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The Effectiveness of Compassion-based Therapy on Rumination and Concern in Patients with Type I Diabetes

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Abstract

Objective: According to the studies, 80% of patients with diabetes suffer from concern and rumination in their life cycle. The present study aimed to investigate the effectiveness of compassion-based therapy (CBT) on rumination and concern in patients with type 1 diabetes.

Materials and Methods: A quasi-experimental study evaluated the effect of CBT on women with type 1 diabetes. Thirty women with type 1 diabetes, recruited from Qazvin city health centers between October 2024 and March 2025 and meeting inclusion criteria, were purposively sampled and randomly assigned to the CBT (n= 15) or control (n= 15) group. The intervention group received eight weekly 90-minute sessions. The control group received no intervention. The Pennsylvania State Worry Questionnaire (PSWQ) and Rumination Questionnaire (RQ) were administered pre- and post-intervention, and data were analyzed using ANCOVA in SPSS version 26.

Results: A comprehensive analysis of variance has revealed notable disparities between the experimental and control groups in terms of worry and rumination. The results indicate a moderate effect size for worry (η= 0.29; F= 10.63; *P*= 0.003). Similarly, rumination also shows a strong effect size (η= 0.39; F= 17.23; *P*< 0.001).

Conclusion: CBT effectively reduces rumination and worry in patients with type I diabetes in Qazvin, suggesting its potential as a supportive treatment for these symptoms.

Keywords: Compassion-based therapy, Rumination, Worry, Type I diabetes, Qazvin city

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Introduction

Type 1 diabetes (T1D) incidence varies globally. In the US, 1 in 400 children and adolescents are affected. Iran reports a high prevalence of non-communicable diseases, with an annual T1D incidence of approximately 3.7 per 100,000. Worldwide incidence ranges from 1 to 35 per 100,000 in those under 14, often higher in males, sometimes 1.3 to 2 times greater in males over 15. East Asian and Native American populations exhibit the lowest adult rates, while Finland, Sardinia, and Sweden report the highest (1). The increasing global prevalence of T1D in adults, with its largely unknown cause, has spurred psychological and physical treatment research (1).

Structural equation modeling suggested that baseline rumination mediated the effects of baseline metacognitive variables on 6-month distress in Type 1 and 2 diabetes (2). Rumination, a maladaptive coping mechanism characterized by repetitive and passive self-focused attention on negative emotions and experiences (3), perpetuates the impact of stressful life events and increases psychological distress (4). This negative information processing style is associated with heightened negative emotions like anger and distress and has historically been linked to depression. However, recent research identifies rumination as a transdiagnostic construct relevant across mood, anxiety, and psychotic disorders. As a passive coping style, it involves a constant focus on the symptoms, causes, and consequences of problems without effective problem-solving (5). Furthermore, rumination, along with thought suppression, depression, and anxiety, significantly predicts suicidal thoughts (6).

The impact of habitual worry on mental health in T1D cannot be ignored. The results demonstrate that worry is positively correlated with depression. What is more, the relationship between habitual worry and depression was mediated through illness acceptance (7). Adapting the metacognitive model of pathological worry may explain depression severity in T1D patients for two reasons: prior research models have shown significant results (8), and chronic diseases like diabetes are dynamic and significantly impact daily life. Given that effective treatment relies heavily on patient self-care, worry may serve as a cognitive coping strategy for managing the uncertainty and self-care demands inherent in diabetes treatment. The metacognitive model differentiates between worry as a coping mechanism for daily challenges and "worry-inducing" worry, which involves negative appraisal of the worry itself. While positive appraisals of worry can be adaptive (e.g., "Worrying about my blood glucose ensures preparation"), negative appraisals appear to exacerbate blood sugar levels. Sensitivity to threat stimuli can impair adaptive coping due to deep, cyclical, and pathological worry (e.g., "My worry is uncontrollable, I will lose my mind") (7).

Psychotherapy can mitigate these complications, potentially strengthening physical health by addressing psychological well-being. Considering psychological treatments is crucial for diseases like diabetes, which have both direct and indirect psychological effects. Existing psychological interventions aim to promote positive and reduce negative factors in diabetic patients (9). Evidence suggests these interventions can improve disease-related secondary factors and even complement biological treatments. Compassion-based psychotherapy, increasingly favored by therapists, addresses the pressure experienced by diabetic patients. This approach targets issues prevalent in diabetes, such as perceived lack of control, coping demands, social isolation, worry, anxiety, depression, and rumination (10).

