



Investigating the Mediating Role of Mindfulness in Relation to Optimism and Mental Vitality in Women with Autoimmune Disease

Marzieh Karimian¹, Seddiqa Salehi², Mona Norouzi³, Mona Samavati⁴, Leila Rahimi^{5*}

¹ Department of Psychology and Educational Sciences, Yazd University, Yazd, Iran.

² Department of Psychology, Islamic Azad University, Meybod Branch, Yazd, Iran.

³ Department of Psychology, Islamic Azad University, Kermanshah Branch, Kermanshah, Iran.

⁴ Department of Psychology, Islamic Azad University, Kermanshah Branch, Kermanshah, Iran.

⁵ Department of Psychology, Islamic Azad University, Arsanjan Branch, Arsanjan, Iran.

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Abstract

Background: The prevalence of certain autoimmune disorders among women is rising at a faster rate compared to men, potentially affecting the well-being of women globally. This study aimed to explore the moderating influence of mindfulness on optimism and mental energy among women diagnosed with autoimmune conditions.

Methods: Descriptive-correlational and cross-sectional research methods, along with structural equation modeling (SEM), were utilized in this study. The research population consisted of all women with autoimmune diseases in Tehran from May to April 2023. A total of 204 women with autoimmune diseases were selected as the statistical sample using targeted sampling. The research utilized the Trauma Resilience Scale (TRS), Mental Vitality Questionnaire (MVQ), and Five Facet Mindfulness Questionnaire (FFMQ) as measurement tools. Descriptive statistics were analyzed using SPSS version 27 software, while path coefficients were analyzed using SmartPLS version 4 software. Additionally, Sobel's test was employed to determine the significance of the mediator variable. A significant level was set at 0.05.

Results: Based on the findings, optimism had a favorable and noteworthy influence on mental vitality ($\beta=0.399$, $Pvalue<0.001$). Similarly, the variable of optimism also had a favorable and noteworthy impact on accompanying action with awareness, description, no judgment, and view aspects ($Pvalue<0.001$). However, the optimism variable did not exhibit a significant influence on No reaction ($Pvalue=0.134$). Furthermore, a negative and significant correlation ($\beta=-0.065$, $Pvalue=0.007$) was identified between optimism and mental vitality, with the intervening aspect of the no judgment component. Conversely, a positive and meaningful association ($\beta=0.172$, $Pvalue<0.001$) was observed between optimism, and mental vitality, with the involvement of the view component. Nonetheless, the indirect associations between optimism and mental vitality, with the mediating role of No reaction, accompanying action with awareness, and description components, were not statistically significant ($Pvalue>0.05$).

Conclusions: The results of the present study indicated that optimism increases mental vitality and the dimensions of mindfulness, of course, except for lack of reaction. And the mediating variable of mindfulness also has significant effects on optimism and mental vitality.

Keywords: Mindfulness, Optimism, Mental vitality, Autoimmune disease.

*Corresponding to: L Rahimi, Email: L.Rahimi5239@gmail.com

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Introduction

Autoimmune disease is a common disease that affects 5-8% of the population and is four times more common in women. Autoimmune disorders are caused by an immune response against the individual's body due to loss of immune response, also known as immune tolerance, to self-antigens¹. The prevalence of this disease worldwide is estimated at 4.5%, and 80% of patients with this disease are women. Female predominance in autoimmunity is more evident between puberty and menopause, suggesting that different levels of sex hormones during reproductive years play a role in the development of autoimmune disease². Currently, more than erythematous diseases have been identified, such as systemic lupus erythematosus, type 1 diabetes, rheumatoid arthritis, Sjogren's syndrome, multiple sclerosis, Graves' disease, inflammatory bowel disease, systemic scleroderma, psoriasis, etc.³. In a study, some autoimmune diseases are associated with an increased risk of cardiovascular diseases⁴.

