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Effectiveness of Lifestyle Modification Training on Psychological Symptoms and Self-Care in Patients with Type 2 Diabetes

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A B S T R A C T

Objective: Diabetes is a disease that endangers the health of many individuals in society. The aim of this study was to evaluate the effectiveness of lifestyle modification training on psychological symptoms and self-care in patients with type 2 diabetes.

Methods and Materials: The study employed a pre-test post-test design with experimental and control groups. The research population consisted of all patients with type 2 diabetes from the Diabetes Association and hospitals in Gilangharb province, in 2020. A total of 45 individuals (divided into a lifestyle modification intervention group and a control group) were selected using a convenience sampling method. Data were collected using the SCL-90-R and the Toobert and Glasgow Self-Care Questionnaires. Data were analyzed using multivariate and univariate analysis of covariance tests, as well as the LSD post hoc test, utilizing the SPSS software.

Findings: The results of the multivariate analysis of covariance indicated that after controlling for pre-test effects, F was significant at the 0.05 level for "psychological symptoms" components. In other words, there were significant differences in the post-test scores of these variables between the "experimental group" and the "control group". The results also showed differences between the two intervention groups and the control group in the self-care variable. Furthermore, the lifestyle modification training intervention was effective in components of psychological symptoms, including somatization, obsessive-compulsive, anxiety, aggression, phobia, paranoid ideation, and psychoticism dimensions.

Conclusion: It can be concluded that lifestyle modification training was effective in improving psychological symptoms and self-care in patients with type 2 diabetes, and this psychological approach can be used to improve the condition of patients with type 2 diabetes.

Keywords: *Lifestyle Modification, Psychological Symptoms, Self-Care, Diabetes.*

1. Introduction

Diabetes is a disease that jeopardizes the health of many individuals in society. This disease manifests through disturbances in glucose, fat, and protein metabolism and particularly involves disorders in the production and utilization of insulin, which is essential for glucose metabolism. Consequently, it has numerous long-term and short-term complications (Martinez, 2005). Currently, diabetes is one of the most common health problems worldwide. It is characterized by increased blood sugar levels and disturbances in the metabolism of carbohydrates, fats, and proteins, along with partial or complete deficiency in insulin production. The prevalence of diabetes has increased in recent decades, partly due to advancements in healthcare and medical care, leading to increased life expectancy among diabetic individuals. However, the high prevalence of this disease is also attributed to lifestyle changes, with reduced physical activity and poor dietary habits. Chronic diseases are primary health concerns in modern societies. The ability and power to accept one's condition are personality factors that affect patients' states and enhance their capability to deal with problems, including diseases (Borhaninejad et al., 2017).

Diabetes is a chronic metabolic disease and a major health problem, especially in developing countries (Kavvoura & Owen, 2019). The global diabetic population exceeds 250 million, and it is expected to rise to 350 million by 2020 and over 438 million by 2030 (Kreider, 2019). This disease, with its distressing symptoms and society's negative perception, which often results in stigmatization, threatens individuals' identities and diminishes their mental health (Zamora-Kapoor et al., 2018).

Self-care is a component that plays a significant role in individuals' health. It encompasses conscious, learned, and purposeful actions performed to maintain and enhance one's own and their family's health. Self-care includes actions that people take to stay healthy, care for their mental and physical health, and improve illnesses and chronic conditions (Stearns et al., 2000). Therefore, self-care is an action where each individual uses their knowledge, skills, and abilities as resources to independently care for their health. It is a crucial part of disease control, reflecting relative processes involving purposeful behaviors and choices that mirror each individual's attitude and knowledge (Riegel & Dickson, 2008).

The most significant factor leading to mortality in diabetic patients is the failure to perform self-care activities. There is a global consensus that self-care plays a special role in managing chronic diseases. Successful management of these diseases is possible when the patient is involved in self-care activities (Inoue et al., 2013; Sharifi & Sharifi, 2017). According to the American Diabetes Association, individuals with diabetes must be educated about self-care to delay the onset of diabetes complications (Shirazi & Anousheh, 2011).

