognizing emotions is significantly related to the mental health of MS patients (17). In the study by Aaron et al. (2019), which was conducted on individuals with chronic pain, Alexithymia was significantly associated with pain severity, physical interference, depression, and anxiety (18).

Anxiety is one of the problems that occur in patients with MS. Negative and uncontrollable thoughts in the form of worry are significant features of anxiety (19). Anxious thoughts include negative beliefs about worry that lead to the use of ineffective mind control strategies and play a key role in the development and maintenance of anxiety (20, 21). Studies have shown that MS patients have significantly higher levels of mental disorders such as stress and anxiety compared to healthy individuals (8, 22). One of the most important exacerbating factors of MS is the stress resulting from life events (3). Concerning the relationship between anxious thoughts and psychological vulnerability, Balazadeh et al. (2020) showed that there is a relationship between anxiety sensitivity and psychological vulnerability in patients with asthma (23). In the study by Ranjbari et al. (2017), it was shown that patients with generalized anxiety disorder suffer from high psychological vulnerability, such as intolerance of uncertainty, thereby predicting the triple vulnerability model of emotional disorders (24). Studies have also indicated that there is a relationship between Alexithymia and anxious thoughts; for instance, Abbasi Kamal and Sobhi (2021) showed that as Alexithymia increases, the level of anxiety in individuals with hypertension increases, and thus Alexithymia correlates positively with anxiety in individuals with hypertension (25). The study by Afshari et al. (2013) also showed that there is a significant relationship between Alexithymia, anxiety, and depression in psychosomatic skin patients (26).

As mentioned, MS patients have high psychological vulnerability. The prevalence of depression in these patients ranges from 20 to 50 percent, which is higher than the depression reported in other chronic neurological diseases (27). The meta-analysis showed that the prevalence of depression and anxiety in MS patients was 30.5% and 22.1%, respectively (6). Given the high prevalence of MS and its harmful effects, and the limited research conducted in Iran, understanding the factors predicting psychological vulnerability in these patients can pave the way for practical solutions in this field and create new platforms for optimal interventions and pave the way for follow-up research. Accordingly, the current study raises the question of whether the model of psychological vulnerability based on Alexithymia in patients with multiple sclerosis, mediated by anxious thoughts, fits well.

2. Methods and Materials

2.1. Study Design and Participants

The method of this study was descriptive-correlational. The population included patients who were members of the Multiple Sclerosis Society of Tehran in 2022. Participants were selected based on inclusion criteria such as having been diagnosed with the disease for at least three years, being literate, and being under the age of 50. Exclusion criteria included being in a severe and acute stage of the disease according to the latest evaluation by the attending physician as recorded in the medical file and personal report of the patient, and having personality disorders according to evaluations recorded in the medical file. Using convenience sampling, 312 individuals were selected and responded to the Toronto Alexithymia Scale (28), the 25-Item Symptom Checklist by Nejarian and Davoudi (2001), and the Wells Anxious Thoughts Questionnaire (1994) (19, 29).

2.2. Measures

2.2.1. Psychological Vulnerability

In this study, the 25-Item Symptom Checklist by Nejarian and Davoudi (2001) was used to measure psychological vulnerability. This questionnaire is used for assessing general psychological pathology based on the original form (SCL-90-R) and was derived through exploratory factor analysis. It measures seven subscales: dissociation, somatization, anxiety, depression, interpersonal sensitivity, phobia, and obsessive-compulsiveness. The scoring is on a five-point Likert scale ranging from 1 (none) to 5 (extreme). A total score for general psychological damage is derived, with higher scores indicating greater damage. Construct and content validity were confirmed by the developers. Concurrent validity of the total score showed significant correlations with the Beck Depression Inventory (r = .49) and the Hill Perfectionism Questionnaire (r = .66), and the overall Cronbach's alpha reliability was reported as .78 (29).

2.2.2. Alexithymia

This study used the Toronto Alexithymia Scale to measure Alexithymia. Developed by Bagby and colleagues (1994), it includes 20 questions covering three subscales: difficulty identifying feelings, difficulty describing feelings,

and externally-oriented thinking. Items are scored on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). A total score for overall Alexithymia is calculated from the sum of the three subscale scores. This scale is suitable for use in both general and clinical samples and can be administered individually or in groups. In Bagby et al.'s (1994) research, the scale demonstrated good internal consistency and test-retest reliability, confirming a three-factor structure aligned with the theoretical construct of alexithymia. Cronbach's alpha coefficients for the entire scale were .81, and for the subscales, they were .78 for difficulty identifying feelings, .75 for difficulty describing feelings, and .66 for externally-oriented thinking. Besharat (2007) reported Cronbach's alpha internal consistency in clinical samples for the total scale and subscales as .77, .73, .69, and .65, respectively, using a retest method (15, 16, 25, 28).