Autoimmune diseases are commonly linked to metabolic changes characterized by inflammatory processes and oxidative stress⁵. Patients with autoimmune diseases who experience stress exhibit decreased levels of optimism⁶. Optimism plays a crucial role in coping with various life events, and higher levels of optimism are associated with improved physical health, positive emotions, reduced psychological stress, major career success, and better social relationships⁷. Optimism refers to generalized positive outcomes despite uncertainties⁸. Optimists have the tendency to predict positive future performance based on their firm beliefs or overestimations⁹. A study demonstrated that stress related to multiple sclerosis (MS) disability inversely affects optimism, mental health, and life satisfaction, whereas optimism positively influences mental health and life satisfaction⁶. Furthermore, another study revealed that optimism has a direct and indirect positive impact on mental vitality¹⁰.

In addition, the mental well-being of patients can be negatively impacted by hospitalization and the prospect of disability and death. When we mention vitality, we are

referring to the state of being strong and active, and it is often associated with mental energy, a sense of purpose, and self-confidence¹¹. This subjective feeling of energy and vitality, which emphasizes psychological aspects, is what we define as vitality. Feeling vital is crucial for maintaining good psychological functioning, the ability to regulate oneself, work performance, and achieving personal goals¹². A study revealed that a healthy lifestyle, self-esteem, and mental vitality are directly and significantly related¹³. The research findings also indicated that gender differences exist among individuals with diabetes, with women generally exhibiting lower mental vitality, lower educational attainment, lower perception of health, higher rates of depression, and poorer physical performance overall¹⁴.

Programs based on mindfulness are effective in improving mood and quality of life while also reducing anxiety, depression, and mental distress, thereby enhancing well-being¹⁵. Mindfulness is defined as a cognitive ability that involves being morally aware and focused on the present moment, which can disrupt normal behavior and provide a solid framework for personal growth¹⁶. Originating from Buddhism, mindfulness involves observing one's feelings,

emotions, and thoughts with a non-judgmental and accepting attitude¹⁵. A study discovered that mindfulness has the intriguing effect of enhancing the positive correlation between trust and optimism¹⁷. Furthermore, research findings indicate that mindfulness has a beneficial impact on mental vitality¹⁸.

Autoimmune diseases are significant social and medical challenges that impact numerous individuals, diminishing their quality of life and potentially shortening their lifespan. Despite the advancement in biological treatments, there is still no cure for these diseases, and they only provide temporary relief from symptoms. Therefore, it is crucial to give special attention to patients with autoimmune diseases and their specific issues. Despite the importance of this matter, no previous research has examined the role of mindfulness as a mediator between optimism, mental vitality, and women with autoimmune diseases. As a result, there is a research gap in this area, and this study aims to investigate the relationship between optimism, mental vitality, and mindfulness in women with autoimmune diseases. Afterward, the conceptual model of the study was demonstrated by the researcher through Figure 1.