Cognitive, behavioral, emotional, and social factors play a role in the development, regulation, and control of diabetes (Nematpour et al., 2010). Chronic illnesses, including diabetes, disrupt individuals' psychological adaptation and social functioning on one hand, and negatively impact family functioning on the other. The prevalence of negative psychosocial outcomes among those with diabetes highlights the need for developing psychological interventions in clinical and health psychology (Kavvoura & Owen, 2019; Kirk et al., 2012; Kreider, 2019; Mirmiran et al., 2018; Zamora-Kapoor et al., 2018).

Lifestyle education is significant as it impacts health levels and disease prevention (Potter et al., 2021). Teaching various aspects of lifestyle, such as adhering to a proper diet and engaging in physical activity, leads to improvements in patients' awareness, attitudes, and performance, ultimately enhancing their lifestyle (Bayat et al., 2013). Therefore, it is preferable to employ these care and clinical and psychological methods alongside medication. Attention to lifestyle modification as a comprehensive educational package (including main components of education: principles of proper nutrition, sleep, exercise, communication skills, stress management, and spiritual coping) in patients with type 2 diabetes has been less considered in various studies and research, with focus only on specific components on a case-by-case basis (Alijani et al., 2015; Bayat et al., 2013; Sharifi & Sharifi, 2017; Stearns et al., 2000).

Overall, research shows that educational interventions significantly affect the psychological states of patients with type 2 diabetes in various countries. However, due to the lack of research based on self-compassion training methods on psychological symptoms and self-care in patients with type 2 diabetes, and despite extensive searches, there is a lack of research examining the impact of lifestyle modification training on these components in one study, making research in the area of the effectiveness of lifestyle modification training on psychological symptoms and self-care in these patients necessary. Thus, the present research seeks to answer whether lifestyle modification training is

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

effective on psychological symptoms and self-care in patients with type 2 diabetes.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a quasi-experimental design with a pre-test and post-test with a control group. The population comprised all type 2 diabetes patients from the Diabetes Association and hospitals in Gilangharb. Samples were selected using a convenience sampling method. Participants were randomly assigned to three groups of 15 each: lifestyle modification intervention and control group. Inclusion criteria included being diagnosed with type 2 diabetes, no history of hospitalization for mental disorders, and willingness to participate in the study. Exclusion criteria were unwillingness to participate in the intervention, occurrence of events during the study, and receiving psychiatric medication during the study. Ethical considerations involved obtaining consent and confidentiality of participants' information. The research was conducted online via Adobe Connect by the researcher.

2.2. Measures

2.2.1. Clinical Symptoms

Symptom Checklist-90-Revised (SCL-90-R), first introduced in 1973 by Derogatis and colleagues, is a self-report symptom inventory developed through clinical experiences and prior psychometric analyses. It comprises 90 items rated on a five-point Likert scale from "not at all" to "very much." This test measures nine different dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Additionally, it contains seven extra items not classified under the aforementioned dimensions, referred to as "others." This test evaluates an individual's state over the past week. Besides the nine dimensions, the test includes three general criteria: Global Severity Index (GSI), Positive Symptom Distress Index (PSDI), and Positive Symptom Total (PST), with scoring and interpretation based on these indices. A cutoff point of 2.5 is used to determine the prevalence of psychiatric symptoms in each dimension, with mean scores of 2.5 and above considered pathological. In Iran, the cutoff for GSI is set at 0.4 (DeRogatis et al., 2008; Derogatis, 1973; Derogatis et al., 1976; Derogatis & Savitz, 1999). This test's reliability and validity have been confirmed through numerous studies, including internal consistency and test-retest methods (Alijani et al., 2015).

2.2.2. Self-Care

The Toobert and Glasgow Self-Care Questionnaire (2000) is used to assess self-care behaviors in diabetic patients. It consists of 15 questions allowing individuals to report the quality of their diabetes-related self-care activities over the past seven days. Activities include following a healthy diet, administering insulin or taking medication correctly, blood sugar testing, exercising, foot care, and smoking behaviors. Scoring is such that a person who did not perform any self-care behaviors in the past seven days receives a score of zero, while someone who fully performed these care activities daily receives a score of seventy. Scores range from 0-70, divided into three levels to determine the adequacy of self-care status. A total compliance score is obtained by summing the scores for each question (Toobert et al., 2000). Cronbach's alpha for the self-care behavior construct was calculated at 0.66 in a preliminary study and 0.68 in the entire sample, with a validity equivalent of 0.75 (Borhaninejad et al., 2017).

