

Comparison of the Effectiveness of the Matrix Model and Quality-of-Life Therapy on Distress Tolerance in Women With Stimulant Use Disorder

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Article type:
Original Research

Article history:

Received 11 July 2026

Revised 06 September 2026

Accepted 15 September 2026

Initial Publish 10 October 2026

Published online 01 May 2027

ABSTRACT

In recent decades, stimulant use disorder, particularly methamphetamine use disorder, has emerged as a major public health challenge associated with extensive biological, psychological, and social consequences. Research evidence indicates that women who use stimulants, because of their greater vulnerability in domains such as distress tolerance, experience more severe consequences and different patterns of relapse and impairment. Therefore, the present study aimed to compare the effectiveness of the Matrix Model and Quality-of-Life Therapy in improving distress tolerance among women with stimulant use disorder. Using an experimental design with three groups and three measurement occasions (pretest, posttest, and 2-month follow-up), 45 women were selected through convenience sampling from all women with stimulant use disorder who attended the Baharan Addiction Treatment Center in Zahedan during 2021–2022. After meeting the inclusion criteria, participants were randomly assigned to three groups: Quality-of-Life Therapy ($n = 15$), Matrix Model treatment ($n = 15$), and control ($n = 15$). The two experimental groups received the standard Matrix Model and Quality-of-Life Therapy protocols during the designated treatment sessions, whereas the control group received no structured intervention during the study period. Distress tolerance was assessed using the Distress Tolerance Scale developed by Simons and Gaher. Data were analyzed using descriptive statistics and repeated-measures analysis of variance. The findings showed that both the Matrix Model and Quality-of-Life Therapy significantly increased distress tolerance compared with the control group, and these improvements were maintained at the 2-month follow-up ($p < .001$). Furthermore, the results indicated no statistically significant difference between the two interventions in their effectiveness ($p > .05$). These findings highlight the importance of structured interventions such as the Matrix Model and Quality-of-Life Therapy for enhancing distress tolerance among women with stimulant use disorder and may provide guidance for designing effective interventions for this population.

Keywords: Substance use disorder, Matrix Model, Quality-of-Life Therapy, distress tolerance

How to cite this article:

ShahBakhsh, Sh., Mansouri, A., Akbarzadeh, M., & Bolghan-Abadi, M. (2027). Comparison of the Effectiveness of the Matrix Model and Quality-of-Life Therapy on Distress Tolerance in Women With Stimulant Use Disorder. *Mental Health and Lifestyle Journal*, 5(3), 1-20. <https://doi.org/10.61838/mhlj.309>

Introduction

Stimulant use disorder, particularly methamphetamine use disorder, has become a major public health concern because of its increasing prevalence, chronic relapsing course, and extensive biological,

psychological, interpersonal, and socioeconomic consequences. Stimulant use is associated with impaired cognitive functioning, mood disturbances, impulsivity, psychiatric symptoms, deterioration of social functioning, and substantial difficulties in maintaining stable family and occupational roles. At the global level, the rapid expansion of stimulant markets and the increasing burden associated with methamphetamine and other stimulant-type substances have created significant challenges for prevention, treatment, and rehabilitation systems (1). Although pharmacological interventions have been investigated for stimulant use disorder, available evidence suggests that psychosocial and behavioral interventions continue to play a central role in treatment because no single medication has demonstrated consistently robust efficacy across all populations (2). The complexity of stimulant use disorder is particularly apparent in populations exposed to multiple psychosocial stressors, psychiatric symptoms, limited social support, and recurrent treatment failure. These conditions may intensify craving, undermine motivation for abstinence, increase emotional vulnerability, and contribute to repeated relapse. Consequently, contemporary approaches to stimulant use disorder increasingly emphasize structured and multidimensional interventions that address not only substance use itself but also emotion regulation, distress management, quality of life, interpersonal functioning, and relapse-prevention skills (3).

Women with stimulant use disorder constitute an especially important clinical population because the etiology, psychosocial consequences, treatment needs, and recovery trajectories of substance use disorders may differ substantially by gender. Gender-related differences have been reported in patterns of substance initiation, motivations for continued use, psychiatric comorbidity, trauma exposure, social stigma, caregiving responsibilities, and access to treatment services (4). Recent evidence has also demonstrated gender differences in stimulant misuse and its epidemiological distribution, highlighting the importance of developing interventions that are sensitive to the specific characteristics of women who misuse stimulants (5). In Iran, women who use drugs may encounter additional social, cultural, and familial pressures that can deepen the adverse effects of addiction and complicate treatment engagement and recovery. Qualitative evidence concerning Iranian women who use drugs indicates that their experiences are frequently shaped by social judgment, damaged family relationships, identity disruption, and progressive deterioration in perceived social and personal standing (6). Furthermore, gender differences have been observed in patterns and consequences of opioid and stimulant poisoning in Iran, providing additional evidence that biological and psychosocial factors associated with substance use may operate differently in women and men (7). These findings underscore the need for therapeutic programs that address emotional and psychosocial vulnerabilities in women in addition to targeting substance-related behaviors.

Methamphetamine is particularly concerning because its adverse consequences extend beyond intoxication and withdrawal to multiple domains of psychosocial functioning. Chronic methamphetamine use has been associated with impaired interpersonal functioning, psychological distress, disrupted occupational performance, family conflict, and broader deterioration in psychosocial adjustment (8). These impairments can persist during periods of abstinence and may become significant triggers for renewed substance use. Treatment is therefore unlikely to be sufficient if it focuses only on cessation of drug use without addressing the psychological mechanisms that contribute to relapse. Previous research has demonstrated that interventions targeting broader aspects of psychological functioning, such as life satisfaction, self-compassion, self-criticism, perceived stigma, and quality of life, can be clinically valuable

for individuals with substance use disorders (9-11). From this perspective, recovery can be conceptualized not simply as the absence of substance use but as a process of reconstructing adaptive emotional, behavioral, interpersonal, and lifestyle patterns that support sustained abstinence and psychological well-being.