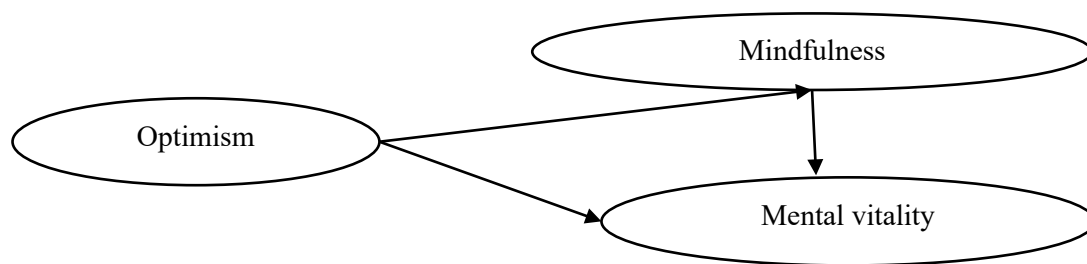


Figure 1. Conceptual framework of the research

Materials and Methods

This research is part of descriptive-correlational research, and the cross-sectional research method and structural equation modeling (SEM) was used. The statistical population of this research included all women with autoimmune disease in Tehran between May and April 2023 a specialist doctor confirmed the existence of autoimmune disease in the hospitals of the research site. The statistical sample included 204 women with autoimmune diseases who were selected among the patients through targeted sampling. The adequacy of the sample size was determined using Cohen's formula in 2013¹⁹. This calculation was performed to identify the appropriate sample size for the study, considering the research variables and the use of structural equation modeling. In this research, the assumed effect size is equal to 0.3, the Desired statistical power level is equal to 0.8, the number of latent variables is equal to 3, the number of observed variables is equal to 52 cases, and the Probability level is equal to 0.01 were considered. According to Loehlin and Beaujean, 250-350 participants are enough to test the proposed model and research

hypotheses¹⁹. Therefore, the researcher chose a sample size of 250 people. The criteria for entering the study included having a medical record in autoimmune disease, informed consent to participate in the research, and having enough literacy and understanding to answer the questions. The criteria for withdrawing from the study were having any physical disorder that prevented answering, failure to answer more than ten items in the questionnaires, caused withdrawal from the study.

The investigation was conducted systematically. Initially, the researcher obtained the necessary authorization from their university to carry out the study. Subsequently, the researcher visited two undisclosed government hospitals in Tehran. The researcher then collaborated with the hospitals' management departments to proceed with the study. In addition, the researcher communicated with the hospital's admissions department, providing them with a message that outlined the research objectives and requested their cooperation. Furthermore, comprehensive information, including the research goals, permits, and ethical guidelines, was shared to ensure transparency. The women participating in the research

were assured that their details would not be included in any research documents and that they had the option to withdraw from the study at any time. The participants were thoroughly instructed on how to complete the questionnaires and were given the choice to do so either online or in person. Due to limitations in participant cooperation, the entire research process, including questionnaire completion, lasted approximately four months. Out of the 250 questionnaires distributed, only 204 were considered for analysis, as 46 were either incomplete or intentionally filled out with mistakes. The participants provided self-reported data on mindfulness, optimism, and mental vitality through online and in-person methods. Throughout the study, all ethical considerations were strictly adhered to, and participants were free to withdraw from the study whenever they wished.

Trauma Resilience Scale (TRS): Madsen developed the resilience against injury scale in 2010, which includes the optimism self-report questionnaire, to assess levels of resilience and optimism²⁰. This scale covers various factors such as self-esteem, self-regulation, problem-solving, belief structure, family support, supportive peer relationships, academic performance, community participation, and neighborhood support. Six questions regarding optimism were used in this study, with scoring done on a Likert scale ranging from 0 to 6. The scores obtained through this scale reflect the individual's level of optimism, with higher scores indicating greater optimism. The total score can range from 0 to 36. The validity of the subscales was assessed in Iran using the method of calculating the total correlation between each subscale question and a general question. Significant correlation values were obtained for self-esteem, optimism, supportive relationships, family support, and supported academic performance²¹. The researcher also obtained a Cronbach's alpha coefficient of 0.71 for the optimism component of this scale.

Mental Vitality Questionnaire (Deci and Ryan, 1977): Deci and Ryan developed a self-report questionnaire in 1977 to assess mental vitality²². The questionnaire consists of 7 items, where the subject selects one of five options to indicate their level of mental vitality, ranging from total disagreement to complete agreement. The scores obtained from this scale reflect the individual's mental vitality, with a higher score indicating greater mental vitality. The range of scores on this scale is between 7 and 35. In a survey conducted in Iran, the Cronbach's alpha coefficient for this scale was 0.79²³. Additionally, in this study, the researcher determined Cronbach's alpha coefficient for the optimism component of the scale to be 0.83.