Compassion-focused therapy (CFT), developed by Paul Gilbert in 2007, is a prominent third-wave behavioral therapy. It integrates cognitive techniques with evolutionary, social, developmental, and

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Buddhist psychology, as well as neuroscience, bridging the gap between cognition and emotion in traditional CBT. A core element of CFT is compassionate mind training, which cultivates inner softness, security, and relief through self-compassion and compassion for others (10). This training helps clients modify problematic cognitive and emotional patterns linked to anxiety, anger, worry, self-criticism, depersonalization, and rumination. Rooted in biological evolution, CFT increasingly emphasizes compassion as a guide for behavior in challenging situations (11). Shame and anxiety, often stemming from negative self-image (particularly prevalent in diabetic patients due to the disease's nature), can hinder patients' interactions with themselves and others (7).

Despite treatment advances, many patients experience adverse effects and complications, reducing psychological well-being, physical function, and life expectancy. These complications impose substantial healthcare costs due to associated physical and psychological problems, including rumination, depression, anxiety, and cognitive issues**.** Cognitive problems and psychological disorders can hinder treatment and overall well-being, necessitating a focus on psychological structures in this population. Rumination and worry, critical aspects of psychological health, should be prioritized in mental health interventions for T1D (12). Research demonstrates the significant role of rumination and impaired cognitive function in worry and anxiety. Limited research explores rumination and worry in this population with a therapeutic approach. Investigating these factors can contribute to understanding the pathology of psychological well-being in individuals with T1D. Identifying high-risk individuals through educational therapy may enable proactive management of psychological and physical challenges.

Studies in Iran indicate a lack of research on the effectiveness of CFT for worry and rumination in women with T1D specifically in Qazvin. Therefore, this study investigates whether CFT impacts worry and rumination in this population. According to the studies conducted in Iran, no research has been conducted in the field of the effectiveness of this therapeutic approach CFT on worry and rumination in women with T1DM in the city of Qazvin. Finally, the present study aimed to investigate the effectiveness of compassion-based psychotherapy on rumination and worry in patients with T1D in Qazvin.

Material and Methods

This semi-experimental study employed a pre-test/post-test, two-group (experimental and control) design. Compassion-based psychotherapy, the independent variable, was administered to the experimental group, and its effect was assessed by comparing post-test scores between the experimental and control groups. The study population comprised women with T1D registered at Qazvin city health centers between October 2024 and March 2025. Cohen's formula (1981) was used to determine the sample size.

This formula includes Type I error (α), Type II error (β), Z percentage points above the normal distribution, expected mean difference $\mu_1 - \mu_2$ between the two groups studied, variance of the first group σ^2, and variance of the second group σ_2^2. Typically, the rate α is set at 0.05 and β 0.1.

The power analysis indicating a large effect size, a sample size of 10 per group was initially calculated. To account for potential attrition and align with similar studies (13), the sample size was increased to 15 participants per group, resulting in a total of 30 participants. These 30 women with T1D residing in Qazvin were purposefully selected from health centers based on case numbers and admission dates, with a review of exclusion criteria. If a potential participant was excluded, the next available case number, incremented by five, was considered. Participants completed questionnaires anonymously, and exclusion criteria were reiterated at the start to ensure eligibility.

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Inclusion criteria included informed consent, T1D diagnosis, female gender, and abstinence from tobacco, drugs, and cigarettes. Exclusion criteria encompassed the use of psychiatric or psychotropic medications, missing more than two therapy sessions, concurrent participation in other therapeutic interventions, substance abuse, and self-reported psychiatric disorders.

Following coordination with health centers in Qazvin to identify the desired sample, participants were provided with information about the study, treatment courses, and objectives. Informed consent was obtained, emphasizing the voluntary nature of participation. Participants were then randomly assigned to either an experimental or a control group. The experimental group received emotion-focused couple therapy, while the control group received no intervention. Post-intervention, both groups completed emotion regulation and marital adjustment questionnaires.

Ethical considerations were paramount throughout the study. Participants received a comprehensive explanation of the research, and their opinions were valued. All participants provided written informed consent and were informed of their right to withdraw at any time. Confidentiality was strictly maintained, and participants remained anonymous. The researcher ensured respect for all individuals involved, avoiding discrimination based on ethnicity, gender, or socioeconomic status. Following the study, the control group was provided with educational materials upon request.