2.2.3. Anxious Thoughts

Developed by Wells (1994), this questionnaire is a multidimensional tool assessing worries, measuring anxiety while also indicating metacognitive processes of anxiety. It includes 22 items covering three areas: health worries, social worries, and meta-worries. The first two factors are entirely cognitive in nature and measure cognitive content, while the meta-worry factor encompasses items assessing metacognitive evaluations of self-worry, or "worry about worrying." Items are rated on a four-point Likert scale from 1 (almost never) to 4 (almost always). This questionnaire has a total score. Studies using the Metaworry Questionnaire implicitly confirm its convergent and discriminant validity. For example, Wells and Carter (1999) found that Type 2 worry more effectively predicts pathological worry compared to Type 1 worry and trait anxiety. Additionally, they reported in another study that the meta-worry factor effectively differentiates patients with generalized anxiety disorder from those with social phobia, panic disorder, and normal individuals. Furthermore, individuals with generalized anxiety disorder scored significantly higher on health and social worry factors compared to normal individuals and those with social phobia. In Wells' (1994) study, internal consistency for social worry, health worry, and meta-worry factors was reported as .84, .81, and .75, respectively, with reliability for the social worry factor at

.76, health worry at .84, and meta-worry at .81. This scale was validated in Iran by Feti and colleagues (2010), who reported internal consistency for social worry, health worry, and meta-worry as .85, .74, and .81, respectively. The test-retest reliability was .92, and the split-half reliability was .89 (19, 20, 25).

2.3. Data Analysis

To test the research hypothesis, structural equation modeling was employed using AMOS26 software. Model fit was assessed using indices including the chi-square to degrees of freedom ratio, parsimonious normed fit, comparative fit, parsimonious comparative fit, incremental fit, goodness-of-fit index, and the root mean square error of approximation.

3.   Findings and Results

A total of 312 patients with multiple sclerosis were studied, with an average age of 33.93 years and a standard deviation of 10.03, ranging from 20 to 50 years. Of these, 234 (75%) were female and 78 (25%) were male. The average duration of MS was 8.12 years with a standard deviation of 6.85, ranging from 3 to 35 years. Descriptive statistics including the mean, standard deviation, and correlation coefficients of the study variables are presented in Table 1.

Table 1

Descriptive Findings Including Mean, Standard Deviation, and Correlation Matrix

Variable	Mean	Standard Deviation	Skewness	Kurtosis	1	2
1. Alexithymia	57.57	10.73	0.67	0.85	1	
2. Anxious Thoughts	38.95	12.17	0.66	0.07	0.38**	1
3. Psychological Vulnerability	56.20	16.51	0.57	0.32	0.46**	0.49**

**p<0.01

According to the correlation matrix results, there is a significant positive relationship between all study variables ($p < .05$). Prior to using structural equation modeling, certain assumptions were evaluated as suggested by Kline (30). The assumptions of univariate normality were tested and confirmed through estimates of skewness and kurtosis. As the range of skewness and kurtosis for variables was within ±2, univariate normality was confirmed. Multivariate normality was assessed using Mardia's coefficient of multivariate kurtosis and the critical ratio. According to Blanch (2012), values less than 5 for the critical ratio are considered indicative of no deviation from multivariate normality. In this study, Mardia's coefficient was 4.732, and the critical ratio was 1.168, which are less than 5, thus confirming the assumption of multivariate normality. The presence of multivariate outliers was examined using Mahalanobis distance, and significance levels less than .05 indicated no outlying data were identified. Therefore, the assessment of statistical assumptions showed that structural equation modeling is a suitable method for model fit evaluation, and the maximum likelihood estimation method was used.

Table 2

Fit Indices for the Proposed Structural Model

Index	χ^2	df	p-Value	χ^2/df	RMSEA	PNFI	CFI	PCFI	IFI	GFI	SRMR
Proposed Model	175.303	62	< .001	2.827	.076	.545	.905	.557	.905	.901	.074

The results from Table 2 indicate that the fit indices for the proposed model (PCFI = .557, PNFI = .545, CMIN/DF = 2.827, SRMR = .074) are at acceptable levels.

