TMP UNIVERSAL JOURNAL OF RESEARCH AND REVIEW ARCHIVES

VOLUME 4 | ISSUE 1 | YEAR 2025 | JAN – MAR 2025

RECEIVED DATE	ACCEPTED DATE	PUBLISHED DATE
03/01/2025	24/01/2025	06/02/2025

Article Type: Research Article

Available online: www.tmp.twistingmemoirs.com

ISSN 2583-7214

THE EFFECTIVENESS OF ACCEPTANCE AND COMMITMENT GROUP THERAPY ON MINDFULNESS AND HEALTH-ORIENTED LIFESTYLE OF DIABETIC PATIENTS

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ABSTRACT

The aim of this study was to evaluate the effectiveness of Acceptance and Commitment Therapy (ACT) group therapy on mindfulness and health-oriented lifestyle in diabetic patients. The research employed a quasi-experimental design, with both a control group and an experimental group. The study population consisted of all type 1 diabetic patients who visited hospitals in Borujerd city in 1401. A total of 40 participants were selected using random sampling, with 20 individuals assigned to the experimental group and 20 to the control group. The research utilized Brown and Ryan's (2003) mindfulness questionnaire and Laali et al.'s (2013) health-oriented lifestyle questionnaire. Data were analyzed using multivariate analysis of covariance (MANCOVA). The results revealed that ACT group therapy significantly improved both mindfulness and health-oriented lifestyle in the experimental group compared to the control group. Therefore, it can be concluded that ACT group therapy has a positive effect on the mindfulness and health-oriented lifestyle of diabetic patients.

Keywords: Acceptance and commitment group therapy, mindfulness, health-oriented lifestyle, diabetic patients

INTRODUCTION

Chronic diseases are significant health and medical concerns. These conditions are permanent, debilitating, and cause irreversible damage, with treatments offering limited effectiveness. One of the most prevalent chronic diseases, which has garnered increasing attention from healthcare professionals, is diabetes. The International Diabetes Federation estimated that in 2017, 8.8% of the adult population, approximately 425 million people, were affected by diabetes, with this number projected to rise to over 629 million by 2045 (Egartswah et al., 2017). Diabetes ranks as the fifth leading cause of death worldwide, with 1 to 2% of the global population impacted by the disease. Complications associated with diabetes include blindness, kidney failure, non-

traumatic amputations, and an elevated risk of cardiovascular and cerebrovascular diseases. If not properly controlled, the likelihood of these complications increases (Fath Abadi et al., 2018). The World Health Organization estimates that, without effective preventive measures, the number of diabetes patients in Iran could reach 7 million by 2030 (Khaledi et al., 2011). Cognitive, behavioral, emotional, and social factors all contribute to the prevention, control, and management of diabetes (Nematzadeh et al., 2010).

One psychological factor associated with diabetic patients is mindfulness. Mindfulness is a method of recognition and meta-recognition that emphasizes mental, emotional, and physical calmness, awareness of automatic thoughts, and directing attention towards thoughts to foster self-regulation. It is defined as an awareness that is accepting and free from judgment of what is occurring in the present moment. Awareness of the present, along with non-judgmental acceptance, is a central aspect of mindfulness and plays a crucial role in enhancing executive control. This leads to heightened sensitivity to emotional cues, contributing to an individual's experiences (Teper et al., 2013). As a highly effective process for information processing, mindfulness helps regulate emotions in a balanced way, preventing individuals from becoming overwhelmed by emotions or avoiding them. It promotes the alignment of adaptive behaviors, positive psychological states, and the enhancement of personal and social functioning (Chambers et al., 2009). Numerous studies have highlighted the relationship and impact of mindfulness on individuals coping with chronic diseases. While emphasizing the connection between mindfulness and diabetes, no specific negative effects or adverse outcomes have been reported. Thus, it can be concluded that mindfulness yields positive results in the management of various chronic diseases, including diabetes (Brown et al., 2003). Zarashahabadi and colleagues (2013) found in their study that mindfulness has a significant impact on blood sugar control in diabetic patients. Additionally, Rosenthal et al. (2007) demonstrated that mindfulness reduces or eliminates psychological responses to stressors, and by modulating the impact of stress on physiological functions, it improves blood sugar regulation in diabetic patients.