One psychological construct that appears particularly relevant to this process is distress tolerance. Distress tolerance refers to the perceived or actual capacity to withstand aversive emotional, cognitive, and physiological states without resorting to maladaptive avoidance or impulsive behaviors. Low distress tolerance may contribute to substance use because psychoactive substances can function as rapid strategies for escaping, suppressing, or modifying unpleasant internal experiences. When individuals perceive distress as unbearable, threatening, or impossible to regulate, they may become more likely to engage in substance use as a form of experiential avoidance. Meta-analytic evidence suggests that reduced distress tolerance is observed across a range of psychiatric and behavioral conditions, including substance use disorders, eating disorders, and borderline personality disorder, indicating that it represents an important transdiagnostic mechanism of psychopathology (12). Distress tolerance has also been linked to treatment-related outcomes and substance-use behaviors in clinical populations, suggesting that an individual's ability to endure discomfort may influence motivation for treatment, coping responses, and vulnerability to maladaptive substance use (13). Consequently, enhancing distress tolerance may represent an important therapeutic target in the treatment of stimulant use disorder.

The clinical importance of distress tolerance is closely connected to emotion regulation. Individuals with substance use disorders frequently experience difficulties identifying, accepting, and effectively regulating emotional states, and these difficulties may increase reliance on substances as short-term emotion-regulation strategies. A systematic review and meta-analysis has shown that emotion-regulation deficits are strongly implicated in substance use disorders and may play a central role in the maintenance of problematic substance use (14). Among women with substance use disorder, stressful experiences and psychological distress may be especially relevant because exposure to chronic stress can increase emotional reactivity and undermine adaptive coping capacities (15). In addition, early adverse experiences may contribute to later substance-use risk partly through physiological reactivity and reduced distress tolerance, indicating that distress tolerance may serve as an important link between vulnerability and maladaptive coping behavior (16). Thus, interventions that improve the ability to remain engaged with difficult emotional experiences without resorting to substance use may strengthen treatment outcomes and reduce relapse vulnerability.

The Distress Tolerance Scale has been widely used to assess perceived ability to tolerate negative psychological states, and its measurement properties have been examined across populations with different behavioral and psychological characteristics (17). Within the context of substance use disorder, distress tolerance is especially important because abstinence often involves exposure to craving, withdrawal-related discomfort, interpersonal conflict, negative affect, shame, and uncertainty about recovery. Individuals with limited distress tolerance may interpret these experiences as intolerable and may consequently return to substance use to obtain immediate emotional relief. This process can become self-reinforcing because repeated avoidance of distress reduces opportunities to develop adaptive coping skills and increases dependence on substance-related behaviors. Therefore, interventions capable of strengthening coping, emotional regulation, behavioral flexibility, and tolerance of unpleasant internal states may contribute substantially to relapse prevention and long-term recovery.

One of the most established structured interventions for stimulant use disorder is the Matrix Model. The Matrix Model is an intensive, multicomponent psychosocial treatment originally developed specifically for stimulant dependence. It combines elements of cognitive-behavioral therapy, motivational enhancement, relapse prevention, psychoeducation, contingency-related strategies, self-monitoring, family involvement, and behavioral skills training. Its structured format is particularly relevant to stimulant use disorder because patients are taught to recognize craving triggers, anticipate high-risk situations, modify maladaptive patterns, develop coping responses, and maintain motivation for abstinence. In Iran, the Matrix Model has been applied in treatment and rehabilitation settings and has shown feasibility and clinical utility among individuals with methamphetamine-related problems (18). Research involving Iranian women receiving methadone treatment has also suggested that Matrix-based interventions may be useful for addressing methamphetamine dependence in female populations (19). The adaptability of the Matrix Model to Iranian treatment contexts is clinically important because cultural and service-delivery factors can influence intervention acceptability and adherence.

Empirical findings also suggest that the Matrix Model may improve several variables associated with recovery. In individuals with stimulant drug abuse, structured Matrix treatment has been reported to improve abstinence-related self-efficacy, distress tolerance, and mindfulness, indicating that its therapeutic effects may extend beyond reductions in substance use itself (20). Furthermore, research evaluating Matrix-based treatment in combination with pharmacological strategies has reported improvements in addiction severity, craving, relapse-related outcomes, and mental health among individuals with methamphetamine use disorder (21). These outcomes are theoretically plausible because the Matrix Model directly addresses the behavioral and cognitive processes that maintain substance use. Through repeated identification of triggers, restructuring of high-risk routines, development of adaptive coping strategies, and monitoring of relapse-warning signs, participants may become better able to tolerate negative affect without responding through immediate drug use. Accordingly, increased distress tolerance may be one pathway through which Matrix treatment supports more stable recovery.

Nevertheless, the Matrix Model is not the only approach relevant to distress tolerance. A broader therapeutic perspective emphasizes that substance-use recovery may be strengthened when treatment helps individuals develop a more satisfying and meaningful life. Quality-of-Life Therapy is one such approach. Quality-of-Life Therapy is grounded in positive psychology and cognitive-behavioral principles and focuses on improving satisfaction across important domains of life rather than concentrating exclusively on symptoms or pathology (22). This intervention encourages individuals to identify areas of dissatisfaction, establish meaningful goals, increase engagement in rewarding activities, improve relationships, strengthen self-esteem, develop adaptive coping strategies, and create greater balance and meaning in everyday life. Such a framework may be particularly relevant to individuals with substance use disorder because long-term substance use frequently narrows the person's behavioral repertoire and disrupts meaningful sources of reinforcement. When recovery is accompanied by improvements in relationships, daily functioning, emotional health, purposeful activity, and perceived life satisfaction, the individual may have fewer reasons to rely on substances as a primary source of relief or reward.

Evidence from substance-using populations supports the potential usefulness of quality-of-life-based interventions. Quality-of-Life Therapy has been shown to improve distress tolerance and cognitive emotion

regulation among individuals with substance-use problems, suggesting that interventions focused on life satisfaction and adaptive functioning may directly affect the ability to cope with negative emotional states (23). Comparative research has also indicated that quality-of-life improvement training can enhance distress tolerance and reduce self-destructive behaviors in individuals who use substances (24). Similarly, psychotherapy based on quality-of-life improvement has been associated with reductions in emotion-regulation difficulties and improvements in relapse-prevention outcomes among individuals receiving methadone maintenance treatment (25). These findings suggest that improving broader life functioning may indirectly reduce relapse risk by strengthening adaptive emotional regulation and increasing the individual's access to non-drug sources of meaning, pleasure, competence, and interpersonal support.

