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Effectiveness of an Integrative Educational Package Based on Motivational Interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy on Alexithymia and Quality of Life in Women with Multiple Sclerosis

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ABSTRACT

Objective: The present study aimed to design an educational package based on Motivational Interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy and evaluate its effectiveness on alexithymia and quality of life in patients with Multiple Sclerosis (MS) in Tehran.

Method: This study employed a quasi-experimental design with a control group and pre-test, post-test, and follow-up assessments. Forty women with MS, who visited the MS Association in Tehran Province from October to February 2021, were selected based on research criteria through purposive sampling and were randomly assigned to two groups (using a random number table). After random assignment, one of the groups was randomly designated as the experimental group, receiving the researcher-developed integrative treatment package, and the other as the control group (n=20). The data collection tools included a demographic information questionnaire, the Toronto Alexithymia Scale (Bagby, Taylor, & Parker, 1994), and the Multiple Sclerosis Quality of Life-54 Instrument (Ware et al., 1988). Data were collected at three stages: baseline, post-intervention, and three-month follow-up. The research hypotheses were analyzed using repeated measures ANOVA and Bonferroni post hoc tests.

Findings: The results of this study indicated that the educational package based on Motivational Interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy significantly improved alexithymia ($F=24.31$, $P<0.001$) and quality of life ($F=22.67$, $P<0.001$) in women with MS.

Conclusion: It can be concluded that the educational package based on Motivational Interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy is effective in improving alexithymia and quality of life in women with MS.

Keywords: *Motivational Interviewing, Acceptance and Commitment Therapy, Compassion-Focused Therapy, Multiple Sclerosis, Quality of Life, Alexithymia*

1. Introduction

Chronic disease is a long-term illness that causes physical changes in the body and limits the patient's functions (Babaei et al., 2024; Rahmani, 2020; Salma et al., 2022; Wang et al., 2023). Chronic diseases are often difficult to cure, with lengthy treatment periods and challenging recovery phases; in some cases, they are incurable, with no definitive and specific treatment. Multiple Sclerosis (MS) is one type of chronic disease (Fahy, 2024; Farhadi & Pasandideh, 2017; Marsool et al., 2024). The general hypothesis about the onset of this disease is that a damaged immune system fails to distinguish between viral proteins and the body's own myelin, producing antibodies that attack the body. In other words, the body becomes sensitive to itself, a condition known as autoimmunity (Sandesjö et al., 2024; Schlindwein et al., 2024). Multiple Sclerosis is one of the leading causes of neurological disability in young adults, second only to traumatic injury. The disease usually appears when patients are between 20 and 30 years old, a time when they are starting their careers and families (Minden et al., 1987; Vaheb, 2024).

Multiple Sclerosis presents with a range of symptoms, including widespread musculoskeletal pain, multiple and unstable tender points, sleep disturbances, fatigue, prolonged muscle spasms, limb weakness, muscle rigidity, swallowing and bowel/bladder dysfunction, sleep disorders, headaches, cognitive and mood disturbances such as short-term memory deficits and reduced concentration, depression, anxiety, and morning joint stiffness (Tahmasebi et al., 2021; Tremlett et al., 2021).

Alexithymia refers to an individual's limited ability to understand, process, or describe their own emotions (Dubé et al., 2024; Mahmoodiasl et al., 2024) and comprises four main factors: difficulty identifying emotions and distinguishing them from bodily and emotional arousal, difficulty describing emotions to others, limited imaginative processes accompanied by reduced fantasy, and an externally oriented cognitive style (Mohamadpoor et al., 2015). Alexithymia is observed in many psychosomatic patients. These patients often do not report alexithymia as a primary complaint when visiting a physician; instead, they express their difficulties through physical symptoms and tend to describe environmental events rather than articulating their emotions (Nemiah, 2010; Renzi et al., 2020; Taliei & Moataghedi Fard, 2024).