Five Facet Mindfulness Questionnaire (FFMQ): Bauer et al. developed a self-report questionnaire in 2006 to assess mindfulness in individuals²⁴. The questionnaire consists of 39 items, each offering five response options ranging from never to always. It includes five components: observation, description, accompanying action with awareness, non-judgment, and non-reaction. Each component's score is determined by adding up the scores of its respective questions, with a range of 8 to 40 for all components except the last, which ranges from 7 to 35. In Iran, the Cronbach's alpha coefficient for this scale was found to be 0.84²⁵. The researcher

in this study obtained Cronbach's alpha coefficients of 0.72, 0.84, 0.74, 0.85, and 0.92 for the View, Description, Accompanying action with awareness, No judgment, and No reaction components, respectively.

To conduct descriptive statistics, the researchers utilized SPSS version 27 software. Data were analyzed using SmartPLS version 4 software. Sobel's test was employed to assess the significance of the mediator variable. The normality of the distribution of the research variables was examined using the Kolmogorov-Smirnov test. Given the significant results of this test, the research variables did not follow a normal distribution. Thus, SmartPLS was used. The sample size for the structural equation model using the partial least squares method consisted of 204 individuals. A significance level of 0.05 was considered.

Results

At first, the researcher examined the descriptive statistics of the research variables. Women with autoimmune diseases (204 people), in terms of age, were divided into three groups: 20 to 30 years old (56.4%), 31 to 40 years old (26.5%), and 40 years and older (17.2%), were divided. Table 1 shows the mean and standard deviation of the research variables.

Based on Table 2, mental vitality showed a favorable and significant correlation with optimism. Similarly, mental vitality displayed a positive association with various aspects of mindfulness, such as perspective and explanation, being conscious during actions, and avoiding judgment and reactions ($P\text{value} < 0.05$). Following the model analysis, the researcher examined the Path coefficients and the significance level of the variables in Table 3.

Table 3 and Figure 2 reveal that the impact of optimism on mental vitality is positive and statistically significant ($\beta = 0.399$, $P\text{value} < 0.001$). Similarly, the presence of optimism has a positive and significant effect on accompanying action, awareness description, no judgment, and view dimensions ($P\text{value} < 0.001$). However, optimism does not have a significant effect on No reaction ($P\text{value} = 0.134$). Subsequently, the researcher employed the bootstrap method with a value of 5000 to explore the indirect influence of optimism on the variable dimensions of mindfulness.

According to the results from the bootstrap findings provided in Table 4, it can be observed that the link between optimism on mental vitality and the mediating factor of the No judgment component was both negative and significant ($\beta = -0.065$, $P\text{value} = 0.007$). Nonetheless, when analyzing the path coefficient, this association is moderately weak. Conversely, the path connecting optimism on mental vitality and the mediating factor in the view component was both positive and significant ($\beta = 0.172$, $P\text{value} < 0.001$). Conversely, the indirect route connecting optimism on mental vitality and the mediating factors of No reaction, accompanying action with awareness, and description did not demonstrate significance ($P\text{value} > 0.05$). To determine the significance of the research's mediating variable, the researcher employed the Sobel test, which was calculated according to the provided formula (Eq. 1).

$$Z\text{-value} = a \cdot b / \sqrt{b^2 \cdot sa^2 + a^2 \cdot sb^2} \quad (\text{Eq. 1})$$

If the Z value is more than 1.96 in the Sobel test, it can be determined that the mediating effect of a variable is statistically significant at a confidence level of 95%. The Z value for the mediator component "No judgment" between the variables optimism and mental vitality was -2.8231. Based on the results of the Sobel test, it can be inferred that the mediating variable in the study is significant. Similarly, the Z value for the mediator component "view" between optimism and mental vitality variables was 4.5314. According to the results of the Sobel test, it can be concluded that the mediating variable in the research is significant.