The importance of targeting quality of life in substance use treatment is reinforced by studies demonstrating that psychological interventions can improve domains beyond substance use itself. Acceptance and commitment-based interventions, for example, have been associated with improved life satisfaction and sexual functioning among women with substance use disorder (9), as well as improved self-compassion and reduced self-criticism among individuals with opioid use disorder (10). Other interventions have demonstrated improvements in quality of life and reduced stigma among people who use substances (11). These findings are consistent with the broader assumption that recovery outcomes improve when therapeutic attention extends beyond abstinence to encompass psychosocial functioning, self-evaluation, interpersonal relationships, and perceived life quality. They also support the rationale for evaluating Quality-of-Life Therapy as a potentially valuable intervention for women with stimulant use disorder.

Contemporary treatment research increasingly emphasizes the importance of multimodal and person-centered approaches. Mindfulness-based and neurofeedback interventions have been investigated as adjunctive treatments for substance use disorder, reflecting growing interest in approaches that improve self-regulation and psychological flexibility in addition to controlling substance use (26). Likewise, digital and cognitive-behavioral treatment models increasingly target the cognitive and emotional mechanisms associated with substance-use behavior (3). At the service-delivery level, research on treatment expansion and access has emphasized that effective addiction care requires interventions that are not only evidence-based but also feasible, scalable, and responsive to treatment-system limitations (27). These considerations are particularly relevant for women who may face barriers related to stigma, family responsibilities, financial dependence, and limited access to specialized treatment.

Despite increasing evidence supporting both the Matrix Model and quality-of-life-oriented interventions, direct comparisons of these approaches with respect to distress tolerance remain limited, particularly among women with stimulant use disorder in Iran. This gap is important because the two interventions may influence distress tolerance through partially different mechanisms. The Matrix Model primarily addresses substance-related triggers, craving, maladaptive cognitions, relapse-warning signs, motivation, and behavioral coping skills, whereas Quality-of-Life Therapy focuses more broadly on meaningful living, life satisfaction, personal goals, emotional well-being, and engagement with rewarding life domains. Both approaches may therefore increase the individual's ability to tolerate negative emotional experiences, but it is unclear whether one produces greater improvement than the other. The available literature supports the effectiveness of structured psychosocial interventions for methamphetamine use disorder (2), demonstrates the therapeutic relevance of Matrix-based treatment in Iranian clinical populations (18, 19), and indicates

that quality-of-life-based interventions may improve distress tolerance and emotion regulation among people with substance-use problems (23, 24). However, few studies have directly compared these two treatment models in a female stimulant-using population.

Given the substantial psychosocial burden of methamphetamine use, the specific vulnerabilities experienced by women, and the central role of distress tolerance in maladaptive substance-use behavior, identifying effective psychological interventions for strengthening distress tolerance has both theoretical and clinical significance. Such evidence can assist clinicians in selecting interventions that are better matched to the needs of women with stimulant use disorder and can inform the development of structured rehabilitation programs that target both relapse-related processes and broader psychosocial functioning. Therefore, the present study aimed to compare the effectiveness of the Matrix Model and Quality-of-Life Therapy in improving distress tolerance among women with stimulant use disorder.

Methods and Materials

Study Design and Participants

The present study was an applied study in terms of purpose and an experimental study in terms of data collection method, employing a randomized pretest–posttest control-group design with a 2-month follow-up. The study included three groups: the Matrix Model treatment group, the Quality-of-Life Therapy group, and the control group. Participants were assessed at three measurement occasions, including pretest, posttest, and 2-month follow-up. The statistical population consisted of all women diagnosed with stimulant use disorder, specifically methamphetamine use disorder, who attended addiction treatment centers in Zahedan, Iran. The study sample consisted of 45 women who attended the Ba haran Addiction Treatment Center in Zahedan during the second half of 2021 and early 2022. Participants who met the eligibility criteria were recruited using convenience sampling and were subsequently randomly assigned to the Matrix Model treatment group ($n = 15$), Quality-of-Life Therapy group ($n = 15$), or control group ($n = 15$). The required sample size was estimated based on Cohen's guidelines for between-group comparisons, assuming a minimum statistical power of .80, a medium effect size ($f = 0.25$), and a significance level of $\alpha = .05$ (Cohen, 2013). Accordingly, the estimated minimum sample size was 14 participants per group. Considering sample sizes commonly used in comparable experimental studies and allowing for potential participant attrition, the sample size was increased to 15 participants per group, resulting in a total sample of 45 participants. The inclusion criteria were a diagnosis of stimulant use disorder involving methamphetamine, ability to read and write and adequately comprehend the research instruments, age between 25 and 45 years, provision of written informed consent, and ability to attend the intervention sessions regularly. The exclusion criteria were the presence of physical conditions or hearing or visual impairments that could interfere with participation, simultaneous participation in other structured psychological treatment programs, absence from more than two treatment sessions, and failure to cooperate adequately during the intervention.

Following approval of the research proposal by the Research Council of the Department of Psychology at the Islamic Azad University, Neyshabur Branch, and receipt of ethical approval from the Biomedical Research Ethics Committee of the Islamic Azad University, Lahijan Branch (Ethics Code: IR.IAU.LIAU.REC.1400.049), the necessary administrative arrangements were made with the authorities of the Baharan Addiction Treatment Center in Zahedan. The clinical records of potential participants were

reviewed, and women who satisfied the inclusion and exclusion criteria were invited to participate. An orientation session was subsequently held in which the purpose of the study, research procedures, participants' rights, confidentiality of the collected information, voluntary nature of participation, and right to withdraw from the study at any time without adverse consequences were explained. Written informed consent was obtained from all participants before enrollment. After completion of participant selection, eligible women were randomly allocated to the three study groups. At the pretest stage, all participants completed the demographic questionnaire, which included information regarding age, sex, marital status, educational level, and history of substance use, as well as the Distress Tolerance Scale developed by Simons and Gaher (2005), under similar conditions and under the supervision of the researcher. Instructions regarding completion of the measures and assurance regarding confidentiality were provided before administration. Following the pretest assessment, the interventions were implemented. Treatment attendance and participation were systematically monitored throughout the intervention period, and a clinical supervisor oversaw treatment delivery to promote adherence to the intervention protocols. The control group did not receive either of the structured psychological interventions during the study period and continued to receive only the routine services provided by the treatment center. After completion of the interventions, all three groups completed the posttest assessment, and the same outcome measure was administered again at the 2-month follow-up. Throughout the study, participants were assured that personal information would remain confidential and that research findings would be reported anonymously without identifying information.