Pennsylvania State Worry Questionnaire (PSWQ)

The 16-item questionnaire, developed by Meyer et al. (14) and rated on a 5-point Likert scale (1= not at all true, 5= very true), demonstrated good content validity (CVI= 0.75, CVR= 0.85), internal consistency (α= 0.79), and test-retest reliability (ICC= 0.76) (15). Dehshiri et al. (15) reported a Cronbach's alpha of 0.88 and a test-retest reliability of 0.79. In this study, internal consistency was also high (α= 0.87).

Rumination Questionnaire (RQ)

The 55-item Rumination Questionnaire (Nolen- Hoeksema et al., 16) assesses rumination levels using a 4-point scale (0=almost never to 4=almost always), with higher scores indicating greater rumination. A score above the cutoff of 35 suggests significant rumination. The questionnaire has demonstrated test-retest reliability (r=0.82, Nolen-Hoeksema et al., 16) and concurrent validity (r= 0.55 with the Beck Depression Inventory, Nolen-Hoeksema et al., 16). Bagherinezhad et al. (17) standardized the questionnaire in Iran, reporting a Content Validity Index (CVI) of 0.84, a Content Validity Ratio (CVR) of 0.86, and a Cronbach's alpha of 0.84. In this study, the alpha coefficient for this scale was 0.60.

A compassion-based treatment protocol adapted from Gilbert typically draws from Paul Gilbert's Compassion Focused Therapy (CFT) (18) (Table 1).

Data analysis

The information obtained from the initial assessment and final assessment was examined using SPSS version 26. An ANCOVA analysis was utilized to evaluate any discrepancies in post-test scores between groups while accounting for initial levels. Before conducting statistical tests, the normal distribution of data for difficulty factors among diabetic women was assessed using the Shapiro-Wilk test. Box's test was performed to verify that there was homogeneity in variances across the different groups.

Ethical considerations

Ethical approval was obtained by the Islamic Azad University Ethics Committee, West Tehran Branch, Iran. (ethical code: IR.IAU.WT.REC. 1403.053).

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Table 1. Compassion-based treatment protocol adapted from Gilbert (2009) (18)

Sessions	Meeting content	Homework
First session	Introduction and familiarization of group members with each other and with the therapist. The purpose of forming the group, the importance of the problem, defining the role of defective psychological factors in diabetes, introducing compassion-based therapy to psychological approaches in diabetes psychological education, determining the outline and general structure of the sessions, getting to know compassion and self-compassion.	
Second session	Investigating the role of worry and rumination based on the compassion-based therapy model, presenting techniques and ways to succeed in achieving a reduction in worry and rumination based on the compassion-based therapy model, presenting techniques and ways to succeed in achieving a reduction in worry and rumination by acting according to the standards that individuals have considered in the valuable areas of their lives. In this way, they gain the ability to reduce anxiety, worry, and rumination. Reviewing important topics, receiving feedback.	An exploration of the old and new brain, the three core components of CFT, and their connection to worry and rumination.
Third session	Review of the previous session: Introduction to the role of self-compassion, compassion for others, goals, values, philosophy of life, implementation of the model of identifying areas related to worry and rumination, practice of dynamic activities to produce values in the life area, summary of the session, receiving feedback.	Home-based breathing exercises for emotional regulation.
Fourth session	Review of the previous session: Using the attitude change step to improve symptoms of worry and rumination in areas of life where these factors are dominant, training in attitude change based on the principles of cognitive therapy, mental training in the technique of thinking in behavior, training in the technique of familiarizing oneself with risky and risky behaviors in diabetes, review of the session, receiving feedback.	Doing the mind -making technique at home and its relationship. With worry and rumination
Fifth session	Training in using the strategy of changing goals and attitudes and desirable criteria, using the technique of gaining insight into consciousness towards oneself and others with a compassionate mind, training in changing priorities and important areas in diabetes using compassionate insight, review of the session, receiving feedback.	Being mindful of the present moment and engaging with it rather than avoiding or escaping it.
Sixth session	teaching important principles of compassion including: the principle of lifestyle, the principle of seeking peace or being a sadist, the principle of being popular or immersed in social connections, and .Review of the session, receiving feedback.	Short -term and long -term goals for personal development and improvement, taking the necessary steps to achieve these goals and practicing it are other compassionate exercises.
Seventh session	Review of the previous session, teaching important principles of optimism, the principle of solitude, the principle of intimacy with friends, the principle of kindness to oneself and others, the principle of compassion to oneself and others, the principle of calming breathing and feeling comfortable, the principle of forgiving and forgiving, the principle of putting aside and postponing, the principle of accepting and forgetting, review of the session, receiving feedback	Essential self-compassion exercises include focusing on positive thinking by reflecting on your achievements, skills, and past experiences.
Eighth session	Review of the previous session, providing solutions to increase the quality of life considering the role of the compassionate mind with diabetes, spontaneous education with positive self-induction and problem solving focused on being sadist, compassion-based imagery through spontaneous education, implementing desired responses in dealing with the physical and mental symptoms of diabetes and providing the necessary feedback, reviewing and concluding compassion-based treatment techniques and presenting a summary of strategies and techniques, and finally implementing a poster and concluding treatment.	Maintaining good physical health involves taking care of the body through healthy nutrition, sufficient sleep, and avoiding negative thoughts, along with regular exercise, which can boost energy levels. All of these practices can be viewed as self-compassion.