A health-oriented lifestyle is another key factor associated with diabetic patients (Behnam-Rad et al., 2014). Lifestyle is defined as the set of behaviors that individuals can control or that influence their health risks. Health-protective behaviors (such as risk reduction and prevention) and health-promoting behaviors are complementary components of a healthy lifestyle (Baker, 2007). A health-oriented lifestyle is a multifactorial and multidimensional phenomenon related to collective behavior patterns that can either prevent health problems or promote individual well-being. This lifestyle includes various components such as exercise, proper and improper nutrition, self-control, preventive behaviors, and more. At its core, a health-oriented lifestyle involves the coherence and consistency in performing behaviors related to health and wellness (Chen, 2002). Research has demonstrated a direct relationship between diabetes and individuals' health-oriented lifestyles. For example, research from the late 19th century indicates that changes in lifestyle (such as nutrition and personal hygiene) contributed to a decline in infectious diseases, while giving rise to chronic conditions like diabetes and obesity, which are often the result of unhealthy living habits and cannot be treated with medication. Consequently, attention has been directed toward the root causes of these diseases—namely, lifestyle and human behaviors (Dutta-Bergman et al., 2004). Furthermore, Behnam-Rad and colleagues (2014) found in their study that modifying lifestyle can significantly reduce the effects of diabetes.

Building on the previous points, alongside traditional clinical treatments, various psychological interventions have been developed over time to enhance mindfulness and health-oriented lifestyles in diabetic patients. Psychological treatments commonly employed in this area include mental and physical techniques, behavioral approaches, and cognitive-behavioral therapy. However, we are now witnessing the emergence of the third generation of psychological treatments, collectively referred to as acceptance-based models. Examples of such therapies include Mindfulness-Based Cognitive Therapy (MBCT), Compassion-Focused

Therapy, and Acceptance and Commitment Therapy (ACT) (Hayes et al., 2012). These therapies aim to improve individuals' psychological well-being by working with their thoughts and emotions. Among these, Acceptance and Commitment Therapy (ACT) has garnered significant attention from researchers in recent years (Thomas et al., 2014).

ACT is one of the most widely utilized therapeutic approaches in this context (Mousavi et al., 2018). In ACT, the initial focus is on enhancing the individual's acceptance of their mental experiences—such as thoughts, emotions, and sensations—and reducing ineffective control behaviors. The therapy teaches the individual that any attempts to avoid or control these mental experiences are unproductive and may even exacerbate the problem. Instead, ACT encourages patients to fully accept their mental experiences without reacting internally or externally to eliminate them. In the second phase of ACT, the individual becomes more aware of their present mental state, increasing awareness of their thoughts, emotions, and behaviors as they occur in real time. In the third phase, patients learn cognitive defusion, which involves separating themselves from their mental experiences, enabling them to act independently of these thoughts and feelings. In the fourth phase, the therapy reduces excessive focus on bodily sensations or personal narratives that the individual has constructed for themselves. The fifth phase of ACT helps the individual identify their core personal values, clarify them, and transform these values into specific behavioral goals (value clarification). Finally, the therapy aims to foster motivation for committed action, encouraging individuals to engage in behaviors that align with their values and goals while simultaneously accepting their mental experiences. These experiences may include irrational thoughts, worries, stress, fears, social anxieties, or other challenging emotions (Thomas et al., 2014).

Hafman and colleagues (2007) also found that multidimensional therapeutic approaches, which include psychological interventions, have produced more effective long-term and short-term results in terms of pain relief and improvements in daily functioning and work performance. Umann (2007), through an analysis of acceptance-based interventions like Acceptance and Commitment Therapy (ACT), discovered that these approaches had a greater impact on patients with chronic pain, suggesting they could serve as an effective alternative to traditional cognitive-behavioral therapies. Mackerracken and Wells (2004) further demonstrated the effectiveness of acceptance and commitment-based therapies in treating chronic pain patients. Following these therapies, patients showed improvements in various areas, including pain management, depression, anxiety, and disability levels, as well as significant gains in job performance and physical functioning.