Data Collection Tools

Demographic Questionnaire. A demographic information form developed for the present study was administered at baseline to obtain relevant background information about the participants. The questionnaire collected information concerning participants' age, sex, marital status, educational attainment, and history of substance use. These data were used to describe the demographic and clinical characteristics of the sample and to examine the comparability of the study groups at baseline.

Distress Tolerance Scale. Distress tolerance was assessed using the Distress Tolerance Scale (DTS), developed by Simons and Gaher (2005) as a self-report measure of individuals' perceived capacity to experience and withstand negative psychological states. The scale consists of 15 items organized into four dimensions: Tolerance, which assesses the perceived ability to tolerate emotional distress; Absorption, which evaluates the extent to which attention becomes dominated by distressing emotions; Appraisal, which reflects individuals' subjective evaluation and acceptability of distress; and Regulation, which assesses perceived efforts to regulate or alleviate distress. Items are rated on a 5-point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree), with appropriate reverse scoring applied in accordance with the original scoring procedure. Total scores range from 15 to 75, with higher scores indicating greater distress tolerance. In the original psychometric evaluation, Simons and Gaher (2005) reported Cronbach's alpha coefficients ranging from .70 to .82 for the subscales and an internal consistency coefficient of .82 for the total scale. The psychometric properties of the Persian version were subsequently examined by Azizi (2010), who reported Cronbach's alpha coefficients of .75, .77, .70, and .75 for the Tolerance, Absorption, Appraisal, and Regulation subscales, respectively. Two-month test-retest reliability coefficients for the subscales and

total score ranged from .69 to .79, supporting the satisfactory reliability of the instrument in Iranian populations.

Interventions

Matrix Model Treatment. The Matrix Model is a structured, intensive, multimodal outpatient treatment approach originally developed during the 1980s by the Matrix Institute in Los Angeles for individuals with stimulant use disorders, particularly cocaine and methamphetamine use disorders. It integrates empirically supported therapeutic components including motivational enhancement, cognitive-behavioral strategies, psychoeducation concerning substance use and its consequences, relapse-prevention training, behavioral modification, self-monitoring, and coping and stress-management skills (Obert et al., 2000; Rawson et al., 2004). Rather than focusing primarily on exploration of the presumed underlying causes of substance use, the Matrix Model emphasizes strengthening motivation for behavioral change and equipping clients with practical skills for recognizing and managing internal and external triggers associated with craving and relapse. In the present study, the intervention was adapted from the standard Matrix Model protocol described by Rawson and McCann (2005) and was delivered in 10 weekly 90-minute sessions. The first session focused on developing readiness for change, examining reasons for discontinuing substance use, evaluating the perceived advantages and disadvantages of use, and identifying major triggers for substance use. The second session addressed the course of recovery, physical and psychological indicators of improvement, and identification of external and internal triggers that could provoke craving. The third session addressed major challenges encountered during recovery, particularly family mistrust and inappropriate substitution of other medications or substances for the primary stimulant. Participants were encouraged to identify emotional responses to family mistrust and to develop healthier strategies for coping with interpersonal difficulties. The fourth session focused on recognizing craving episodes, identifying when, where, and under what emotional conditions craving occurred, and developing effective behavioral responses to such episodes. The fifth session addressed maladaptive responses to craving and introduced cognitive, emotional, and behavioral warning signs that may precede relapse. Participants were taught to identify high-risk cognitions and behaviors and distinguish effective from ineffective craving-management strategies. The sixth session focused on boredom, low mood, and loss of pleasure that may emerge after discontinuation of stimulant use and emphasized replacing substance-related behaviors with rewarding, pleasurable, and health-promoting activities. Participants were encouraged to establish regular positive activities, such as physical exercise, social interaction, and recreational pursuits, as protective factors against relapse. The seventh session concentrated on relapse-prevention planning, particularly identification of high-risk activities and situations, while also examining the relationship between employment, excessive workload, unemployment, unstructured time, and relapse vulnerability. The eighth session emphasized structured daily activity, constructive leisure, avoidance of monotony, and strengthening and sustaining the motivation that initially led participants to treatment. The ninth session focused on honesty during recovery, recognizing the relationship between substance use and deceptive behavior, and promoting complete abstinence from psychoactive substances rather than substitution with other substances perceived as less harmful. The final session emphasized identification of substance-related cognitions and behavioral patterns that may persist after abstinence, anticipation and prevention of relapse, and development of a strategic

rather than willpower-based approach to coping with high-risk situations. Homework assignments were provided after each session and included self-monitoring of triggers and cravings, recording high-risk thoughts and behaviors, completing cognitive exercises, and scheduling adaptive activities. Homework was reviewed at the beginning of each subsequent session, and individualized feedback was provided to facilitate experiential learning and generalization of treatment skills. Sessions were conducted by therapists trained in the Matrix Model under specialist supervision to maximize adherence to the treatment protocol.

Quality-of-Life Therapy. Quality-of-Life Therapy was implemented on the basis of the therapeutic framework developed by Frisch (2005), which integrates principles of positive psychology and cognitive-behavioral therapy with the objective of improving satisfaction and functioning across important life domains. The intervention focuses on identifying areas of dissatisfaction or dysfunction, clarifying personally meaningful goals, increasing engagement in rewarding activities, promoting psychological well-being, strengthening self-esteem, improving interpersonal functioning, enhancing physical and psychological health, developing stress-management and coping strategies, and increasing the sense of meaning and purpose in everyday life. In the present study, the protocol was adapted for women with stimulant use disorder and delivered in eight weekly 60-minute sessions. The initial session focused on developing readiness for change, identifying participants' reasons for discontinuing substance use, evaluating the short-term perceived benefits and longer-term adverse consequences of stimulant use, and recognizing major cues and triggers associated with consumption. Subsequent sessions emphasized recognition of physical and psychological indicators of recovery, identification of internal and external triggers, and improvement of problematic areas of everyday life that could undermine recovery. Particular attention was given to family relationships, coping with mistrust from family members, and recognition of maladaptive attempts to substitute medications or other substances for stimulant use. Participants were taught to identify episodes of craving, determine their situational and emotional antecedents, and apply more adaptive coping responses. The intervention also addressed maladaptive cognitions and behaviors that increase relapse vulnerability, warning signs of relapse, and psychological experiences such as boredom, depressed mood, reduced pleasure, and lack of meaningful daily activity following cessation of stimulant use. Participants were encouraged to replace substance-related routines with enjoyable and health-promoting activities and to establish structured patterns of exercise, interpersonal contact, recreation, and other personally valued pursuits. Later sessions addressed relapse-prevention strategies, management of high-risk situations, development of a balanced relationship between work and recovery, constructive use of free time, systematic daily planning, enhancement of treatment motivation, and strengthening commitment to a substance-free lifestyle. Consistent with the quality-of-life framework, treatment also emphasized improving the perceived quality and meaningfulness of daily experiences, strengthening psychological resources, and establishing personally relevant goals capable of supporting long-term recovery. Participants received homework assignments corresponding to each session, including monitoring substance-use triggers, recording emotional experiences, scheduling pleasurable and meaningful activities, evaluating life domains, and practicing coping strategies. Homework was reviewed at the beginning of the following session and feedback was provided to reinforce skill acquisition and application outside the treatment setting. The Quality-of-Life Therapy sessions were held on the same day as the Matrix Model sessions but at a different time of day, with Matrix Model sessions conducted in the morning and Quality-of-Life Therapy sessions