Alexithymia exacerbates an individual's vulnerability to physical illnesses. The theory that difficulties in emotional and cognitive processing increase susceptibility to illness aligns with the principles of psychosomatic medicine. Alexithymia is associated with overall health indicators and physical health issues such as essential hypertension, pain dimensions, and physical discomfort (Dubey et al., 2010). Since alexithymia reflects a deficit in the cognitive processing of emotions, it may predispose individuals to psychological and physical symptoms, thereby reducing health-related quality of life in these patients (Capet et al., 2021). Alexithymia is a risk factor for experiencing psychological reactions such as anxiety and depression, which may trigger, exacerbate, and perpetuate the symptoms of Multiple Sclerosis in patients (Capet et al., 2021; Javadi et al., 2021; Van Assche et al., 2021).

A large number of MS patients referred to neurology specialists in treatment centers exhibit a high prevalence of psychiatric disorders. This issue, along with the lack of a specific physiopathology, has led some researchers to consider psychological origins for this disease (Seekis et al., 2017). Psychological factors, including patients' beliefs, expectations, and positive feedback about the disease, are significant determinants of their subsequent responses to the illness. Therefore, designing and implementing therapeutic interventions to reduce emotional disorders in these patients is essential. This disease impacts patients' health-related quality of life, generally leading to a lower quality of life and resulting in depression (Javadi et al., 2021; Laurson-Doube et al., 2021; Lin et al., 2021; Shams et al., 2021; Tremlett et al., 2021). There is substantial evidence supporting the effectiveness of third-wave psychological therapies for a variety of disorders. Acceptance-based therapies, such as Mindfulness-Based Stress Reduction (MBSR) and Acceptance and Commitment Therapy (ACT), and self-compassion-focused therapy are effective for many psychological and physical conditions (Javadi et al., 2021). These approaches aim to reduce the restrictive role of awareness and mitigate the distressing emotional and behavioral effects of psychological experiences (Baer & Krietemeyer, 2006).

Mindfulness-based interventions are considered part of the third-wave or third-generation cognitive-behavioral therapies. Mindfulness is a form of meditation rooted in Eastern religious and spiritual practices, particularly Buddhism. Linehan (1993) emphasized the necessity of incorporating mindfulness as a core component of

psychological treatments. Mindfulness involves cultivating three qualities: nonjudgment, intentional awareness, and present-moment focus, which lead to the comprehensive processing of immediate experiences, including cognitive, physiological, or behavioral activities. Through mindfulness practices and techniques, individuals develop awareness of their daily activities, recognize the automatic functioning of the mind in the past and future, and achieve moment-to-moment awareness of their thoughts, emotions, and physical states, gaining control over them and breaking free from habitual, past- or future-focused mental patterns (Segal et al., 2002). Although little attention has been paid to the mechanisms underlying mindfulness, it appears to influence two cognitive processes: attention regulation and adopting a non-reactive and accepting attitude (Bishop et al., 2007). In mindfulness, individuals become aware of their mental modes in the moment and learn to shift from a "doing" mode to a "being" mode, which involves training specific behavioral, cognitive, and metacognitive strategies to focus attention. Mindfulness-based therapies, addressing both physical and mental dimensions, have been reported to be effective for treating some clinical and physical disorders (Segal et al., 2002).

Third-wave therapies are behavioral interventions grounded in self-focused attention. Practices involve focusing on thoughts, emotions, and perceptions, often achieved through breath awareness in all daily activities (Bishop et al., 2007). Among psychological therapies, various models have been designed and studied for Multiple Sclerosis, forming the basis of the present study. This study aimed to design an educational package based on Motivational Interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy and evaluate its effectiveness on alexithymia and quality of life in patients with Multiple Sclerosis. The present research sought to answer the following questions:

Is the educational package based on Motivational Interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy effective in reducing alexithymia and improving quality of life in patients with Multiple Sclerosis at the post-test stage?

Is the effectiveness of the educational package based on Motivational Interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy on alexithymia and quality of life in patients with Multiple Sclerosis sustained at the follow-up stage?

2. Methods and Materials

2.1. Study Design and Participants

The present study was a quasi-experimental research employing a pre-test, post-test design with a control group. The statistical population consisted of all women with Multiple Sclerosis (MS) covered by the MS Patients Association in Tehran, who visited the association from October to February in 2021. The sample size was calculated as 20 participants per group. The inclusion and exclusion criteria for this study were: age range of 30-55 years, diagnosed with relapsing-remitting MS, education level above junior high school, no history of neurological or psychiatric disorders or hospitalizations, no substance abuse, ability to participate in group therapy sessions, and willingness to cooperate. The exclusion criteria for the experimental group included missing more than two intervention sessions and unwillingness to continue attending the intervention sessions.

