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The Influence of Mindfulness on Cravings, Stress, and Cortisol Levels in Crystal Meth-Using Males in Mashhad

Lancy Dsouza[1] , Mojtabga Aghili[*2], Zeynab Nasiri[3], Arezou Asghari[4]

Abstract

Objective: Drug addiction is one of the four worldwide crises of the third millennium, at the forefront of risks and societal ills, and one of the most severe challenges confronting today's societies, particularly ours. The purpose of this research was to assess the efficacy of mindfulness on drug craving, stress, and cortisol levels in Mashhad-based males who used crystal meth.

Method: Pre- and post-tests with a control group were the sort of quasi-experimental study used. The statistical population comprised all males who used crystal meth, which was sent to the Ofogh Rah-e Sabz addiction treatment clinics in Mashhad, from which 30 participants were randomly assigned to the experimental and control groups using convenience sampling methods (15 people in each group). They answered the Holmes and Rahe stress questionnaire in addition to the Somoza et al. cravings questionnaire. And their urine was examined to determine cortisol levels. The experimental group got eight sessions of mindfulness treatment, whereas the control group received no treatment. Multivariate analysis of covariance was used to examine the research data.

Results: The findings indicated that mindfulness lowered cravings, stress and cortisol levels ($p<0/001$).

Conclusion: According to the results, mindfulness-based interventions may be utilized with medical therapy for methamphetamine addicts.

Keywords: Mindfulness, Stress, Addiction, Cortisol, Cravings.

Introduction

Drug addiction is one of the four worldwide crises of the third millennium, at the forefront of risks and societal illness, and one of the most severe challenges confronting today's societies, particularly ours (Sedaghatzadeh et al., 2018). Patients and the community are affected by drug use disorders, which are typically the eighth most significant cause of mortality globally. As a result, 4.5 percent of the disease's overall worldwide impact is covered (Sasani Nejad and Mohammadkhani, 2018). The progressive nature of addiction in all aspects of life has medical and psychological consequences for the addict. Also, it harms the social, economic, political, and cultural health of society (Garcia et al., 2018). The need for drugs, which is at the heart of addiction, initiates and sustains substance misuse and results in a return to addiction after treatment (Basharpour et al., 2018). Drug theories highlight the importance of craving in maintaining drug use (Bersin and Verona, 2019). Craving is described as the urge to take drugs, with the heart of this phenomenon being a component of experience or conscious individual experience (Mikaeli et al., 2017). Craving is a subjective emotion and multifaceted phenomenon related to the urge to get a pleasurable sensation and

1. Professor of Psychology maharaja's college university of mysore.
2. Assistant Professor, Department of Psychology, Payame Noor University, Iran.
3.Master of Psychology, Payame Noor University, Golestan, Iran.
4.Assistant Professor, Faculty of Humanities, Kosar University of Bojnord, Bojnord, Iran.
*Corresponding Author: Mojtaba Aghili , Email: dr-aghili1398@yahoo.com.

overcome an unpleasant feeling (Rosenberg, 2017). The intensity of craving is determined by indications of drug use such as intake, period of abstinence, or degree of dependency, and assessment of withdrawal time (Seri et al., 2015). Substance-related disorders are characterized by a constellation of cognitive, behavioral, and physiological symptoms, including stress (Fetzis, Seri, Alexandra, 2015). Stress is a physiological and psychological response to a perceived (real or imagined) threat to a person's mental, physical, or emotional well-being that results in a sequence of psychological and physiological reactions and adaptations (Shams and Babakhani, 2018). Stress results in the activation of target organs and the elicitation of coping mechanisms. A person's cognitive evaluation of stressors refers to how the individual understands the stressor. In contrast, emotional interpretation refers to how the person mixes and tags the interpreted information about the stressors (Gross, 2018). According to Yu (2016), stress decreases activity in the frontal areas of the brain, which are associated with executive control, alters an individual's analytical reasoning, and enhances the process of emotional thinking and exploration, which results in dangerous and impulsive decisions.