Results

Table 2 shows that most participants were 37-45 years old (63.3%), married (73.3%), had a high-school education (53.3%), and were housewives (50%). Half the participants were classified as obese. Chi-square tests revealed no significant group differences in age, marital status, or job (all $P> 0.05$), but the intervention group had significantly higher education levels and lower BMIs (both $P< 0.05$).

Table 3 shows that post-test rumination scores were lower in the experimental group (M= 39.53) compared to the control group (M= 34.46), representing a decrease from the experimental group's pre-test score of 34.26. The experimental group experienced a mean rumination score decrease of 5.27, while the control group showed a lower change of -1.14, indicating a more significant shift in rumination levels in the experimental group. Similarly, post-test worry scores were lower in the experimental group (M= 116.8) than in the control group (M= 162.6), a decrease from the experimental group's pre-test score of 160.33. The experimental group's mean worry score decreased by 43.53, whereas the control group's

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change was lower (-2.80), suggesting a notable reduction in worry within the experimental group. Adjusted means were calculated (Table 3) to control for pre-test effects using pre-test scores as covariates. Analysis of covariance showed no significant interaction between pre-test worry, rumination, and group, supporting the homogeneity of regression slopes hypothesis.

Based on the findings in Table 4, it can be inferred that with a confidence level of 95% and a margin of error of 0.05%, the significance level for all tests is lower than 0.05. This indicates that the null hypothesis is rejected and the research hypothesis is validated, showing a notable disparity between the two groups in at least one of the variables being studied.

Table 5 indicated that significant differences between the experimental and control groups for both worry (η= 0.29, F= 10.63, *P*= 0.003) and rumination (η= 0.39, F= 17.23, *P*= 0.001), thus supporting the research hypothesis.

Table 2. Comparison of demographic data at the baseline

Variables	Categories	Groups		Comparison
		Intervention Number	Control Number	
age	20-25	3	2	*P*= 0.360
	26-36	3	3	
	37-45	9	10	
Marital status	Married	12	10	*P*= 0.285
	Single	3	5	
Education	Illiterate	1	5	*P*= 0.000
	High school	9	7	
	Higher education	5	3	
Job	Housewife	8	7	*P*= 0.376
	Employed	3	5	
	Rented	4	3	
BMI	Overweight (>25)	6	9	*P*= 0.0001
	Underweight (<18.5)	4	2	
	Healthy (18.5-25)	6	4	

Table 3. Results of descriptive indicators

Variables	Group	Stage	Mean	Adjusted Means	SD
Rumination	Intervention	Pre-test	39.53	-	8.82
		Post-test	34.26	33.81	7.57
	Control	Pre-test	34.46	-	7.12
		Post-test	35.60	34.73	7.28
Worry	Intervention	Pre-test	160.33	-	29.24
		Post-test	116.8	115.47	26.71
	Control	Pre-test	159.8	-	30.25
		Post-test	162.6	160.91	26.25

Table 4. Results of the analysis of covariance (MANCOVA) test

Test	Value	F	df error	*P*-value
Pillai's Trace	0.605	19.16	25	0.001
Wilk's Lambda	0.395	19.16	25	0.001
Hotelling's Trace	1.53	19.16	25	0.001
Roy's Largest Root analysis	1.53	19.16	25	0.001

Table 5. The multivariate analysis of variance for worry and rumination in the experimental and control groups

Variable	Source	SS	MS	F	*P*-value
Between groups	Worry	50.21	50.21	10.63	0.003
	Rumination	126.99	126.99	17.23	0.001
Error	Worry	122.77	4.72		
	Rumination	191.60	7.36		
Total	Worry	8278			
	Rumination	44287			

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The experimental group exhibited significantly higher levels of worry and rumination compared to the control group.