Table 5 demonstrates the confirmation of the model's reliability and validity. The variables have a Cronbach's alpha

reliability score exceeding 0.7. Additionally, the combined reliability of these variables also surpasses 0.7. The model's validity was assessed using the average variance extracted index, which yielded values higher than 0.5 for the research variables. Thus, it can be inferred that the model's validity has been established. Furthermore, the researcher evaluated the model's fit, confirming all fit indices. The SRMR, or Standardized Root Mean Square Residual Index, represents the disparity between the observed correlation and the correlation matrix of the structural model. Here, the model's SRMR value was calculated as 0.301. Consequently, the model's fit was validated.

Table 1. Description of the main research variables

Variables	Mean±SD	Max	Min	N	Skewness	Kurtosis
Optimism	25.02±5.457	32	10	204	-0.686	-0.692
Mental vitality	23.45±6.241	33	15	204	-0.041	-1.622
View	27.14±5.047	36	20	204	0.049	-1.324
Description	26.49±5.713	36	20	204	0.508	-1.217
Accompanying action with awareness	27.91±6.199	36	20	204	-0.097	-1.544
No judgment	26.00±4.526	36	20	204	0.137	-1.328
No reaction	24.54±4.059	32	20	204	0.455	-1.437

Table 2. Correlation matrix between variables

Variables	1	2	3	4	5	6	7
Optimism	-						
Mental vitality	0.633	-					
View	0.386	0.646	-				
Description	0.471	0.619	0.820	-			
Accompanying action with awareness	0.535	0.672	0.740	0.762	-		
No judgment	0.312	0.404	0.731	0.704	0.603	-	
No reaction	0.106	0.319	0.350	0.423	0.384	0.284	-

Table 3. Standard research coefficients

Result of the hypothesis	Path coefficient	STDEV	Pvalue	T-value	Result
Optimism -> Mental vitality	0.399	0.059	<0.001	6.727	confirmation
Optimism -> Accompanying action with awareness	0.535	0.053	<0.001	10.100	confirmation
Optimism -> Description	0.471	0.048	<0.001	9.860	confirmation
Optimism -> No judgment	0.312	0.059	<0.001	5.265	confirmation
Optimism -> No reaction	0.106	0.070	0.134	1.500	rejection
Optimism -> View	0.386	0.056	<0.001	6.953	confirmation
Accompanying action with awareness-> Mental vitality	0.207	0.108	0.054	1.929	rejection
description -> Mental vitality	0.014	0.082	0.868	0.166	rejection
No judgment -> Mental vitality	-0.207	0.062	0.001	3.327	confirmation
No reaction-> Mental vitality	0.095	0.045	0.034	2.117	confirmation
View -> Mental vitality	0.445	0.074	<0.001	6.012	confirmation