conducted in the afternoon, in order to minimize interaction and treatment contamination between the two intervention groups. Treatment delivery was monitored by a supervisor to promote consistency and adherence to the therapeutic framework (Frisch, 2005).

Data Analysis

The collected data were analyzed at both descriptive and inferential levels. Descriptive statistics, including means and standard deviations, were calculated to summarize the study variables across the pretest, posttest, and 2-month follow-up assessments and to describe the characteristics of the sample. At the inferential level, because the study involved three independent groups assessed repeatedly across three measurement occasions, repeated-measures analysis of variance was used to examine changes in distress tolerance over time, differences between the treatment and control groups, and the differential effectiveness of the two therapeutic interventions. The analysis therefore evaluated the main effects of time and group as well as the group-by-time interaction. Statistical significance was evaluated at an alpha level of .05, and all statistical analyses were conducted using IBM SPSS Statistics, Version 27.

Findings and Results

The participants' demographic and background characteristics were examined in terms of age, marital status, duration of substance use, and educational level. The mean age of participants was 32.27 years (SD = 9.65) in the Matrix Model group, 33.47 years (SD = 8.31) in the Quality-of-Life Therapy group, and 30.27 years (SD = 2.67) in the control group. A one-way analysis of variance indicated that the three groups did not differ significantly in age ($p = .626$). The mean duration of substance use was 3.40 years (SD = 0.59) in the Matrix Model group, 3.07 years (SD = 0.64) in the Quality-of-Life Therapy group, and 3.27 years (SD = 0.53) in the control group, with no statistically significant between-group difference ($p = .843$). Regarding educational level, the Matrix Model group included 1 participant with no formal education, 4 with primary education, 6 with lower-secondary education, and 4 with a high-school diploma. In the Quality-of-Life Therapy group, 1 participant had no formal education, 6 had primary education, 6 had lower-secondary education, and 2 had a high-school diploma. The control group consisted of 1 participant with no formal education, 5 with primary education, 7 with lower-secondary education, and 2 with a high-school diploma. The chi-square test indicated no significant difference among the groups in educational level ($p = .521$). With respect to marital status, the Matrix Model group included 2 single, 10 married, and 3 divorced participants; the Quality-of-Life Therapy group included 2 single, 9 married, and 4 divorced participants; and the control group included 2 single, 11 married, and 2 divorced participants. The chi-square test similarly indicated no significant difference among the three groups in marital status ($p = .749$). These findings indicated that the groups were comparable in terms of the assessed demographic and background characteristics at baseline.

Table 1. Descriptive Statistics

Variable	Group	Pretest M	Pretest SD	Posttest M	Posttest SD	Follow-up M	Follow-up SD
Distress tolerance	Matrix Model	36.80	2.18	48.20	6.10	48.20	6.03
Distress tolerance	Quality-of-Life Therapy	40.00	1.85	45.53	1.12	45.47	2.41
Distress tolerance	Control	31.93	2.40	33.13	2.03	33.80	2.54

As shown in Table 1, mean distress tolerance increased from pretest to posttest in both intervention groups, whereas relatively little change was observed in the control group. In the Matrix Model group, the mean distress tolerance score increased from 36.80 (SD = 2.18) at pretest to 48.20 (SD = 6.10) at posttest and remained at 48.20 (SD = 6.03) at the 2-month follow-up. Similarly, in the Quality-of-Life Therapy group, the mean score increased from 40.00 (SD = 1.85) at pretest to 45.53 (SD = 1.12) at posttest and remained relatively stable at follow-up, with a mean of 45.47 (SD = 2.41). In contrast, the control group demonstrated only a modest increase from 31.93 (SD = 2.40) at pretest to 33.13 (SD = 2.03) at posttest and 33.80 (SD = 2.54) at follow-up. Thus, the descriptive findings suggested improvements in distress tolerance following both therapeutic interventions and relative maintenance of these improvements during the follow-up period.

Prior to conducting the repeated-measures analysis of variance, the statistical assumptions underlying the analysis were examined. The normality assumption was evaluated using the Shapiro–Wilk test. The results were nonsignificant for distress tolerance across all groups and measurement occasions ($p > .01$), indicating that the distributions did not significantly deviate from normality. Homogeneity of error variances was examined using Levene’s test, which was nonsignificant for distress tolerance at each of the three measurement occasions ($p > .05$), supporting the assumption of homogeneity of variance. The sphericity assumption was assessed using Mauchly’s test of sphericity. The test was statistically significant ($p < .05$), indicating that the assumption of sphericity was violated. Consequently, the Greenhouse–Geisser correction was applied to adjust the degrees of freedom for the within-subject effects. Given that the dependent variable was measured on a continuous scale, group sizes were equal, and the assumptions of normality and homogeneity of variance were satisfied, repeated-measures analysis of variance with the Greenhouse–Geisser correction was considered appropriate for examining the effects of time, group, and their interaction on distress tolerance.

