



# Effect of Compassion-Focused Therapy (CFT) on Blood Cortisol and Cognitive-Emotion Regulation in Drug Abusers

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## Abstract

**Objectives:** This study aimed to investigate the efficacy of compassion-focused therapy on blood cortisol and cognitive-emotion regulation among drug abusers.

**Methods:** It was a quasi-experimental study with a pretest-posttest design and a control group. The statistical population consisted of all men with drug abuse referring to Torbat-e-Heydariyeh Adult Drug Abuse Clinic in 2018, 40 of whom were selected by simple random sampling for the experimental and control groups. The experimental group was trained for 10 sessions of 90 min, but the control group was on the waiting list and received no training. A demographic questionnaire and the cognitive-emotion regulation questionnaire of Garnefski were used for data collection before and after the intervention. Besides, the data on the in vitro serum levels of cortisol we gathered. The data were analyzed using the analysis of covariance in SPSS 24 software.

**Results:** The results of the multivariate analysis of covariance showed that in the group of compassion-focused behavioral therapy, the intervention had a significant effect on blood cortisol and cognitive-emotion regulation at the posttest ( $P < 0.005$ ).

**Conclusions:** According to the findings, compassion-focused behavioral therapy was effective in reducing cortisol levels and elevating cognitive-emotion regulation among drug abusers.

**Keywords:** Compassion-Focused Therapy, Blood Cortisol Level, Cognitive-Emotion Regulation, Drug Abuse

## 1. Background

Drug abuse refers to the frequent and prolonged use of a drug so that depriving it causes an uncontrollable desire to reuse it. Drug abuse is a leading cause of physical and psychological problems. Drug dependence is a global problem. Statistics from international organizations, notably the World Health Organization, the World Narcotics Control Committee, and UNESCO, indicate increasing use of drugs worldwide (1). Every year, many people with drug abuse disorder lose their lives through its direct and indirect consequences (2). Drug abuse is a set of cognitive, behavioral, and psychological symptoms of repeated use leading to tolerance, abandonment, and coercive acts (3).

Studies have shown that physical and psychological stressors can stimulate the hypothalamus and release corticotropin-releasing factor, resulting in increased cortisol secretion from the adrenal gland (4). Cortisol is a catabolic hormone and the major form of glucocorticoid in humans that is secreted from the cortex of the

adrenal gland in response to physiological and psychological stress (5). Cortisol simply enters brain cells and its changes can cause behavioral changes, interference with cognitive function, gastrointestinal disorders, and adverse immune function. Therefore, physical/cognitive anxiety plays an important role in the release of cortisol in people with drug abuse and its negative consequences (6). Mental and personality problems can be the cause of substance abuse. Many studies have reported concurrent drug abuse and mental disorders. Ignoring mental disorders before and after quitting is one of the factors leading to treatment failure and drug reuse (7). One of the strategies used to control body stress hormones (cortisol) is the use of behavioral and psychological therapies in individuals, which helps patients to continue treatment for a longer period (8).

The lack of cognitive-emotion regulation is one of the main problems with drug abusers. People with no cognitive-emotion regulation are more likely to be at risk

of drug abuse than others. Emotion regulation is an important motivation for consuming or not consuming drugs. In fact, drug users often attribute their consumption to the relieving effects of the drug (9). Reports also indicate that drug/tobacco use is increased when people are angry, anxious, sad, and distressed. Effective emotion management can reduce the risk of drug abuse when one is pressured to use drugs. The ability to manage emotions can enable one to use appropriate coping strategies in situations where the risk is high. People with high emotion regulation are more capable of anticipating what others want. They understand the unwanted pressures of others and better control their emotions, thereby making them more resistant to drug use. In contrast, those with lower emotion regulation tend to move toward drug abuse (10) to counteract their negative emotions.

In addition to medication therapy, numerous cognitive interventions have been devised over several consecutive years to address psychological problems, including anxiety. Psychological interventions are ways of communicating with positive, negative, and neutral experiences. These techniques help people to identify the involuntary patterns of mind and turn them into conscious and voluntary patterns to perceive negative emotions and thoughts as simple, transient matters in the mind (11, 12).

People with drug abuse lack emotional control and show abnormalities in body hormones (12) and these are exactly the same things that are taught in dialectical behavior therapy. Moreover, in this therapy, the patient's recurrence is confirmed and it prevents the patient from experiencing negative emotions of a particular situation (13).

A very recent issue that has attracted the interest of many researchers is the concept of self-compassion, self-judgment, self-care, and understanding, as well as the reduction of criticism and judgment about our shortcomings. Compassion itself is a way to reduce anxiety associated with mental disorders (14). Compassion-focused therapy (CFT) can play a protective role against depression, anxiety, and repressive thinking. It can develop self-compassion, reduce self-criticism, anxiety, and stress, suppress negative thoughts and emotions, promote emotion regulation, and lead to self-control. Self-compassion was first defined by Nephi as a three-component model of self-compassion versus self-judgment, human communion versus isolation, and self-awareness versus incremental simulation. The combination of these three related components is an individual's characteristic of compassion. Self-compassion and self-understanding are used instead of judging or criticizing one's own shortcomings and inadequacies by admitting that all humans are defective, make mistakes, and have unhealthy behaviors that are common characteristics of humans (15). Awareness leads

to a balanced knowledge of current experiences and make painful dimensions not to be ignored.