Discussion

This study investigated the effect of compassion-based psychotherapy on rumination and worry in patients with T1DM in Qazvin. Results confirmed the hypothesis that this therapy effectively reduces rumination and worry in this population (9,12,19-27).

Compassion-based psychotherapy aims to alleviate psychological distress by fostering empathy and self-acceptance. Rumination, characterized by persistent, negative thinking often centered on past or future issues, can manifest in type 1 diabetes patients as anxieties about blood sugar, complications, or treatment adherence (16). Similarly, worry, a form of anxious future-oriented thinking, can hinder disease management and increase feelings of stress (28). Research suggests compassion-based interventions effectively reduce both rumination and worry. For instance, a study involving type 2 diabetes patients demonstrated significant reductions in rumination and worry, alongside improved quality of life, following compassion-based therapy (29). Further research on patients with chronic illnesses indicates that compassion-based psychotherapy reduces anxiety and stress, with sustained positive effects on worry (30).

Compassion-based psychotherapy aims to cultivate self-acceptance and compassion by targeting three brain systems. The threat system, responsible for stress responses, can be overactive in diabetic patients, particularly when facing anxieties about potential health complications. The reward system, which motivates goal achievement, is often disrupted when patients avoid necessary self-care practices like insulin injections or blood sugar monitoring. Compassion-based therapy seeks to strengthen the compassion system, promoting calm and reducing stress, thereby shifting patients from a state of threat to one of acceptance (31). Interventions focus on reducing threat system activity and bolstering compassion, helping patients overcome negative associations. Therapists guide patients to accept themselves and reduce self-blame, a key component of rumination in diabetes related to perceived poor disease control. Through self-compassion techniques, patients learn to treat themselves with kindness and understanding instead of harsh criticism. This shift in perspective significantly reduces rumination intensity, enabling patients to view mistakes with acceptance and offer self-forgiveness (22).

Compassion-based psychotherapy, using techniques like meditation and mindfulness, can help diabetic patients reduce negative rumination and enhance inner peace. By cultivating self-compassion, patients experience more positive emotions, breaking the cycle of negative thinking and fostering self-trust (32). Acceptance, a core principle, allows patients to acknowledge anxieties about their diabetes without blame, leading to a sense of calm and control (33). This therapy also encourages a shift towards practical problem-solving, enabling patients to focus on crucial tasks like diet, blood sugar management, and treatment adherence, thereby lessening anxieties about future complications (34). Compassion-based therapy fosters feelings of safety and self-support in stressful situations, reducing anxiety and improving self-confidence.

This study, limited by research resources and time constraints, lacked a follow-up period, making it unclear how durable the training was. Relying solely on self-reported questionnaires introduced potential bias. The sampling method used was intentional, which could lead to biased selection. The study population comprised individuals with type 1 diabetes in Qazvin, limiting the generalizability of findings. This study examined the reliability of the RQ questionnaire by evaluating its effectiveness through the calculation of Cronbach's alpha value, which was found to be 0.60. This result indicates that the questionnaire may not be as reliable as expected, as it falls below the widely accepted threshold of 0.7.

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Due to this, there are concerns about the accuracy of the results related to rumination obtained from using the RQ questionnaire, suggesting the need for a more dependable questionnaire to be utilized in future studies. The findings from this research are specific to females who have been diagnosed with type 1 diabetes and may not apply to males or individuals with other forms of diabetes. Since there was not a significant amount of follow-up conducted over an extended period, the overall impact of the treatment remains unknown. It is recommended that this aspect be highlighted in the suggestions provided by the authors for upcoming studies that require long-term monitoring. Future research should investigate the effectiveness of compassion psychotherapy on type 2 diabetes patients and compare it to other third-wave therapies regarding worry, rumination, and other psychological variables in type 1 diabetes.

Conclusion

Compassion-based psychotherapy effectively reduces rumination and worry in type 1 diabetes patients by strengthening compassion pathways, decreasing threat system activity, and promoting acceptance and relaxation, thereby improving patients' ability to manage negative thoughts and focus on positive disease management.

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Conflict of Interest

The authors declared no conflict of interest.

Authors' contributions

Z.A.: writing- original draft and analyzing data, supervision and conceptualization, collecting the data and conceptualization, AM.: Supervision and methodological contributions. All the authors critically revised the manuscript, agree to be fully accountable for the integrity and accuracy of the study, and read and approved the final manuscript.

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