Table 2. Repeated-Measures Analysis of Variance for the Main and Interaction Effects on Distress Tolerance

Source of Variation	df	Mean Square	F	p	Partial η^2	Observed Power
Time	1.22	927.55	115.64	< .001	.73	1.00
Time $\times$ Group	2.44	202.71	25.27	< .001	.55	1.00
Group	2.00	1846.81	73.17	< .001	.78	1.00

As presented in Table 2, the repeated-measures analysis of variance revealed a statistically significant main effect of time on distress tolerance, $F = 115.64$, $p < .001$, partial $\eta^2 = .73$, indicating that distress tolerance scores differed significantly across the pretest, posttest, and follow-up assessments. The main effect of group was also statistically significant, $F = 73.17$, $p < .001$, partial $\eta^2 = .78$, demonstrating significant overall differences in distress tolerance among the Matrix Model, Quality-of-Life Therapy, and control groups. Furthermore, the time $\times$ group interaction was statistically significant, $F = 25.27$, $p < .001$, partial $\eta^2 = .55$, indicating that changes in distress tolerance over time differed according to group membership. The effect sizes were substantial: approximately 73% of the variance associated with repeated measurements was attributable to time, 78% of the variance in overall distress tolerance was associated with group membership, and 55% of the variance in changes over time was associated with the interaction between time and group. The observed statistical power for all three effects was 1.00. Because significant

effects of time, group, and their interaction were identified, Bonferroni-adjusted post hoc pairwise comparisons were conducted to determine the specific differences between measurement occasions and study groups.

Table 3. Bonferroni-Adjusted Pairwise Comparisons for Distress Tolerance

Comparison Type	Reference Condition	Comparison Condition	Mean Difference	SE	p
Measurement occasion	Pretest	Posttest	-6.04	0.53	< .001
Measurement occasion	Pretest	Follow-up	-6.24	0.57	< .001
Measurement occasion	Posttest	Follow-up	-0.20	0.21	1.000
Study group	Matrix Model	Quality-of-Life Therapy	0.73	1.06	1.000
Study group	Matrix Model	Control	11.44	1.06	< .001
Study group	Quality-of-Life Therapy	Control	10.71	1.06	< .001

As shown in Table 3, the Bonferroni-adjusted pairwise comparisons demonstrated that distress tolerance scores increased significantly from pretest to posttest ($MD = -6.04$, $SE = 0.53$, $p < .001$) and from pretest to the 2-month follow-up ($MD = -6.24$, $SE = 0.57$, $p < .001$). In contrast, the difference between posttest and follow-up was not statistically significant ($MD = -0.20$, $SE = 0.21$, $p = 1.000$), indicating that the improvement observed after treatment was maintained during the 2-month follow-up period. Pairwise comparisons between the study groups further showed no statistically significant difference between the Matrix Model and Quality-of-Life Therapy groups ($MD = 0.73$, $SE = 1.06$, $p = 1.000$). However, the Matrix Model group demonstrated significantly higher distress tolerance than the control group ($MD = 11.44$, $SE = 1.06$, $p < .001$), and the Quality-of-Life Therapy group likewise demonstrated significantly higher distress tolerance than the control group ($MD = 10.71$, $SE = 1.06$, $p < .001$). Taken together with the significant time $\times$ group interaction and the descriptive pattern of scores, these findings indicate that both the Matrix Model and Quality-of-Life Therapy were effective in increasing distress tolerance among women with stimulant use disorder, that the treatment gains were maintained at the 2-month follow-up, and that there was no statistically significant difference between the two interventions in their effectiveness.

Discussion and Conclusion

The present study aimed to compare the effectiveness of the Matrix Model and Quality-of-Life Therapy in improving distress tolerance among women with stimulant use disorder. The findings showed that both interventions significantly increased distress tolerance from pretest to posttest compared with the control group, and these improvements were maintained at the 2-month follow-up. The significant main effect of time indicated that distress tolerance changed across the three assessment occasions, while the significant main effect of group demonstrated that overall distress tolerance differed among the Matrix Model, Quality-of-Life Therapy, and control groups. More importantly, the significant time $\times$ group interaction indicated that the pattern of change over time differed according to group membership. Bonferroni-adjusted pairwise comparisons further showed that both intervention groups had significantly higher distress tolerance than the control group, whereas no statistically significant difference was found between the Matrix Model and Quality-of-Life Therapy groups. In addition, the absence of a significant difference between posttest and follow-up indicated that the therapeutic gains achieved by both interventions were relatively stable over the 2-month follow-up period. Overall, these findings suggest that both structured treatment approaches are

effective for improving the ability of women with stimulant use disorder to tolerate aversive emotional and psychological states.

The finding that the Matrix Model significantly improved distress tolerance is consistent with previous research demonstrating the beneficial effects of structured Matrix-based interventions on psychological variables associated with recovery from stimulant use. Hasanzadeh reported that structured Matrix treatment improved distress tolerance, abstinence self-efficacy, and mindfulness among individuals with stimulant drug abuse, directly supporting the present finding that Matrix-based treatment can strengthen the capacity to withstand psychological distress without resorting to maladaptive responses (20). Similarly, studies conducted in Iranian treatment settings have shown that the Matrix Model is clinically applicable and potentially effective for individuals with methamphetamine-related problems (18, 19). Aryan and colleagues also found that Matrix-based treatment was associated with improvements in addiction severity, craving, relapse-related outcomes, and mental health among individuals with methamphetamine use disorder (21). Taken together, these findings suggest that the Matrix Model affects not only substance-use behavior but also broader psychological processes that are central to recovery.

One explanation for the effectiveness of the Matrix Model is its direct emphasis on identifying triggers, monitoring craving, anticipating relapse, modifying maladaptive cognitive and behavioral patterns, and developing effective coping strategies. Distress tolerance is closely related to the individual's ability to remain in contact with unpleasant internal experiences without escaping through impulsive or avoidant behaviors. For people with stimulant use disorder, craving, negative affect, interpersonal conflict, boredom, anxiety, and withdrawal-related discomfort may function as powerful triggers for renewed substance use. The Matrix Model systematically exposes patients to discussions and monitoring of these high-risk states while teaching them alternative responses. By learning to identify internal and external triggers, differentiate craving from action, evaluate relapse-warning signs, and engage in structured coping behaviors, participants may gradually develop greater perceived control over difficult emotional experiences. This interpretation is consistent with evidence that emotion-regulation difficulties are strongly associated with substance use disorders and that deficits in managing negative affect constitute an important mechanism in the maintenance of addictive behavior (14). The present findings therefore suggest that improving relapse-prevention skills and behavioral self-regulation may simultaneously increase tolerance of emotional distress.