Drug use has many negative consequences for the consumer's physical and mental health, one of which is Increase cortisol levels (Blius, Duane, and Best, 2019). The neurological and hormonal systems regulate cortisol secretion, which is dependent on the health and function of the hypothalamus, pituitary, and adrenal glands (Paniagua, Phillips, Rosen, 2017). The pituitary gland produces adrenal cortisol in response to the regular release of the hormone adrenocorticotropin, and the body's physiological need for this hormone is increased during times of worry, stress, surgery, and anesthesia (Charlesson, Baxter, Deva, 2015). In patients who consistently use opium and morphine, the regular connection between these hormones and the hypothalamic, pituitary, and adrenal axis is disrupted. They eventually develop adrenal insufficiency, reducing blood cortisol levels (Mousavi, Kafi, 2014).

Specialists have created and tested several treatment methods for this group of individuals and other initiatives to avoid drug use problems. In 1960, Dall and Nistvalder implemented a methadone agonist therapy program in New York (Goodarzi, 2016). Simultaneously with medication treatment, a variety of psychotherapy techniques have been used. One of the most significant advances in psychological treatments, particularly addiction treatment, is the integration of Eastern spiritual traditions, such as mindfulness meditation practices, with classical cognitive behavior therapy, dubbed the third wave of behavior therapy (Hayes, Louma, and Bond, 2016). Mindfulness-based cognitive therapy is one of these emerging techniques (Bowen, Charla and Marlat, 2015). Mindfulness is a non-judgmental, indescribable, present-moment awareness of an event now occupying a person's attention. Additionally, this idea encompasses awareness and acceptance of the event above (Janowski and Lukjan, 2010). Mindfulness is a commonly utilized approach in the mind-body perspective, with its beneficial effects on various ailments verified. Stress, both physical and psychological, activates neurohormonal pathways, most notably the hypothalamic-pituitary-adrenal axis. It is responsible for regulating relaxation, cortisol, and other stress chemicals. Organized Meditations, such as stress-based mindfulness, are a structured group program to reduce stress to increase mental wellness and pain relief. Moreover, mindfulness activities require you to see temptation as a fleeting cognitive and emotional experience, similar to other experiences. These exercises intend to increase awareness of one's temptation experience and develop the ability to examine it objectively and without response or judgment (Vetikotiz et al., 2013).

Cortisol levels significantly increase in response to stress, allowing the body to overcome anxiety and rebalance. According to the research Gonzalo, Auschwitz (2016), stress-relieving methods such as yoga, meditation, focused breathing, and mindfulness is helpful. (Matusk et al., 2010) shown that cortisol size provides concrete evidence for the efficacy of mindfulness-based treatment in chronic illness patients. Cortisol levels in these patients drop after mindfulness activities. In research, Sadeghi Firoozabadi (2019) found a significant difference between the experimental and control groups' mean metacognition post-test scores. In other words, mindfulness training has enhanced metacognition in women who use stimulants, reducing recurrence. Bahrehbar et al. (2019) discovered that emotion regulation and coping therapy training programs had a favorable influence on the quality of life in teenagers at risk of drug misuse. Until the follow-up stage, these modifications remained constant. Although evidence for the efficacy of cognitive rehabilitation and mindfulness therapy exists, there is little research on the treatment's impact on drug users' cravings, stress, and cortisol levels. As a result, the goal of this research was to see whether mindfulness may help men who use crystal meth in Mashhad with cravings, stress, and cortisol levels.

Method

Participants

The current research has a quasi-experimental design with a pretest-posttest design and a control group. The study's statistical population included crystal meth addicts referred to Mashhad's Kamyab Addiction Treatment Center. A convenience sample of 30 persons was chosen and randomly allocated to the experimental and control groups (15 people in each group). Among the requirements for inclusion are male, age between 20 and 50 years, minimum diploma education, no antipsychotic medication use before entering the treatment program, willingness to participate in research, a history of at least one year or 12 months of crystal meth use, and the following criteria and withdrawals: having significant psychiatric and physical disorders as determined by the physician (such as bipolar disorder, psychosis, epilepsy, and seizures), absence of more than two sessions, and a history of at least one year or 12 months of crystal meth use.