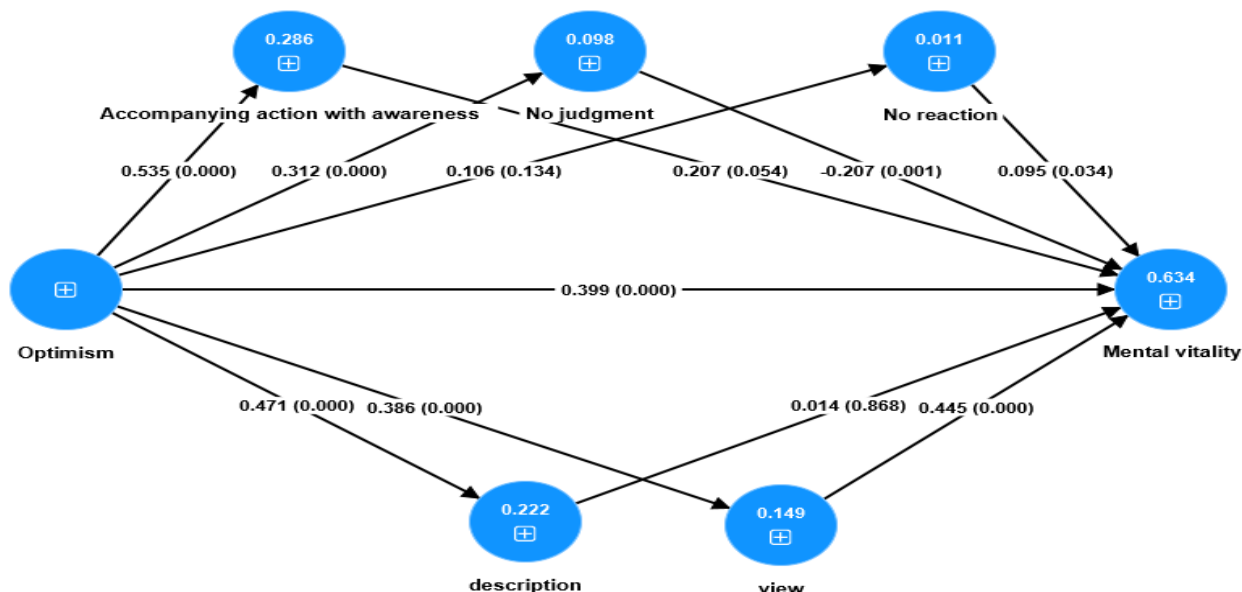


Figure 2. Path coefficients between variables and significance level

Table 4. Indirect effects between research variables

Path to variables	Path coefficient	STDEV	Pvalue	T-value
Optimism -> No judgment -> Mental vitality	-0.065	0.024	0.007	2.722
Optimism -> View -> Mental vitality	0.172	0.037	0.000	4.626
Optimism -> No reaction -> Mental vitality	0.010	0.009	0.272	1.098
Optimism -> Accompanying action with awareness -> Mental vitality	0.111	0.057	0.052	1.944
Optimism -> Description -> Mental vitality	0.006	0.039	0.869	0.164

Table 5. Reliability and validity of the model

Variables	Cronbach's alpha	Composite reliability	AVE
Optimism	0.71	0.75	0.67
Mental vitality	0.83	0.85	0.54
View	0.72	0.76	0.55
Description	0.84	0.87	0.53
Accompanying action with awareness	0.74	0.76	0.52
No judgment	0.85	0.90	0.53
No reaction	0.92	0.95	0.64

Discussion

This research aimed to explore how mindfulness affects optimism and mental energy in women with autoimmune diseases. The findings revealed that optimism has a strong and positive impact on mental energy. Additionally, optimism is also positively associated with being aware, describing experiences, having non-judgmental thoughts, and observing situations. However, it does not significantly impact non-reaction. Furthermore, the mediating factor in this study was found to be significant.

The results of the current investigation indicate that having a positive outlook boosts one's mental energy, aligning with earlier research^{10,26}. One study explicitly stated that optimism has both a direct and indirect impact on one's mental energy¹⁰. Moreover, a separate investigation unveiled that optimism influences bullying, the quality of social connections, and one's mental energy²⁶. Furthermore, there hasn't been any specific study that directly explores the impact of optimism on mindfulness, despite existing research highlighting the favorable influence of optimism on various aspects of mindfulness, such as awareness, description, non-judgment, and observation. However, overall, research suggests that

optimism can have a positive effect on enhancing overall health. For instance, one study found that optimism and mindfulness contribute to better internal health control and decreased reliance on external factors in women²⁷. Similarly, another study discovered that high scores in mindfulness, optimism, and adaptability can diminish the sense of fear towards illness and lessen the occurrence of depression, stress, and anxiety²⁸.