After receiving approval from the ethics committee and obtaining written permission from the Islamic Azad University, Tonekabon Branch, the researcher visited the MS Association in Tehran. After introducing themselves to the relevant authorities, the researcher explained the study's objectives and procedures. Upon obtaining approval from the association's president and officials, the sampling process began. A clinical interview and initial assessment were conducted with MS patients, and 60 participants who met the inclusion criteria were recruited after providing informed consent. The research sample was selected purposefully and randomly assigned to an experimental group and a control group (using a random number table). To maintain the principle of randomization, one of the groups was randomly designated as the intervention group (receiving the integrative package), while the control group received only standard medical treatment.

All participants completed the demographic information questionnaire, the Quality of Life Questionnaire, and the Toronto Alexithymia Scale. The experimental group received the specified intervention. Three months after the intervention, a follow-up session was conducted to evaluate the overall effectiveness of the intervention. Ethically, there was no interaction between the experimental and control groups during the study. The control group continued their usual medical treatment under the supervision of a specialist physician, with no interference from the researcher. At the end of the study, the educational content provided to the experimental group was shared with the control group in the form of an educational package.

2.2. Measures

2.2.1. Alexithymia

The original 20-item Toronto Alexithymia Scale (TAS-20) was developed by Taylor, Ryan, and Bagby in 1985 and revised in 1994 by Bagby, Taylor, and Parker. Bagby et al. (1996) identified that the TAS-20 has a three-factor structure consistent with the alexithymia construct. The scale includes three subscales: Difficulty Identifying Feelings (7 items), Difficulty Describing Feelings (5 items), and Externally Oriented Thinking (8 items). Scoring is based on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). A total score is obtained by summing the scores of all 20 items. The validity of the TAS-20 has been confirmed by its developers. Bagby et al. (1994) reported a Cronbach's alpha coefficient of 0.87, indicating acceptable internal consistency. In a study by Besharat (2008), the Cronbach's alpha reliability coefficients were 0.75 for the total scale, 0.72 for Difficulty Identifying Feelings, 0.72 for Difficulty Describing Feelings, and 0.69 for Externally Oriented Thinking (Javadi et al., 2021; Mohamadpoor et al., 2015).

2.2.2. Quality of Life

This questionnaire was developed by Ware et al. (1988) to comprehensively measure quality of life in health-related matters. It assesses eight dimensions of quality of life using 36 items, which can be self-administered or completed via interview, applicable to various age groups and illnesses. Ware et al. (1988) confirmed the reliability and validity of this questionnaire. It assesses individuals' perceptions of their quality of life across eight dimensions, with scores ranging from 0 to 100. A score of 100 indicates optimal status, while a score of 0 reflects the worst possible status in each dimension. The dimensions include physical functioning, role limitations due to physical problems, bodily pain, vitality, general health, mental health, role limitations due to emotional problems, and social functioning. The questionnaire has demonstrated international reliability and validity, and it was translated and validated in Iran by the Health Sciences Research Institute of the Academic Center for Education, Culture, and Research. Cronbach's alpha coefficients for reliability ranged from 0.77 to 0.95 across all dimensions, except for vitality, which was 0.65 (Mohamadpoor et al., 2015; Rahmani, 2020).

2.3. Intervention

2.3.1. Combined Program

The motivational interviewing, Acceptance and Commitment Therapy, and Compassion-Focused Therapy protocol (researcher-developed) was delivered as an eight-week online program with sessions lasting 2 to 2.5 hours each.

Session 1: Introduction, acceptance of participants, setting session goals, and outlining the group rules and overall structure. Discussion on MS, the role of family in managing MS, and the physical, psychological, and social impacts of the disease. Explanation of the importance of quality of life in managing MS and the role of positive psychological factors. Introduction to Compassion-Focused Therapy and modern psychological approaches for MS treatment. Familiarization with self-compassion and meditation exercises, with assignments given for the next session.