2.3. Intervention

2.3.1. Lifestyle Modification Training

Training sessions for lifestyle modification for diabetic patients, as conducted by Alijani and colleagues (2015), were held over eight 90-minute weekly sessions (Alijani et al., 2015).

First Session: Establishing connections and introducing participants, stating session objectives, completing commitment forms by patients, conducting pre-test (questionnaire presentation and blood test), examining daily lifestyle dimensions of patients, discussing healthy lifestyle dimensions (physical and psychological), receiving feedback, assigning homework.

Second Session: Reviewing the previous session's summary by patients, revising previous homework, discussing proper nutrition principles related to diabetes, presenting a healthy nutrition plan, receiving feedback, assigning homework (attached education on proper nutrition principles).

Third Session: Summarizing previous sessions by patients, reviewing homework, discussing exercise and its physical and psychological benefits, familiarizing with suitable methods for patients, presenting an optimal exercise

JAYPS Adolescent and Youth Psychological Studies
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program and introducing several books, receiving feedback, assigning homework (attached education on exercise and sleep).

Fourth Session: Recapping previous sessions, reviewing homework, discussing sleep and examining sleep disorders related to diabetes, tips for proper sleep, receiving feedback, assigning homework.

Fifth Session: Members summarizing previous sessions, revising homework, defining social skills and their impact on a healthy lifestyle, familiarizing with social skills, providing tips for better communication, receiving feedback, assigning homework.

Sixth Session: Summarizing previous sessions by members, reviewing homework, familiarizing with stress factors and their impact on a healthy lifestyle, learning stress coping methods and their application in life, receiving feedback, assigning homework.

Seventh Session: Recapping the previous session and reviewing homework, discussing values and their impact on a healthy lifestyle, presenting spiritual coping methods (trust and hope in God, optimism, patience, forgiveness, gratitude for existing blessings in life, etc.), receiving feedback, assigning homework.

Eighth Session: Reviewing the previous session's summary and homework, patients' explanations about experiences with the new lifestyle and its continuity, conducting post-tests (questionnaire presentation and blood test).

2.4. Data analysis

In the descriptive statistics section: Frequency tables and charts, as well as central and dispersion indices like mean and standard deviation, were calculated. In the inferential statistics section: MANCOVA and ANCOVA methods were used, thereby examining the research hypotheses. It's noteworthy that to check the assumptions of inferential tests, the Levene's test (for homogeneity of variances), Kolmogorov-Smirnov test (for normal distribution of data), homogeneity of regression, and Box's M test were used. The above statistical analyses were performed using SPSS software version 24.

3. Findings and Results

The mean age (SD) in the experimental group was 51.14 years (12.00) and in the control group 50.89 years (10.76). There was no significant age difference between the two groups ($P < 0.05$).

Table 1

Psychological Symptoms and Self-Care Measures Before and After Lifestyle Modification Training

Variables	Component	Group	Pre-Test Mean (SD)	Post-Test Mean (SD)
Psychological Symptoms	Somatization	Lifestyle Modification Group	17.5 (5.98)	15.02 (4.75)
		Control Group	17.9 (4.05)	17.8 (3.87)
	Obsessive-Compulsive	Lifestyle Modification Group	12.5 (5.0)	7.64 (3.01)
		Control Group	12.7 (4.5)	12.6 (4.07)
	Interpersonal Sensitivity	Lifestyle Modification Group	9.7 (3.59)	6.54 (1.98)
		Control Group	8.22 (3.77)	8.23 (3.4)
	Depression	Lifestyle Modification Group	17.8 (9.62)	11.5 (7.67)
		Control Group	17.9 (7.41)	17.1 (7.57)
	Anxiety	Lifestyle Modification Group	12.9 (3.72)	10.6 (3.47)
		Control Group	13.07 (4.32)	12.6 (4.41)
	Hostility	Lifestyle Modification Group	9.76 (2.35)	7.3 (2.69)
		Control Group	9.38 (3.19)	9.18 (3.52)
	Phobic Anxiety	Lifestyle Modification Group	7.34 (2.88)	5.71 (2.21)
		Control Group	7.21 (2.2)	7.07 (2.43)
	Paranoid Thoughts	Lifestyle Modification Group	6.31 (2.59)	4.0 (1.67)
		Control Group	6.41 (2.27)	6.14 (2.23)
	Psychoticism	Lifestyle Modification Group	13.9 (2.42)	10.3 (3.9)
		Control Group	13.2 (1.88)	13 (2.29)
Self-Care		Lifestyle Modification Group	33.7 (5.1)	42.8 (7.9)
		Control Group	33.4 (8.06)	33.2 (8.12)