Table 3

Standardized Path Coefficients for Direct Effects in the Proposed Model

Path	Standard Estimate	Standard Error	Critical Ratio	Significance Level (p)
Alexithymia → Psychological Vulnerability	.371	.095	4.428	< .001
Anxious Thoughts → Psychological Vulnerability	.463	.119	6.309	< .001
Alexithymia → Anxious Thoughts	.367	.092	4.205	< .001

Table 4

Bootstrap Results for Testing Mediating Path

Path	Indirect Effect	Error	Lower Bound	Upper Bound	Significance Level
Alexithymia to Psychological Vulnerability via Anxious Thoughts	.1699	.0405	.1163	.2692	< .001

The bootstrap test results indicate that the indirect effect of Alexithymia on psychological vulnerability through anxious thoughts was .1699, which was statistically significant.

Figure 1

Quality of Life Scores by Group Over Time
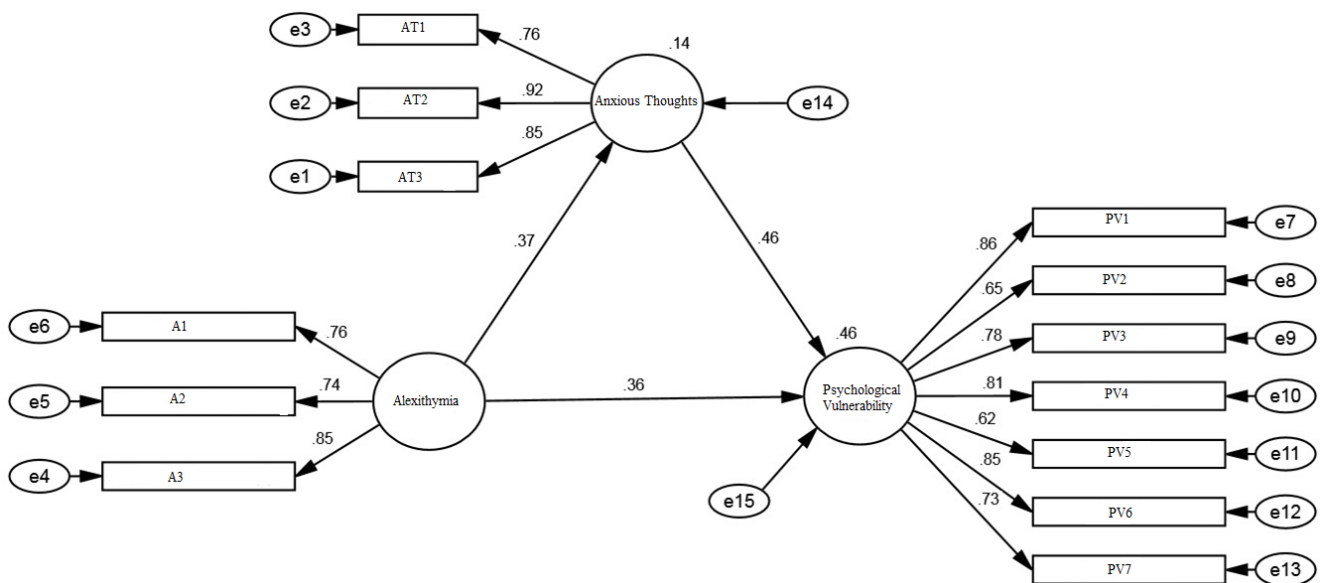
4. Discussion and Conclusion

The present study aimed to determine the indirect effect of Alexithymia on the psychological vulnerability of patients with multiple sclerosis mediated by anxious thoughts. The findings showed that the indirect effect of Alexithymia on psychological vulnerability through anxious thoughts was statistically significant, with a value of 0.1699.