Session 2: Review of feedback and previous session content. Understanding the role of goals, values, and spirituality in supporting life domains. Defining life philosophy and performing goal-setting exercises. Identifying positive and negative emotions, recording positive events, and practicing mindfulness in daily activities, such as mindful eating for better health management. Explanation of meditation practices, with assignments for the next session.

Session 3: Body scan exercise and practicing mindfulness in daily activities. Engaging in a ten-minute breathing-focused mindfulness practice. Compassionate approaches to thoughts and feelings, with techniques to foster hope and understanding the quality of life activities for MS patients. Developing a compassionate understanding of fears, threats, and safety-seeking strategies (e.g., de-shaming). Explanation of mindfulness models, with meditation assignments for the next session.

Session 4: Practicing compassionate awareness and forming non-judgmental relationships with thoughts, feelings, and behaviors. Engaging in "seeing and hearing" meditation, seated meditation (mindfulness of breath and body), and mindful walking. Practicing a three-minute breathing space and recording distressing events while planning value-driven activities. Introducing cognitive behavioral techniques for attitude change and discussing high-risk behaviors. Review of previous content and explanation of meditation assignments for the next session.

Session 5: Feedback review and discussion on optimism principles. Learning about kindness with friends, solitude, calming breathing, and principles of forgiveness and letting go. Writing a self-compassionate letter and techniques for developing effective empathic relationships. Assignments include compassion-based meditation practices for the next session.

Session 6: Reviewing the previous session and teaching essential compassion principles, such as a balanced lifestyle and seeking peace. Seated meditation with awareness of breath, body, and thoughts. Learning to observe and accept unpleasant emotions and thoughts without judgment. Discussing the concept that “thoughts are not facts” and exploring breathing relaxation techniques and social support. Teaching self-expression and self-forgiveness, with meditation assignments for the next session.

Session 7: Practicing a three-minute regular and coping breath. Seated meditation focusing on awareness of breath, body, sounds, and thoughts. Understanding the link between activities and mood and creating a list of enjoyable and mastery-giving activities. Explanation of meditation exercises, with assignments for the next session.

Session 8: Performing a three-minute breathing space and body scan exercise. Reviewing the entire course and discussing strategies to maintain progress. Participants

choose a home practice plan to continue over the next month and discuss the benefits and potential challenges of maintaining practice. Completing final questionnaires, reviewing meditation techniques, and concluding the sessions.

2.4. Data Analysis

Descriptive statistics were calculated for each research variable. Inferential statistics involved repeated measures ANOVA, and data were analyzed using SPSS version 22.

3. Findings and Results

This study included 40 MS patients (20 in the control group and 20 in the experimental group). Participants were in the age range of 40-45 years. The mean and standard deviation of age in the control group were 45.03 ± 4.59 , and for the experimental group receiving the integrative intervention package, the mean age was also 45.03 ± 4.59 . A comparison of means using ANOVA indicated no significant difference in age between the two groups. Additionally, chi-square analysis showed no significant difference in marital status, education level, or income level between the experimental and control groups.

Table 1

Descriptive Statistics for Research Variables by Group

Component	Group	Test	Mean	Standard Deviation
Quality of Life	Control	Pre-test	13.25	1.86
		Post-test	12.58	1.31
		Follow-up	12.65	1.43
	Experimental (Integrative Package)	Pre-test	12.33	1.49
		Post-test	14.41	1.67
		Follow-up	13.08	1.31
Alexithymia	Control	Pre-test	50.98	1.16
		Post-test	51.54	2.35
		Follow-up	52.87	3.21
	Experimental (Integrative Package)	Pre-test	51.43	1.46
		Post-test	39.18	1.35
		Follow-up	41.58	2.57

Before testing the research hypotheses, the normality of data in each group (control-experimental) and test phase (pre-test, post-test, follow-up) was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Shapiro-Wilk results indicated that the assumption of data normality was met for quality of life in the pre-test and post-test stages and for alexithymia in the pre-test and follow-up stages in both

the experimental and control groups ($P < 0.01$). Multivariate repeated measures ANOVA revealed that the between-subjects effect (group) was significant, indicating that at least one group differed from the other in alexithymia or quality of life. The within-subjects effect (time) was also significant, suggesting changes in at least one variable from pre-test to follow-up.