The high prevalence of diabetes in society is closely linked to depression, anxiety, stress, and a diminished quality of life. These factors often result in frequent visits to psychologists and psychiatrists, contributing to feelings of hopelessness and helplessness. This dependency on family members or caregivers, or alternatively, the individual withdrawing from family and community, can lead to introversion and emotional avoidance. Such behaviors may include absenteeism from work, increased medical and pharmaceutical costs, and financial strain on family and friends. These elements collectively amplify the perception of the illness and discomfort, making it seem more severe than it actually is, and reduce the individual's ability to cope. Over time, this stress can lead to feelings of despair and even self-harm. On a broader societal level, the high costs associated with chronic illnesses like diabetes impose a significant burden on healthcare systems and insurance providers. Given these challenges, addressing chronic conditions such as diabetes with appropriate treatment and psychological care has become increasingly crucial. Modern psychological treatments, like Acceptance and Commitment Therapy (ACT), have proven to be effective. ACT is a relatively short-term and cost-effective intervention that aims to improve mental and emotional well-being. The current study seeks to evaluate the effectiveness of group therapy focusing on acceptance, commitment, mindfulness, and a health-oriented lifestyle in patients with diabetes, to help improve their quality of life and overall coping abilities.

Research Method

The research employed a quasi-experimental design with pre-test and post-test measures, including a control group. The target population consisted of individuals visiting specialized clinics and public hospitals in Boroujerd County during 2022, all of whom had been diagnosed by general practitioners with type 1 diabetes. The sample included 40 participants, comprising 20 women and 20 men, who were selected through random sampling. These participants were initially chosen with permission from the Boroujerd Medical Organization and were then randomly assigned to either the experimental or control group, each consisting of 20 individuals. The experimental group underwent group-based Acceptance and Commitment Therapy (ACT), delivered by an instructor over 8 sessions (one per week, each lasting 90 minutes). The control group did not receive any intervention during this period. Each session began by outlining the session's objectives, followed by discussions on the session's topic, where group members engaged in reflective thinking, discussion, and idea-sharing. Upon completing the intervention, both groups were asked to answer the post-test questions again. The collected data were analyzed using multivariate analysis of covariance (MANCOVA).

Table 1. Summary of the Structure and Content of Group Acceptance and Commitment Therapy Sessions Based on the Framework of Martell and Kaplan (2015)

sessions	goals	translates to
first session	Setting group goals and rules, familiarizing group members with each other, defining acceptance and commitment, and the necessity of having them in life.	60 minutes
second session	A review of previous session experiences and receiving feedback from patients; discussion of their experiences and evaluation of them; evaluation of the individual's willingness to change; examining patients' expectations from ACT therapy; creating therapeutic engagement; relaxation and acceptance; summarizing the discussions held in the session and providing a homework assignment.	60 minutes
third session	Identifying ineffective coping strategies and guiding them towards improving them; explaining the concept of acceptance and its difference from concepts like failure, despair, denial, resistance, etc., and that acceptance is an ongoing process, not a one-time event. Then, discussing the difficulties and challenges of accepting chronic illness; summarizing the discussions held in the session and reviewing the exercises for the next session; providing a homework assignment.	60 minutes
fourth session	Application of cognitive defusion techniques; intervention in the functioning of problem-sustaining language patterns and metaphors; weakening self-attachment to thoughts and emotions; relaxation and review of previous session experiences and receiving feedback from patients; behavioral commitment and dedication; summarizing the discussions held in the session and reviewing the exercises for the next session; providing a homework assignment.	60 minutes
fifth session	Indicating the separation between the self, inner experiences, and behavior; observing oneself as a context; weakening conceptual self and self-talk. In these exercises, participants learn to focus on their activities (such as breathing, walking, etc.). Summarizing the discussions held in the session and reviewing the exercises for the next session; providing a homework assignment.	60 minutes
sixth	Reviewing previous session experiences and receiving feedback	60

sessions	goals	translates to
session	from patients; identifying patients' life values and emphasizing and focusing on these values, while paying attention to their power of choice; using mindfulness techniques with a focus on the present moment; relaxation and acceptance; summarizing the discussions held in the session; reviewing the exercises for the next session and providing a homework assignment.	minutes
seventh session	Examining the values of each individual and deepening the previous concepts; explaining the difference between values, goals, and common mistakes in choosing values; discussing internal and external barriers that may prevent pursuing values; then, each member identifies three of their most important values and the goals they are willing to pursue in line with each of those values. Finally, they define the actions/behaviors they intend to carry out to achieve these goals; indicating the dangers of focusing on results.	60 minutes
eighth session	Understanding the nature of willingness and commitment (learning commitment to action); identifying behavioral plans aligned with values and creating commitment to act on them; explaining the concept of relapse and readiness to cope with it; reviewing assignments and summarizing sessions along with references; sharing group members' experiences with each other and discussing the outcomes and expectations that have not been met; and finally, thanking the patients for participating in the group and after the trial, implementation was carried out.	60 minutes

Measurement Tools

Mindfulness Questionnaire (Brown & Ryan, 2003): This questionnaire was developed by Brown and Ryan in 2003 and consists of 15 items. The internal consistency reliability of the questionnaire, as measured by Cronbach's alpha, ranges from 80% to 87% (Brown & Ryan, 2003). For the Persian version of this scale, Cronbach's alpha was calculated to be 0.81 in a sample of 723 students (Najati & colleagues, 2012). Content validity was established through expert opinions, and exploratory factor analysis is currently being conducted. The scoring method for this scale is based on a 6-point Likert scale.