The observed effect of the Matrix Model may also be understood through its motivational and behavioral components. Stimulant use disorder is commonly characterized by recurrent cycles of craving, impulsive responding, temporary relief, and subsequent psychosocial consequences. Over time, repeated substance use may reduce opportunities to develop adaptive strategies for dealing with emotional discomfort. Structured interventions such as the Matrix Model may interrupt this cycle by helping patients identify the short- and long-term consequences of drug use, strengthen motivation for abstinence, increase engagement in positive activities, and create routines incompatible with substance use. Systematic reviews have emphasized the importance of non-pharmacological interventions in methamphetamine use disorder and have shown that psychosocial approaches remain central to treatment (2). This is particularly important because stimulant use presents complex treatment challenges and requires interventions capable of simultaneously addressing craving, relapse risk, cognitive processes, and social functioning (1). Accordingly, the improvement in distress tolerance observed in the Matrix Model group may reflect the cumulative influence of cognitive

restructuring, motivational enhancement, behavioral planning, psychoeducation, and relapse-prevention training.

The second major finding was that Quality-of-Life Therapy also significantly improved distress tolerance compared with the control condition. This finding is consistent with previous studies showing that quality-of-life-oriented interventions can improve emotional and psychological functioning among individuals with substance use disorders. Ghanbari and colleagues found that Quality-of-Life Therapy significantly improved distress tolerance and cognitive emotion regulation among individuals with substance-use problems (23). Similarly, Ghanbari and colleagues reported that quality-of-life improvement training was effective in increasing distress tolerance and reducing self-destructive behaviors in people who use substances (24). Motahhari and colleagues also showed that psychotherapy based on quality-of-life improvement could reduce difficulties in emotion regulation and contribute to relapse prevention in individuals receiving methadone maintenance treatment (25). These findings are highly consistent with the present results and support the assumption that an intervention does not need to focus exclusively on substance-related symptoms in order to improve an important relapse-related psychological construct such as distress tolerance.

Quality-of-Life Therapy may improve distress tolerance by broadening the individual's sources of reinforcement and increasing satisfaction in important life domains. Frisch conceptualized Quality-of-Life Therapy as an intervention that combines cognitive-behavioral strategies with a systematic focus on improving satisfaction, meaning, goals, relationships, health, self-esteem, and everyday functioning (22). Individuals with chronic substance-use problems often experience narrowing of behavioral repertoires, disruption of social relationships, diminished pleasure from ordinary activities, reduced self-worth, and loss of meaningful goals. Under such conditions, distress may be perceived as especially overwhelming because the individual has few alternative sources of reward or psychological support. By helping participants identify valued life domains, set achievable goals, increase engagement in enjoyable activities, and improve interpersonal and emotional functioning, Quality-of-Life Therapy may reduce the subjective intensity of distress and increase confidence in coping with negative states. In other words, the intervention may not merely teach participants to endure distress; it may also create a more meaningful life context in which distress becomes less dominant and less likely to trigger substance use.

The finding regarding Quality-of-Life Therapy is also supported by broader evidence showing that interventions targeting psychological flexibility, self-evaluation, and life functioning can benefit people with substance use disorders. For example, Acceptance and Commitment Therapy has been associated with improved life satisfaction and sexual functioning among women with substance use disorder (9), and with increased self-compassion and reduced self-criticism among individuals with opioid use disorder (10). Sahraian and colleagues also reported improvements in quality of life and stigma following psychological intervention among people who use substances (11). These findings reinforce the broader view that recovery involves more than cessation of substance use and that interventions capable of improving emotional functioning, life satisfaction, social relationships, and self-perception can strengthen resilience to distress. The present findings extend this perspective by showing that a quality-of-life-centered approach can specifically improve distress tolerance among women with stimulant use disorder.

The significant improvement in distress tolerance in both intervention groups may also be interpreted in light of the transdiagnostic role of distress tolerance. Meta-analytic evidence indicates that low distress tolerance is common across multiple forms of psychopathology, including substance use disorders, suggesting that it represents a broad vulnerability factor rather than a problem unique to a single diagnosis (12). Distress tolerance is also related to treatment-relevant outcomes among individuals experiencing pain and substance-related difficulties, indicating that an individual's capacity to endure unpleasant states may influence treatment engagement and maladaptive coping (13). Furthermore, childhood adversity and autonomic reactivity have been linked to substance-use risk through mechanisms involving distress tolerance (16). These findings suggest that interventions capable of increasing distress tolerance may have clinically meaningful effects because they target a fundamental process through which stress and negative affect are translated into maladaptive behavior.

The present findings are particularly important in the context of women with stimulant use disorder. Women who use substances may experience distinctive psychosocial burdens, including greater exposure to stigma, interpersonal instability, family conflict, trauma-related stressors, and barriers to accessing treatment (4). Recent research has identified gender differences in stimulant misuse, emphasizing the need to consider gender-specific patterns of risk and treatment response (5). In Iran, qualitative evidence suggests that women who use drugs may experience severe social judgment, deterioration in social identity, and disruption of family relationships, all of which may increase emotional distress and complicate recovery (6). Gender differences have also been observed in opioid and stimulant poisoning in Iranian populations, highlighting the importance of examining women's clinical needs independently rather than assuming that findings from predominantly male samples can be generalized directly to them (7). Therefore, the observed improvements in distress tolerance following both interventions may be especially meaningful for women, whose substance-use patterns may be strongly embedded in interpersonal and emotional contexts.

The role of psychological distress in women with substance use disorder further supports the present results. Sabouri and Mansouri showed that stressful life events are associated with psychological distress among women with substance use disorder and that resilience-related processes can modify these relationships (15). Women with low distress tolerance may be more likely to respond to stressful life experiences through avoidance, impulsivity, or substance use, particularly when adaptive coping resources are limited. Both the Matrix Model and Quality-of-Life Therapy may counter this vulnerability, although they do so through somewhat different therapeutic pathways. The Matrix Model focuses more directly on managing triggers, craving, relapse-related cognitions, and high-risk situations, whereas Quality-of-Life Therapy emphasizes strengthening valued life domains, positive functioning, emotional resources, and meaningful goals. The fact that both interventions produced significant improvements suggests that distress tolerance can be enhanced through more than one therapeutic mechanism.