Procedure

Pre- and post-test sample members completed the Somoza, Holmes, and Rahe Stress Questionnaires, and cortisol levels were assessed and documented using pre-and post-test urine tests. The experimental group received eight 60-minute mindfulness sessions, whereas the control group received no treatment.

Ethical statement

To comply with the ethical issues of the research, a consent form was prepared in which the purpose of the research was explained in general. Participants, first, read the consent form and participated in the research if they wished. The subjects were also given the necessary explanations about the confidentiality of the answers given to the questionnaires and their results. Finally, to observe the research ethics, after the completion of the research, research interventions were applied for the control group.

Measures

Somoza Craving Questionnaire (1995): The Somoza Craving Questionnaire is a condensed version of an eight-item self-report assessment created by Somoza, Dyrenforth, Goldsmith, Mezinskis, and Cohen (1995). It assesses cravings' length, frequency, and intensity using a five-point Likert scale ranging from 0 to very high. This test has a strong connection with the addiction severity scale, with a Cronbach's alpha

value of 0.88. Basharpour and Abbasi (2013) stated that this questionnaire has a Cronbach's alpha value of 78 percent.

Holmes and Rahe Stress Questionnaire (1967): Thomas Holmes and Richard Rahe created the Holmes and Rahe Stress Questionnaire in 1967 to illustrate the influence of stress on significant life changes that are universal to all forms of stress. The questionnaire covers 43 events that result in some life change, and each event is assigned a score termed the average value. This score is calculated using the degrees and credits earned by innumerable individuals associated with this event. The term LCU refers to units that can change a person's life. Each LCU is multiplied by the number of times an event happened over the preceding two years of a person's life, and the data is then combined to provide the total LCU score. This score represents the individual's stress level during two years. Holmes and Rahe calculated the questionnaire's reliability coefficient using Cronbach's alpha of 0.79 and its validity using Pearson correlation coefficient of 0.36. The reliability coefficients of the stress questionnaire were obtained in Heidari and Namjoo's (2011) study using Cronbach's alpha and split-half methodologies, and they are 0.72 and 0.64, respectively.

Table 1. Summary of mindfulness-based cognitive therapy sessions

Sessions	The sessions' educational content
First	Acquaintance with mindfulness, justifications for optimism, adaptability, resistance, raisin eating practice, breathing-focused meditation practice, body check practice
Second	Body check practice, discuss your experience with mindfulness activities, practice observing your thoughts and emotions, sitting meditation with a focus on your breathing
Third	A short exercise to see or hear, sitting meditation focused on breathing and body sensations, a three-minute breathing space, practicing aware body movements
Fourth	Sitting meditation according to breathing, body, sounds, and thoughts Discussion about stress and people's typical responses to stressful circumstances, as well as alternate attitudes and responses, conscious walking
Fifth	Discussion of accepting the truth of the current circumstance in its current state, followed by practice of the second series of conscious bodily movements
Sixth	Three minutes of breathing space, an assertion that our thoughts are often devoid of genuine substance
Seventh	Discuss the best method to care for yourself, practice comparing pleasant to unpleasant everyday tasks, develop the ability to arrange for enjoyable activities, as well as exercise love and compassion
Eighth	Answering questions, grading the sessions, thanking and applauding the members for participating in the sessions, and administering the post-test

The mindfulness intervention strategy used in this research was based on Kabat-Zinn's (2009) guidance, which is stated as follows:

Results

The descriptive findings indicated that 27% of participants in the experimental group were between the ages of 41 and 50, 33% were between the ages of 31 and 40, and 40% were under the age of 30,

while 40% of participants in the control group were between the ages of 41 and 50, 27% were between the ages of 31 and 40, and 40% were under the age of 30. In addition, 87% of the experimental group had a diploma, 13% had an associate diploma, while 53% of the control group had a diploma, 33% had an associate diploma, and 14% had a bachelor's degree. Table 2 shows the mean and standard deviation of pre-and post-test scores for study variables in experimental and control groups. The Shapiro-Wilk test is also included in this table, used to determine whether or not variables in groups have a normal distribution. According to this table, the Shapiro-Wilk test is insignificant for any variables, indicating normal distributions.