Health-Oriented Lifestyle Questionnaire (Lali & colleagues, 2012): This questionnaire was developed by Lali and colleagues in 2012 and includes 70 items distributed across 10 subscales: physical health, exercise and fitness, weight control and nutrition, disease prevention, psychological health, spiritual health, social health, avoidance of drugs, alcohol, and substances, prevention of accidents, and environmental health. The reliability of this questionnaire was assessed using both the test-retest method and Cronbach's alpha coefficient, with Cronbach's alpha ranging from 0.76 to 0.89, and test-retest reliability ranging from 0.84 to 0.94 (Lali & colleagues, 2012). Additionally, Hajizadeh-Mimandi and colleagues (2015) evaluated the reliability of this scale, reporting that the Cronbach's alpha for all subscales was at least 0.71, indicating satisfactory reliability. Content validity was established through expert feedback, and exploratory factor analysis is still in progress. The scoring method for this scale is based on a 4-point Likert scale.

Findings

The descriptive statistics of the variables mindfulness and health-oriented lifestyle, including mean, standard deviation, minimum, and maximum values, are presented in Table 2.

Table 2. Descriptive statistics of mindfulness and health-oriented lifestyle and its components

	statistical indicators / groups	pre-test				post-test			
		average	standard deviation	minimum	maximum	average	standard deviation	minimum	maximum
mindfulness	test	53.15	6.83	44	68	59.65	5.42	49	69
	control	53.35	10.90	18	68	53.05	11.13	18	69
physical health	test	14.55	3.36	10	25	16.80	2.33	12	24
	control	14.75	1.99	12	18	14.90	2.12	11	18
exercise and fitness	test	14.60	3.03	11	18	16.05	1.70	12	18
	control	14.05	2.08	11	18	14.55	1.82	12	18
weight control and nutrition	test	13.30	1.89	10	17	14.75	1.86	11	18
	control	13.85	1.69	10	17	13.80	1.82	11	18
disease prevention	test	14.65	1.26	12	17	16.05	1.82	11	18
	control	14.05	1.95	11	18	14.35	1.37	12	18
psychological health	test	14.60	1.18	12	17	15.80	1.15	14	18
	control	14.30	1.45	12	17	14.30	1.94	12	18
spiritual health	test	13.85	1.75	10	17	15.40	1.60	11	18
	control	14.15	1.89	10	18	14.10	1.74	11	17
social health	test	14.00	2.00	10	17	15.45	1.82	12	18
	control	14.70	1.62	12	18	14.35	1.34	12	17
avoidance of medication, drugs, and alcohol	test	14.75	1.61	12	17	15.90	1.29	14	18
	control	14.95	1.23	12	17	14.85	1.18	12	17
accident prevention	test	14.65	1.78	11	18	16.15	1.22	14	18
	control	15.30	1.59	12	18	15.35	1.25	12	17
environmental health	test	14.35	1.98	12	18	15.35	1.42	13	18
	control	14.40	1.78	11	18	14.75	1.20	12	17
health-oriented lifestyle	test	143.30	11.36	130	177	157.70	9.39	141	181
	control	144.50	9.54	128	166	145.10	6.64	136	159

As shown in Table 3, for the mindfulness variable, after controlling for the pre-test scores, a significant difference was found between the mean scores of the experimental and control groups in the post-test. Similarly, for the health-oriented lifestyle variable and its components, with the pre-test scores controlled, a significant difference was observed between the mean scores of the experimental and control groups regarding the sub-scores of the health-oriented lifestyle in the post-test. Based on these results, it can be concluded that participation in an Acceptance and Commitment Therapy (ACT) program, with the pre-test scores controlled, positively impacts the health-oriented lifestyle of diabetic patients. Therefore, it can be stated

that ACT is effective in enhancing both mindfulness and health-oriented lifestyle in diabetic patients.