An especially important finding was the absence of a statistically significant difference between the Matrix Model and Quality-of-Life Therapy. This suggests that neither intervention was superior to the other in improving distress tolerance in this sample. One possible explanation is that both approaches share several functional therapeutic components despite their theoretical differences. Both involve structured sessions, therapist guidance, homework assignments, behavioral monitoring, cognitive reflection, goal setting, coping-skill development, and efforts to replace maladaptive substance-related patterns with healthier

activities. These common elements may be sufficient to improve distress tolerance regardless of the intervention's primary theoretical orientation. Contemporary research increasingly emphasizes that many effective substance-use interventions operate through overlapping processes such as emotion regulation, behavioral activation, self-monitoring, coping enhancement, and increased psychological flexibility (3). Similarly, interventions combining mindfulness and other self-regulation approaches have shown that different therapeutic modalities may converge on common mechanisms relevant to recovery (26).

The lack of superiority of either treatment is also compatible with the multifactorial nature of stimulant use disorder. Methamphetamine use affects psychological, social, behavioral, and neurocognitive domains, and no single intervention is likely to address all relevant mechanisms. Research has demonstrated extensive psychosocial impairments among individuals with methamphetamine-related problems (8), while global evidence emphasizes the complexity of treating stimulant use and the need for flexible and integrated treatment strategies (1). Therefore, equivalent effectiveness may indicate that both interventions address clinically relevant but partially different components of the recovery process. The Matrix Model may be particularly effective in improving immediate relapse-prevention skills and managing high-risk situations, while Quality-of-Life Therapy may strengthen broader psychological resources and meaningful engagement. When the outcome is distress tolerance, these different pathways may ultimately produce comparable improvements.

The maintenance of treatment gains at the 2-month follow-up is another clinically significant finding. Distress tolerance scores did not significantly decline from posttest to follow-up in either intervention group, suggesting that participants were able to retain the psychological benefits obtained during treatment. This stability may be related to the use of homework assignments, repeated practice, self-monitoring, and emphasis on applying treatment skills outside the sessions. Maintenance of gains is especially important in stimulant use disorder because relapse commonly occurs after treatment termination, when individuals encounter stressors without immediate therapeutic support. Previous research has highlighted the importance of relapse-prevention strategies and psychological rehabilitation in sustaining improvements among individuals with stimulant-related disorders (20, 21). Quality-of-life-based interventions have similarly been linked to improved relapse-prevention processes and emotion regulation (25). The present results therefore suggest that both interventions may foster skills that continue to function beyond the active treatment period.

From a broader treatment perspective, the findings support the growing emphasis on interventions that target both substance use and the psychological processes associated with relapse. Structured psychosocial treatment remains a key component of care for methamphetamine use disorder (2), but treatment effectiveness may be improved when intervention goals include emotional functioning, distress tolerance, social relationships, and quality of life. Research on open-access and scalable treatment models has also emphasized the importance of developing feasible interventions that can be integrated into routine addiction services (27). Because both the Matrix Model and Quality-of-Life Therapy can be delivered in structured group formats and implemented within addiction treatment settings, they may represent useful approaches for expanding the psychological component of care for women with stimulant use disorder. Taken together, the present findings indicate that both interventions are effective and relatively durable methods for improving distress tolerance, while their comparable effectiveness suggests that treatment selection may

reasonably be guided by patient characteristics, service resources, therapist expertise, and broader clinical goals.

Several limitations should be considered when interpreting the findings of the present study. First, the sample consisted of only 45 women recruited from a single addiction treatment center in Zahedan, which limits the generalizability of the results to women receiving treatment in other geographic, cultural, or clinical settings. Second, convenience sampling was used before random allocation, which may have introduced selection bias and may reduce the representativeness of the sample. Third, distress tolerance was assessed using a self-report instrument, and responses may therefore have been affected by social desirability, recall bias, or participants' subjective interpretation of questionnaire items. Fourth, the follow-up period was limited to 2 months, preventing conclusions regarding the long-term maintenance of treatment gains. Fifth, the study did not include objective indicators of stimulant use, such as biological testing, nor did it systematically assess potential confounding variables such as psychiatric comorbidity, medication use, trauma history, treatment expectancy, or variations in routine clinical services. Finally, therapist and participant blinding were not feasible because of the nature of the psychological interventions.

Future studies should replicate the present findings using larger and more heterogeneous samples recruited from multiple addiction treatment centers and different geographic regions. Studies involving both women and men would allow researchers to examine whether gender moderates the effectiveness of the Matrix Model and Quality-of-Life Therapy. Longer follow-up periods, such as 6 and 12 months, are recommended to evaluate the durability of improvements in distress tolerance and their relationship with actual relapse rates. Future research should also incorporate objective measures of substance use and treatment adherence, including toxicological screening where feasible. Examining potential mediators such as emotion regulation, craving, psychological flexibility, self-efficacy, mindfulness, and quality of life could clarify the mechanisms through which each treatment improves distress tolerance. It would also be valuable to investigate moderators such as severity of stimulant use, duration of dependence, psychiatric comorbidity, trauma exposure, marital status, and baseline distress tolerance. Comparative studies using larger samples and carefully standardized therapist training could further determine whether specific subgroups benefit more from one intervention than the other.

Addiction treatment centers may consider incorporating both the Matrix Model and Quality-of-Life Therapy into psychological rehabilitation programs for women with stimulant use disorder. The Matrix Model may be particularly useful when treatment priorities include craving management, identification of high-risk situations, relapse prevention, and development of structured coping strategies, whereas Quality-of-Life Therapy may be especially appropriate when patients present with dissatisfaction across multiple life domains, reduced meaning, low engagement in rewarding activities, or impaired psychosocial functioning. Clinicians can also integrate selected components of both approaches to address both immediate relapse-related risks and broader quality-of-life needs. Routine assessment of distress tolerance at treatment entry and during follow-up may help identify patients who require additional support in managing negative emotional states. Group-based delivery, homework assignments, behavioral monitoring, and follow-up booster sessions may further strengthen treatment gains and support their maintenance after formal intervention has ended.

Acknowledgments

The authors express their deep gratitude to all participants who contributed to this study.

Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

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

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.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

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