The findings from Table 1 show a notable improvement in both psychological symptoms and self-care measures in type 2 diabetic patients following lifestyle modification training. The intervention group displayed significant

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

reductions in various psychological symptoms, including somatization, obsessive-compulsive behavior, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid thoughts, and psychoticism, compared to the control group. The lifestyle modification group also showed a marked increase in self-care scores post-intervention, indicating a positive impact of the training on managing their diabetes effectively. These outcomes underscore the value of lifestyle modification training in enhancing the psychological well-being and self-care practices of diabetic patients.

Table 2

Summary of MANCOVA Test for the Impact of Self-Compassion Training on Psychological Symptoms in Patients with Type 2 Diabetes

Effects	Wilks' Lambda	F	Df1	Df2	p	Eta Squared (Partial)
Group	0.063	18.1	9	11	0.001	0.937

As Table 2 data indicates, after controlling for pre-test effects, Wilks' Lambda was significant at the 0.05 level (Wilks' Lambda = 0.063, F = 18.1, P = 0.001, $\eta^2 = 0.937$). In other words, it can be claimed that there is a significant difference in at least one of the "psychological symptoms" components between the control and experimental groups.

Table 3

Analysis of Variance for the Impact of Lifestyle Modification Training on Psychological Symptoms

Source	Variable	SS	Df	MS	F	p	Eta Squared
Group	Somatization	390.2	1	390.2	56.3	0.001	0.748
	Obsessive-Compulsive	311.008	1	311.008	84.9	0.001	0.817
	Interpersonal Sensitivity	112.08	1	112.08	31.8	0.001	0.626
	Depression	515.9	1	515.9	28.4	0.001	0.599
	Anxiety	297.7	1	297.7	59.3	0.001	0.758
	Hostility	188.6	1	188.6	55.1	0.001	0.744
	Phobic Anxiety	164.3	1	164.3	43.4	0.001	0.696
	Paranoid Thoughts	125.5	1	125.5	47.2	0.001	0.713
	Psychoticism	347.9	1	347.9	32.8	0.001	0.634
Error	Somatization	131.6	19	6.92			
	Obsessive-Compulsive	69.5	19	3.66			
	Interpersonal Sensitivity	66.8	19	3.52			
	Depression	344.7	19	18.1			
	Anxiety	95.3	19	5.01			
	Hostility	65.04	19	3.42			
	Phobic Anxiety	71.8	19	3.78			
	Paranoid Thoughts	50.4	19	2.65			
	Psychoticism	201.2	19	10.5			

As the analysis of Table 3 results shows, after controlling for pre-test effects, the obtained F-value in components such as "somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, paranoid ideation, and psychoticism" was significant at the 0.05 level.

Table 4

Summary of MANCOVA Test for the Impact of Lifestyle Modification Training on Psychological Symptoms in Patients with Type 2 Diabetes

Effects	Wilks' Lambda	F	Df	Df2	p	Eta Squared (Partial)
Group	0.273	3.26	9	11	0.034	0.727

Similarly, as Table 4 data reveals, after controlling for pre-test effects, Wilks' Lambda was significant at the 0.05 level. Therefore, it can be claimed that there is a significant difference in at least one of the "psychological symptoms" components between the control and experimental groups.

JAYPS Adolescent and Youth Psychological Studies
E-ISSN: 2981-2526

Table 5

Multivariate Analysis of Covariance (MANCOVA) Test for Post-Test Components of Psychological Symptoms