Table 2

Results of Within-Group and Between-Group Effects Comparison

Dependent Variable	Source of Variance	Sum of Squares	df	Mean Square	F	Sig	Eta Squared
Alexithymia	Group	300.81	1	300.81	24.31	0.001	0.525
	Time	112.06	2	56.03	26.33	0.001	0.545
	Time × Group	182.44	2	91.22	42.87	0.001	0.661
Quality of Life	Group	437.01	1	437.01	5.75	0.025	0.207
	Time	910.79	2	455.39	22.67	0.001	0.508
	Time × Group	404.40	2	202.20	10.06	0.001	0.614

The between-group effect results in Table 2 indicate a significant difference in alexithymia between the control and experimental groups ($P < 0.001$, $F = 24.31$). The within-group effect results showed that the time factor for alexithymia was significant ($P < 0.001$, $F = 26.33$). The interaction effect of time × group was also significant ($P < 0.001$, $F = 42.87$), indicating the effectiveness of the integrative intervention on alexithymia, with a reduction in alexithymia observed in the experimental group compared to the control group.

The between-group effect results showed a significant difference in quality of life between the control and

experimental groups ($P = 0.025$, $F = 5.75$). The within-group effect results indicated that the time factor for quality of life was significant ($P < 0.001$, $F = 22.67$). The interaction effect of time × group was also significant ($P < 0.001$, $F = 10.06$), indicating the effectiveness of the intervention on quality of life, with an improvement observed in the experimental group compared to the control group.

Following the significant results for time, group, and interaction effects, Bonferroni post hoc tests were used to compare pre-test, post-test, and follow-up stages pairwise, with the results presented in Table 3.

Table 3

Bonferroni Post Hoc Test Results for the Effect of the Integrative Intervention on Alexithymia and Quality of Life Over Time

Component	Test	Group 1	Group 2	Mean Difference	Standard Error	Significance Level
Quality of Life	Pre-test	Integrative Package	Control	1.577	1.251	0.213
	Post-test	Integrative Package	Control	46.038	2.084	0.001
	Follow-up	Integrative Package	Control	41.769	1.688	0.001
Alexithymia	Pre-test	Integrative Package	Control	0.026	0.107	0.807
	Post-test	Integrative Package	Control	-1.890	0.120	0.001
	Follow-up	Integrative Package	Control	-1.399	0.090	0.001

The results in Table 3 show a significant difference in alexithymia between the pre-test and post-test ($P < 0.001$), confirming the intervention's effectiveness. There was also a significant difference between the pre-test and follow-up for alexithymia ($P < 0.001$), indicating the effect of time. No significant difference was found between the post-test and follow-up ($P > 0.05$), confirming the intervention's stability. Similarly, there was a significant difference in quality of life between the pre-test and post-test ($P < 0.001$), and between the pre-test and follow-up ($P < 0.001$), confirming the intervention's effectiveness and the effect of time. No significant difference was found between the post-test and follow-up ($P > 0.05$), indicating the intervention's stability for quality of life.

4. Discussion and Conclusion

This study aimed to investigate the impact of the integrative intervention package on quality of life and alexithymia in women with Multiple Sclerosis (MS). It was observed that there were no statistically significant differences in demographic characteristics between the control and intervention groups, indicating homogeneity, which allowed for better comparisons considering the intervention.

The results demonstrated that the integrative intervention package effectively reduced alexithymia and improved quality of life in MS patients, with the effects sustained over time. One explanation for these findings is that mindfulness exercises reduce many symptoms associated with

alexithymia by reducing the frequency and impact of negative thoughts, allowing thoughts to pass without labeling. Patients with MS often suppress their emotions due to numerous physical challenges and lack awareness of their emotions, exhibiting characteristics of alexithymia. Individuals with alexithymia struggle to find appropriate words to describe their feelings and are unable to express emotions effectively (Javadi et al., 2021). Taylor et al. (2017) noted that alexithymia is common in psychosomatic patients and is associated with mental health issues such as anxiety and depression. According to Taylor et al. (2017), alexithymia is a risk factor for various illnesses because individuals with alexithymia find it difficult to verbalize emotions, hindering emotional regulation and making successful adaptation challenging. Those who can express emotions timely are better equipped to manage psychological stress (Javadi et al., 2021).