The impact of mindfulness on substance craving, stress, and cortisol levels was investigated using multivariate analysis of covariance. The test for homogeneity of the pre-and post-test regression slopes for drug use, stress, and cortisol levels in the experimental and control groups revealed that the regression slopes were identical in both groups (P<0.217, F= 1.604). The Levene's test used to determine the homogeneity of variance of dependent variables across groups revealed that the variance of substance craving (P<0.517, F= 0.427), stress (P<0.936, F= 0.007), and cortisol level (P<0.611, F= 0.327) is equal between groups. The BOX test results to compare the covariance matrices of dependent variables in the experimental and control groups revealed that the covariance matrices of dependent variables are identical in both groups (BOX M 5.79, F= 1.802, P<0.141). After examining the assumptions behind the multivariate analysis of

Table2. Descriptive indicators of pre-test-post-test scores in experimental and control groups

Variable	Group	Phase	Mean	Standard deviation	Shapiro-Wilk	P
cortisol level	experimental	pretest	224.15	153.08	0.905	0.097
		posttest	92.84	77.25	0.911	0.162
	control	pretest	131.95	149.25	0.930	0.263
		posttest	237.09	198.81	0.853	0.055
stress	experimental	pretest	15.33	7.99	0.932	0.321
		posttest	7.73	5.97	0.928	0.237
	control	pretest	18.53	8.51	0.911	0.077
		posttest	17.8	7.27	0.877	0.245
craving	experimental	pretest	7.87	3.60	0.879	0.128
		posttest	4	4.61	0.865	0.590
	control	pretest	2.67	1.91	0.907	0.585
		posttest	6.73	4.44	0.945	0.678

Table3. Results of univariate analysis of covariance to determine if there are variations in drug craving between experimental and control groups

Source	TSS	Degrees of freedom	Mean squares	F-test	P	η2
covariate	77.70	1	77.70	26.329	0.001	0.494
group membership	248.59	1	248.59	84.234	0.001	0.757
error	79.68	27	2.951			

covariance, the test findings revealed a significant difference in substance craving, stress, and cortisol levels between the two groups (Wilks Lambda = 0.048, F= 0315.567, P<0.001). In the pre-test and post-test of the drug craving variable, Table 3 shows the findings of univariate analysis of covariance to look into the differences between the experimental and control groups.

Table 4 shows the results of a univariate analysis of covariance used to compare the experimental and control groups in terms of stress

Source	TSS	Degrees of freedom	Mean squares	F-test	P	η2
covariate	575.13	1	575.13	34.825	0.001	0.563
group membership	869.96	1	869.96	52.678	0.001	0.661
error	445.902	27	16.515			

According to the F-test in Table 3, substance craving in the post-test is 84.234, which is statistically significant at the 0.001 level, indicating a substantial difference in drug craving between the two groups. Additionally, the effect size of 0.75 means that this difference is significant in the community. According to this result, mindfulness lessens drug cravings in those who use crystal meth. Table 4 summarizes the findings of a univariate analysis of covariance used to compare the experimental and control groups on the stress variable's pre-test and post-test.

According to Table 4, the F-test stress in the post-test is 52.678, which is statistically significant at the 0.001 level, indicating a significant difference in stress between the two groups. Additionally, the impact size of 0.66 means that this difference is significant in the community. According to this result, mindfulness decreases stress among crystal meth users. Table 5 summarizes the findings of a univariate analysis of covariance used to compare the experimental and control groups on the variable cortisol level pre-test and post-test.

According to Table 5, the post-test cortisol level is 3.707, which is meaningful at the 0.001 level, indicating a significant difference in cortisol levels between the two groups. Additionally, the impact size of 0.121 means that this difference is significant in the community. According to one study, mindfulness decreases cortisol levels in persons who use crystal meth.