To clarify this discovery, remarkably, note that optimism refers to the belief that one's efforts will yield positive and desirable outcomes. Additionally, optimism serves as a significant predictor of improved goal performance and accomplishment. For instance, individuals with an optimistic mindset exhibit superior coping mechanisms, increased adaptability, and persistent behavior when pursuing objectives. Because optimists anticipate future success, they are better able to allocate cognitive resources toward a task. Likewise, a positive focus on engaging in activities can enhance attention. In mindfulness, the act of attentively and consciously experiencing the present moment is often viewed as an effective self-regulation tool. Mindfulness encourages concentrated awareness towards both external stimuli (such as visual and physical sensations) and internal stimuli (such as thoughts and emotions)²⁹. This practice involves observing disruptive thoughts and affections without personal judgment. By transforming pessimistic thoughts into optimistic ones and actively engaging with problem-solving emotions, individuals can effectively navigate cognitive, social, and emotional challenges while resolving problems more efficiently³⁰.

Furthermore, concerning the importance of mindfulness as a mediating factor for optimism and vitality, the findings of this research align with previous studies^{18-17,30}. According to one study, mindfulness enhances the positive association between trust and optimism¹⁷. Additionally, research has shown that mindfulness positively impacts mental vitality [18]. Moreover, a separate study revealed that mindfulness yields several advantageous outcomes, such as reducing burnout and enhancing optimism³⁰.

This finding can be explained by stating that mindfulness refers to the ability to observe one's emotions, thoughts, and feelings without judgment and with acceptance. Mindfulness has been found to have a positive impact on mental health by reducing anxiety, depression, and mental distress while improving overall well-being¹⁵. It can be compared to a microscope that allows us to see the deepest patterns of the mind. When we observe our thoughts, they naturally fade away, and by simply observing without interference, we create space for the thoughts to settle. This process helps calm a troubled mind, not by suppressing thoughts but by allowing them to exist as they are, even if only for a moment. Therefore, achieving a sense of peace through mindfulness can significantly alleviate the pain and discomfort experienced by individuals, leading to increased optimism and mental vitality¹⁸.

The existing study had certain limitations. For instance, it proved challenging to administer multiple questionnaires to patients dealing with autoimmune diseases, leading to a lack of

cooperation from some individuals. Additionally, the study was hampered by a scarcity of questionnaires related to optimism, mental vitality, and coping strategies, as well as a limited number of research studies analyzing these questionnaires. Another limitation involved the exclusion of social, economic, and cultural variables within the sample, which could potentially impact levels of optimism and mental vitality. To address these limitations, it is recommended that future research incorporate the mentioned factors. Furthermore, individual differences and the influence of individuals' mental states on questionnaire responses were uncontrollable factors in the study. However, the researcher made efforts to partially mitigate this issue by providing a calm environment, establishing trust, and excluding individuals displaying evident anxiety or stress. Moreover, since the study exclusively focused on female patients with autoimmune diseases, the findings may not apply to different genders or other diseases. To enhance generalizability, future studies should encompass male patients with autoimmune diseases and should be conducted in various provinces, regions, and societies with diverse cultures.

The findings indicated that having a positive attitude contributes positively to mental energy and elements of mindfulness, apart from immediate responses. Moreover, mindfulness plays a significant role in influencing optimism and mental energy. Optimistic individuals, who tend to have favorable expectations for the future, may be more likely to seek out the necessary resources to cope with stressors. This aspect could be particularly advantageous for women suffering from autoimmune conditions. Furthermore, patients dealing with autoimmune diseases often undergo various changes that can hinder their ability to adapt and maintain mental well-being. However, by promoting present-moment awareness, non-judgmental observations, and reducing habitual actions, mindfulness can alleviate distressing emotions and sensations, ultimately helping patients regain vitality. As a suggestion for future research, it may be beneficial to organize educational workshops focusing on optimism and mental energy for women with autoimmune diseases. Such workshops could enhance their ability to effectively manage challenges and illnesses.

Ethical Considerations

The ethical standards of the institutional and/or national research committee under the code IR.IAU.YAZD.REC.1402.122 were followed for all procedures carried out in research involving human participants.

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Conflict of Interest

The authors declared no conflict of interest.

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