These findings suggest that difficulty in identifying and distinguishing emotions predisposes individuals to emotional regulation failures under stressful conditions, such as pain onset in MS patients, leading to emotional distress and reduced adaptability (Capet et al., 2021; Javadi et al., 2021; Van Assche et al., 2021). Another explanation is that one way to manage stress is through emotional expression. If emotions are not expressed and negative feelings cannot be verbalized, psychological components such as depression, anxiety, and worry increase (Besharat, 2013b). Individuals who can recognize their emotions and express them effectively are better at dealing with physical challenges and more successful in adapting to their environment, thereby experiencing better mental health and pain management. The component of difficulty in identifying emotions assesses an individual's ability to recognize and differentiate between emotions and bodily sensations (Capet et al., 2021).

Most research indicates a relationship between alexithymia, anxiety, and depression (Capet et al., 2021; Dubey et al., 2010; Javadi et al., 2021; Jogleux et al., 2021; Martino et al., 2021; Melehin, 2021; Mohamadpoor et al., 2015; Van Assche et al., 2021), which aligns with this study's findings. In other words, individuals with alexithymia struggle to identify and manage negative emotions, leading to increased disabling and problematic negative emotions (Jogleux et al., 2021; Martino et al., 2021). These individuals experience undifferentiated feelings accompanied by physiological arousal that persists due to difficulties in distinguishing, describing, and regulating emotions, exacerbating symptoms. The inability

to express and share emotions is a critical life skill deficit, manifesting as anxiety or depression (Melehin, 2021).

Compassion-focused therapy involves training the mind to be compassionate toward oneself and others. It teaches clients skills and traits of compassion, helping them transform problematic cognitive and emotional patterns. As these patterns change, individuals become kinder to themselves and others, experiencing reduced sensitivity to flaws and difficulties. These changes promote mental calmness and reduce alexithymia. The generation of positive emotions following compassion-focused therapy also enhances quality of life in these patients. Value clarification techniques in this intervention helped participants recognize their personal values, leading to the development of flexible and achievable goals and resulting in more effective functioning and performance over time.

5. Suggestions and Limitations

This study had several limitations, similar to many other research projects. Financial constraints and limited time were significant challenges, typical of doctoral research projects conducted without organizational resources. These limitations are detailed, and recommendations for addressing them are provided to guide future research. The sample was geographically limited, small, and selected voluntarily and purposefully, making the generalization of results cautious. A notable limitation was the occurrence of symptom relapses in patients, complicating the completion of home assignments. The use of a single therapist for initial assessment, intervention delivery, and follow-up assessment may introduce biases. Another limitation was the lack of long-term follow-up assessments (6, 12, and 24 months). The cross-sectional nature of the study was another constraint, and the interdisciplinary nature (psychological and medical) prevented the control of medical treatments. Additionally, not controlling all variables that could affect quality of life in MS patients was a limitation.

Screening and early identification of MS patients with psychological disorders and referring them to psychologists could be effective in preventing and mitigating psychological problems and improving quality of life. Practical recommendations include raising MS patients' awareness of their condition, as early education on the disease's impact on the body is crucial. Support centers and associations should provide comprehensive information immediately after diagnosis. Implementing group interventions to facilitate experience-sharing and enhance

social support (both emotional and informational) is also recommended. Given the effectiveness of group interventions in managing anxiety and fatigue, and the impracticality of widespread in-person sessions, intervention content should be distributed through booklets or brochures. Since the intervention received a positive response from MS patients and considering the significant role of anxiety reduction and sleep disorder improvement, such research and education should extend to other chronic physical conditions. Active collaboration between psychologists and organizations working with chronic illness patients is essential, emphasizing the need for access to psychologists as part of the treatment team. Coverage of psychological counseling costs, especially for chronic illness patients like those with MS, should be included in insurance plans. Future research should apply this intervention to patients with other chronic conditions, refrain from controlling for gender, and use larger sample sizes across different patient groups. Follow-up assessments at 6, 9, and 12 months post-intervention are recommended to evaluate long-term effects. Expanding this research to other regions would increase validity, and comparing outcomes with hospital-based patient groups could provide additional insights.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

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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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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