Studies by Besharat et al. (2014), Barghi Irani et al. (2014), and Aaron et al. (2019) are consistent with the findings of the current study (15, 17, 18). The empirical background also points to high levels of stress, anxiety, and depression in these patients, making them the most common psychiatric diagnoses in MS patients compared to the general population. In individuals with Alexithymia, there is a disconnection among the components of the emotional response, which leads to physiological overreactions to emotional stimuli and an inability to regulate emotions, increasing their vulnerability to mental illness. Alexithymia is a risk factor for many mental disorders as individuals with Alexithymia are often under the strain of unexpressed

physical correlates of emotions. This dysregulation hinders emotion regulation and complicates personal adaptation. Theorists believe that individuals with Alexithymia, who are unable to manage their emotions properly in the face of everyday events, are more susceptible to psychological vulnerabilities and, consequently, experience psychological problems. Furthermore, any defect or deficiency in emotion regulation can make an individual vulnerable to psychological issues, including depression and anxiety (13, 26).

The effect of anxious thoughts on psychological vulnerability in the current study aligns with the prior findings (23, 24) showed a relationship between anxiety sensitivity and psychological vulnerability in patients with asthma. Ranjbari et al. (2017) demonstrated that patients with generalized anxiety disorder suffer from high psychological vulnerability, such as intolerance of uncertainty, thus predicting the triple vulnerability model of emotional disorders (24). Anxiety, a warning sign indicating imminent danger, prepares the person to face threats and makes them aware of potential physical harm, pain, helplessness, and failure in meeting social or physical needs. As mentioned, anxiety is prevalent in MS patients. The prolonged duration of treatment and frequent relapses and remissions in MS are considered stress-inducing factors. Patients always hope for recovery and experience increased anxiety, depression, and despair as treatment follow-ups prolong. Moreover, depression and anxiety can intensify feelings of fatigue. At the core of anxiety lies a prominent sense of uncontrollability, especially when individuals face tasks or challenges that may be threatening. For these individuals, failure or the perception of weaknesses signifies a chronic inability to cope with unpredictable and uncontrollable negative events, and this sense of uncontrollability is associated with negative emotions. The frequent relapses and remissions in MS indicate the uncontrollability of the disease in MS patients, causing distress and psychological harm. This perception of low control and unpredictability has a direct impact on psychological vulnerability in MS patients, particularly in increasing the activity of the adrenal-pituitary-hypothalamic axis, which is the pathway for responding to stressful events. Furthermore, this axis involves various brain regions associated with emotional disorders (10, 11).

Regarding the effect of Alexithymia on anxious thoughts, the findings of the present study are consistent with prior findings (25, 26). As shown by Abbasi-Kamal and Sobhi (2021), an increase in Alexithymia raises the anxiety levels in individuals with hypertension, thereby correlating positively with anxiety in patients with hypertension (25). Afshari et al. (2013) also demonstrated a significant relationship between Alexithymia, anxiety, and depression in psychosomatic skin patients. Alexithymia is associated with difficulty in regulating emotions. Emotion or its suppression is a psychological factor that may play a role in the onset or exacerbation of diseases (26). Effective regulation of strong emotions has a significant impact on health, especially in individuals with a history of chronic diseases. On one hand, the use of adaptive strategies for emotion regulation is effective in moderating perceived stresses and prevents chronic diseases, while on the other hand, the use of maladaptive strategies in emotion regulation can lead to the emergence of psychological harms such as depression, anxiety, aggression, and violence, thus affecting the level of perceived stress and reducing the efficiency of the immune system, increasing physical problems and psychological vulnerability in individuals with chronic physical diseases like MS.

The comprehensive findings of this research could guide the creation and development of a comprehensive therapeutic model for patients with MS and their emotional issues. The limitations of the current research included the inability to sample randomly, the use of self-report scales, and the lack of control over personality traits. Therefore, the generalization of results should be approached with caution. Future research should consider these limitations and be conducted on other chronic patients, and the role of variables such as family history and gender should also be examined.

Authors' Contributions

L.S. designed the study, coordinated data collection, and contributed to the analysis and interpretation of the data. M.Z.B., the corresponding author, led the data analysis using structural equation modeling, wrote the manuscript, and was responsible for the critical revision of the manuscript for important intellectual content. A.P. assisted in the development of the research instruments, supported the data collection process, and provided significant contributions to

the literature review and discussion sections. All authors have reviewed and approved the final manuscript for publication.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study placed a high emphasis on ethical considerations. Informed consent obtained from all participants, ensuring they are fully aware of the nature of the study and their role in it. Confidentiality strictly maintained, with data anonymized to protect individual privacy. The study adhered to the ethical guidelines for research with human subjects as outlined in the Declaration of Helsinki.

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