Source	Variable	SS	Df	MS	F-value	p	Eta Squared
Group	Somatization	69.8	1	69.8	4.67	0.044	0.197
	Obsessive-Compulsive	142.3	1	142.3	20.9	<0.001	0.525
	Interpersonal Sensitivity	30.8	1	30.8	8.47	0.009	0.309
	Depression	23.2	1	23.2	9.42	0.006	0.332
	Anxiety	38.4	1	38.4	4.25	0.048	0.183
	Hostility	38.06	1	38.06	9.97	0.011	0.296
	Phobic Anxiety	15.1	1	15.1	3.84	0.065	0.168
	Paranoid Thoughts	21.05	1	21.05	8.75	0.008	0.315
	Psychoticism	69.8	1	69.8	6.25	0.022	0.248
Error	Somatization	283.9	19	14.9			
	Obsessive-Compulsive	128.8	19	6.78			
	Interpersonal Sensitivity	69.2	19	3.64			
	Depression	468.2	19	24.6			
	Anxiety	171.6	19	9.03			
	Hostility	90.6	19	4.77			
	Phobic Anxiety	74.9	19	3.94			
	Paranoid Thoughts	45.6	19	2.4			
	Psychoticism	212.2					

As the analysis of Table 5 results shows, after controlling for pre-test effects, the obtained F-value in components such as "somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, paranoid ideation, and psychoticism" was significant at the 0.05 level.

4. Discussion and Conclusion

The aim of this study was to evaluate the effectiveness of lifestyle modification training on psychological symptoms and self-care in patients with type 2 diabetes. The results indicated that lifestyle modification training is effective in improving psychological symptoms. These findings are consistent with the results of some previous research (Avelyn, 2014; Inoue et al., 2013; Kirk et al., 2012).

To explain these findings, it can be said that human development occurs in various domains such as psychological, social, physical, sexual, occupational, cognitive, ego (self), moral, and emotional. Each of these domains requires specific skills and abilities (Sharifi & Sharifi, 2017). In fact, it can be argued that developmental progression depends on skill and proficiency in life skills. When individuals acquire the right lifestyle, they progress in optimal functioning. Lifestyle modification training plays a crucial role in mental health, especially when provided at an appropriate developmental stage (Bayat et al., 2013; Stearns et al., 2000).

The study also showed that lifestyle modification training is effective in improving self-care in patients with type 2 diabetes. These results align with the findings of previous studies (Sharifi & Sharifi, 2017). A healthy lifestyle is a way of living that ensures, maintains, and enhances people's health and well-being. A healthy lifestyle is defined as a way of life that reduces the risk of severe illness or premature death and allows us to enjoy more aspects of our lives. Managing lifestyle leads to better control of diabetes and delays the onset of its complications, especially when the patient is well-educated about lifestyle (Stearns et al., 2000). In most type 2 diabetic patients, proper education leads to behavioral change and ultimately disease control without additional treatment. Walker's health promotion program consists of six dimensions: responsibility for health, stress management, interpersonal support, self-actualization, nutrition, and exercise (Sharifi & Sharifi, 2017).

Lifestyle modification training acts like a positive emotional regulation style, reducing negative emotions and enhancing positive ones. This training aims to stimulate the security system (attachment), reduce the perception of danger and threats in individuals, and increase caring, empathetic, and compassionate behaviors. Moreover, based on existing research background, such interventions are known to overcome stress and anxiety. Everyone experiences stressful events throughout their lives. Healthy individuals are those who can cope with long-term stress and manage short-term psychological pressures. If a person fails to adapt or cope in various domains, they become ill. Stress is any psychological tension and imbalance that threatens

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

human general balance, disrupts biological balance, can create negative emotions, change perceptions of reality, disrupt thinking and problem-solving processes, transform interpersonal relationships and feelings of belonging, change attitudes towards life, or cause irreversible effects on personality.

5. Limitations & Suggestions

One limitation of this study was that the sample was selected only from patients with type 2 diabetes in Gilangharb; therefore, generalizing these findings to other groups and cities should be done cautiously. Given the impact of self-modified lifestyle training on improving psychological symptoms and self-care in patients with type 2 diabetes, and considering the importance of these variables in the lives of this group, it is recommended that health organizations and psychological clinics pay more attention to these therapeutic methods so that these individuals can have a better life and greater mental health in society.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This study has received ethical approval with number IR.HUMS.REC.1397.241 from Hormozgan University of Medical Sciences.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

Ali Mozaffaripour contributed to the research design, data collection, and the implementation of lifestyle modification training. Mohammad Ebrahim Madahi provided expertise in research methodology, data analysis, and interpretation. Maryam Kalhornia Golkar assisted in data collection and coordination of various aspects of the study.

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