Table 3. Results of Multivariate Analysis of Covariance (MANCOVA) to examine between-group differences in mean mindfulness, health-oriented lifestyle, and its components.

variable	source of changes	sum of squares	degree of freedom	mean square	F-statistic	level of significance
mindfulness	group	335.478	1	335.478	11.452	0.002
	error	1083.912	37	29.295		
health-oriented lifestyle	group	23.603	1	23.603	8.793	0.006
		9.154	1	9.154	5.062	0.033
		20.036	1	20.036	17.593	0.000
		25.648	1	25.648	16.440	0.000
		17.644	1	17.644	9.125	0.005
		27.112	1	27.112	24.213	0.000
		16.344	1	16.344	6.546	0.016
		10.322	1	10.322	10.544	0.001
		10.378	1	10.378	8.912	0.006
		6.838	1	6.838	8.771	0.006
	error	75.175	28	2.684		
		50.637	28	1.808		
		31.888	28	1.139		
		43.683	28	1.560		
		54.139	28	1.934		
		31.351	28	1.120		
		69.912	28	2.497		
		19870	28	0.710		
		32.606	28	1.164		
		21.827	28	0.780		

$* P \leq 0/05$

DISCUSSION AND CONCLUSION

This study aimed to examine the effectiveness of group-based Acceptance and Commitment Therapy (ACT) on mindfulness and health-oriented lifestyle in diabetic patients. The results indicated that ACT is effective in improving mindfulness in diabetic patients, with the experimental group showing significant improvements in mindfulness scores. These findings are consistent with those of Heidari et al. (2017), who investigated the effectiveness of group-based ACT on mindfulness and found significant differences between the experimental and control groups across all dimensions of mindfulness at three stages of the study. Similarly, McKernan and Wools (2014) demonstrated the effectiveness of ACT in improving mindfulness in patients with chronic conditions. Hayes et al. (2011) also showed that the use of ACT-based methods and mechanisms, such as specific processes and exercises, positively impacts mindfulness. To explain these findings, it is important to note that ACT is grounded in the theory of "relational frames," which suggests that the human mind is continuously constructing relationships. ACT posits that our subjective experience is dynamic and incremental rather than diminishing, and thus, efforts to suppress or reduce thoughts and emotions are ultimately ineffective (Safri Mousavi, 2016). Therapeutic approaches like ACT, which emphasize acceptance, increasing awareness, staying present in the moment, observing without judgment, and avoiding experiential avoidance, can significantly enhance the effectiveness of therapeutic interventions. By fostering psychological flexibility, ACT helps patients develop mindfulness,