Discussion

The purpose of this research was to determine the efficacy of mindfulness on drug cravings, stress levels, and cortisol levels in Mashhad males who used crystal meth. The analysis of covariance revealed that the mindfulness approach was beneficial in lowering cravings, stress, and cortisol levels among crystal meth users. This finding with the research results

Table 5. Cortisol levels in the experimental and control groups were compared using univariate analysis of covariance

Source	TSS	Degrees of freedom	Mean squares	F-test	P	η2
covariate	211758.5	1	211758.5	10.209	0.001	0.274
group membership	76898.2	1	76898.2	3.707	0.001	0.121
error	1609377.3	27	20741.7			

of Tannery et al. (2017) indicates that mindfulness-based cognitive therapy can be effective in reducing recurrence, increasing obedience and retention in treatment; Goldstein et al. (2017), Yu et al. (2017), Mousavi et al. (2014), Vitkotiz et al. (2013), Hamedi, Shahidi, Khademi (2014) on the effectiveness of mindfulness in preventing relapse prevention Is.

To summarize these findings, mindfulness-based exercises provide the potential of alternate reactions to emotional pain and hence conditioned responses to cravings, which may then be controlled and reduced. One recognizes events as distinct from oneself, a temporary condition, and changeable in the awareness mind. As a result, rather than researching the topic or avoiding cognitive or behavioral avoidance of the experience, both of which are unpleasant, it absorbs and ultimately internalizes these experiences, just like other neutral or non-emotionally charged experiences. By training patients to examine cravings in all of their dimensions — emotional, physical, and cognitive — mindfulness activities aim to help patients develop a more nuanced acceptance and understanding of their experiences of desire. Patients using a non-judgmental approach are taught to examine emotional states and avoid cognitive, emotional, and physical components rather than escape via relaxation techniques, mindfulness, and conversation activities (Dabbaghi et al., 2017).

The conditioning phenomenon is one of the most fundamental elements determining the recurrence and duration of addiction. Individuals who experience internal symptoms such as boredom, weakness, sadness, anxiety, stress, and outward symptoms such as specific times and locations and individuals and devices with whom they previously used drugs become conditioned, and their tension and anxiety rise. Through desensitization, mindfulness practice operates as an exposure process, in which the repeated observation of uncomfortable interior sensations without response results in a decrease in sensitivity to appealing internal and external signs for consumption. Mindfulness training allows persons with a history of drug abuse to accept their experiences, set aside the judgment and mental rumination, and conclude that they can act independently of their experiences (Kiani et al., 2013).

Additionally, mindfulness treatment successfully reverses empirical avoidance tactics that seek to decrease the intensity and duration of undesirable internal sensations. These maladaptive techniques are thought to contribute to the persistence of many, but not all, emotional illnesses. Additionally, mindfulness meditation incorporates slow, deep breathing, which has been shown to alleviate physical symptoms of agitation by balancing sympathetic and parasympathetic responses. These two systems communicate continually, and one of their internal connections is visible in the pituitary gland. The pituitary gland and hypothalamus are related, and the two functions in tandem to create and control hormones. The pituitary gland secretes many hormones and encourages the production of others, one of which is adrenocorticotropic, which plays a critical role in stress responses. Under stress conditions, the hypothalamus stimulates the pituitary gland to produce, which in turn induces the adrenal gland to emit the hormone glucocorticoids, one of which is cortisol. Consequently, intentional meditation and breathing exercises may directly reduce cortisol levels (Vetikotiz et al., 2013). It can also be noted that mindfulness exercises reduce many of the symptoms associated with anxiety and reduce the occurrence and frequency of negative thoughts by not labeling and allowing the passage of thoughts (Akbarinia et al., 2019). As Eisendrath et al. (2014) state, mindfulness helps to promote relaxation responses and improve attention self-regulation, and causes people to view stress as a challenge rather than a threat. Accordingly, Hess (2018) believes that

mindfulness can be effective because it promotes cognitive relaxation and profound behavioral changes that are common methods. Therefore, the treatment of mindfulness with regard to physiological processes, as well as special attention to stress and its cognitive aspect, has led to the formation of a new way of thinking according to which people consuming crystal perceive less stress and as a result of excessive cortisol secretion. Is prevented.

One of the study's limitations is that the therapy was conducted on males, making it impossible to compare men and women and assess the treatment's effectiveness in a sample of women with drug dependence. It is advised that this therapy be investigated in addition to cravings, anxiety, and cortisol levels to facilitate other psychological disorders linked with abuse, such as sadness, rage, and so on. Additionally, it is advised that different training courses be conducted in teaching mindfulness practices at the level of medical clinics.

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