which enables them to better cope with the challenges and difficulties of their condition.
In general, Acceptance and Commitment Therapy (ACT) aims to first increase an individual's psychological acceptance of their mental experiences—such as thoughts, emotions, and sensations. It teaches patients that attempts to avoid or control these unwanted experiences are ineffective and counterproductive, as such attempts often intensify the very emotions or thoughts they seek to avoid. The next step is to enhance the individual's awareness in the present moment. Following this, patients are taught to separate themselves from their mental experiences through a process known as cognitive defusion, which allows them to observe their thoughts without becoming entangled in them. The fourth step focuses on reducing excessive self-focus or the personal narrative (such as adopting a victim mentality) that individuals have constructed. In the fifth step, ACT helps individuals clarify their core personal values, which are then used to guide behavior and decision-making. The final step motivates the patient to take action in alignment with these identified values and goals, while continuing to accept their mental experiences, whether they are positive or negative (Lama et al., 2014). These steps work together to enhance mindfulness, which is a key aspect of ACT. ACT's relationship with Eastern cultures, particularly the Buddhist tradition, also aligns with spiritual and religious practices in Iran. In this context, spiritual beliefs are seen as cognitive constructs that help reduce the gap between one's current state and their ideal goals. Acceptance is one of the core principles of mindfulness, and the quality of awareness—cultivated through mindfulness training—supports the development of psychological flexibility. This combination of acceptance and awareness is central to reducing psychological suffering and fostering well-being (Abiar et al., 2018).
The research findings also indicated that Acceptance and Commitment Therapy (ACT) is effective in promoting a health-oriented lifestyle among diabetic patients. In the experimental group, ACT led to improvements across all components of a health-oriented lifestyle for diabetic patients. These findings align with the results of previous studies, such as Zhang et al. (2018), who examined the effectiveness of ACT on behavior change related to health-oriented lifestyles and confirmed its efficacy; Fathi Ahmad Sarai (2016), who investigated ACT's impact on the quality of life in individuals with type 2 diabetes and found that ACT improved both the quality of life and lifestyle in post-tests and three-month follow-ups; Norian et al. (2015), who reported improvements in lifestyle after ACT; and Behrouz et al. (2016), who demonstrated the effectiveness of ACT in addressing psychological symptoms, coping styles, and quality of life in patients with type 2 diabetes. To explain these findings, it is important to understand that ACT theorists assert that a key factor in the development and maintenance of psychological problems is experiential avoidance—the tendency to negatively evaluate internal experiences such as thoughts, feelings, and emotions, and the reluctance to engage with them. This avoidance leads individuals to attempt to control or escape these experiences, which can interfere with effective functioning (Hayes, 2004). Hayes suggests that ACT does not aim to eliminate harmful factors; rather, it encourages clients to accept their thoughts and emotions and break free from the limiting verbal rules that have caused their problems. By ceasing the struggle with these issues, clients gain greater flexibility and psychological health. ACT is fundamentally process-oriented, focusing on enhancing acceptance of psychological experiences and encouraging commitment to meaningful, flexible, and adaptive activities, irrespective of the content of one's psychological experiences. The therapeutic techniques in ACT do not aim to promote rational, logical, or effective thinking, nor do they attempt to encourage specific emotions. Instead, they focus on reducing the avoidance of psychological experiences and enhancing awareness, particularly by focusing on the present moment in a non-confrontational and non-judgmental way. In this process, patients learn to distance themselves from pain and distress, thus reducing the impact of these negative experiences on their behavior (Kashdan et al., 2006). As a result, patients experience improved psychological health, enhanced accident prevention, and better physical well-being, all of which are essential components of a health-oriented lifestyle.
In explaining the obtained results, it can be added that Acceptance and Commitment Therapy (ACT) defines values as a lifestyle in which individuals purposefully act to address problems

and enhance well-being. ACT teaches clients to distinguish between choice and reasoned judgment, allowing them to select and commit to values that are meaningful to them. The core processes of defusion, acceptance, values clarification, and committed action help clients take responsibility for behavioral changes that align with their values. By focusing on values, ACT encourages clients to engage in therapy with greater motivation and a sense of purpose. In the case of diabetic patients, the ACT sessions helped them embrace a healthy and vibrant life while simultaneously accepting the suffering they may experience due to their condition. This therapy allowed the patients to focus on the present moment, identify their core values and life goals, and accept what they could not change. Through this process, patients were able to move toward a healthier lifestyle by accepting their current realities and working towards meaningful goals. In ACT, clients are encouraged to concentrate on what truly matters to them in various life domains, including career, family, intimate relationships, friendships, personal growth, health, spirituality, and other aspects of well-being. Given that diabetes affects many areas of an individual's physical and psychological health, using ACT's techniques in therapy sessions can foster better adaptation and progress. By setting specific goals in domains that are personally valuable and then taking committed action toward those goals—while recognizing and accepting psychological barriers—patients increase their motivation to make meaningful changes. The intervention tactics in ACT can vary greatly depending on the individual and their specific issues, emphasizing the flexibility of the therapy in addressing the unique needs of each client (Hayes, 1994).

Based on the results obtained from this study, we will examine practical suggestions for enhancing the effectiveness of this type of therapy below.

- Presenting the research results to psychologists and chronic disease clinics, especially diabetes, to improve counseling for patients, their families, and their close ones.
- Sharing the results of this research at international seminars and conferences to inform other researchers.
- Offering various workshop classes for individuals who work with chronic and diabetic patients, especially medical and psychological professionals active in this field.

Efforts to Increase the Use of Acceptance and Commitment Therapy over Pharmacological and Clinical Methods in Improving the Psychological Status of Diabetic and Chronic Patients

Among the limitations of this research are: lack of sufficient time for conducting the study during follow-up periods, limited access to up-to-date and relevant resources on the topic, lack of cooperation from some diabetic patients in completing and submitting the questionnaires on time due to their length, limited sample size due to the small size of the city, lack of motivation from diabetic patients in responding to the questionnaires, possibly due to their numerous problems or reluctance to let others know the reality of their situation, and lack of proper cooperation from hospitals and medical centers in identifying and interacting with patients.

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