Compassionate imaging increases heart rate variability and reduces cortisol levels in people with low levels of self-criticism (16). Compassion-focused therapy is focused on a model of emotion regulation, brain states, and personal experiences. This is especially important in addressing self-criticism and shame in people with a history of violent and unhappy lives (17).

## 2. Objectives

Therefore, considering the negative, increasing consequences of drug abuse disorder in the community and the effective role of psychological therapies in reducing drug abuse disorder, we aimed to investigate the efficacy of compassion-focused therapy in changing cortisol levels and cognitive-emotion regulation among drug abusers.

## 3. Methods

It was a semi-experimental study with a pre-test and post-test design and a control group. The statistical population consisted of all men with drug abuse disorder who had experienced detoxification referring to Bozorgmehr Addiction Treatment Center in Torbat-e-Heydariyeh, Iran. The present study was approved by the Research Council and Ethics Committee of Medical University (ID number: IR.IAU.NEYSHABUR.REC.1397.016) and registered at the Clinical Trial Center (with code: IRCT20181022041421N1). Simple random sampling was used to select 40 people using the records of people referring to the addiction treatment center of Torbat-e-Heydariyeh, based on the statistical formula, as well as similar studies (18). They were selected and divided into an experimental group (20 people) and a control group (20 people). The inclusion criteria included no psychiatric illnesses and mental disorders except for drug abuse, written consent and willingness to attend therapy sessions, male gender, negative chromatography test for addiction, a minimum of high school education and a maximum of bachelor degree, age of 20 up to 40 years old (19), not attending other psychotherapy sessions and the anonymous addicts association, having drug addiction for at least 12 months (20), and not taking drugs affecting cortisol including cortisone, anxiolytic, and antidepressant drugs. The exclusion criteria included absence from more than two sessions, lack of interest and cooperation with individuals, and failure to perform specified tasks in the educational process.

The research instrument included a demographic questionnaire, vitro measurement of blood cortisol levels

and cognitive emotion regulation questionnaire of Garnefski. After selecting the sample and explaining the objectives of the study, informed consent was obtained from the participants. Then, they were divided into experimental and control groups. To measure serum cortisol levels, 5 mL of venous blood samples were collected at 8 AM in a sterile dry tube and sent to the laboratory. Blood cortisol levels were assessed by ELISA using an IBL kit made in Germany. The experimental group received compassion-focused therapy. The training was delivered in 10 sessions of 90 min per week, according to Tables 1 and 2. Homework was assigned to the experimental group after each session. The control group was treated in the ongoing routine way (methadone maintenance therapy) and did not receive the study intervention until the end of the research process. The participants in the control group were assured that they would receive the intervention after completing the research process. Immediately after the end of the training sessions, a post-test was conducted for the measurement of serum cortisol and the cognitive-emotion regulation questionnaire of Garnefski.

Urine chromatography tests were performed according to the methadone maintenance therapy (MMT) protocol during the training sessions. The participants were also reassured that their information would be kept confidential and they will experience no harm. Data were analyzed by SPSS software (version 24). Data analysis was performed at two levels of descriptive statistics and inferential statistics using analysis of covariance.

### 3.1. Instruments

1) The Cognitive Emotion Regulation questionnaire was developed by Garnefski et al. (21), as a self-report instrument with 36 items. The scale scores range from 1 = almost never up to 5 = almost always. Each subscale consists of four items and the scores of the subscales are totaled. The questionnaire is scored based on a five-point Likert scale, never (1), rarely (2), sometimes (3), often (4), and always (5). The interpretation of the questionnaire was based on the scale of the questionnaire so that a score between 36 and 72 indicates poor cognitive-emotion regulation, a score between 72 and 108 represents moderate cognitive-emotion regulation, and a score above 108 represents strong cognitive-emotion regulation in individuals. The alpha coefficient for the subscales of this questionnaire was reported by Garnefski et al. in a range of 0.71 to 0.81. Hasani et al. (22) obtained the reliability of the questionnaire using Cronbach's alpha to be 92%. To investigate the convergent and divergent validity of the questionnaire in Iran, we used depression, anxiety, and stress scale that included 21 items that assessed the three factors of depres-

sion, stress, and anxiety. In this scale, each factor assesses the emotional disorder factor.

2) Blood cortisol levels were assessed by ELISA and using the IBL kit made in Germany.

## 4. Results

The mean age of the participants was 33 years; the majority of them were single (53%), and had a diploma degree (46%). The most consumed drug was methamphetamine (40%). Table 2 shows the mean and standard deviation of the two variables in the pre-test and post-test in the compassion-focused experimental group and control group. One of the assumptions of covariance analysis is the homogeneity of Levene's variances. According to Table 3, in Levene's test, the dependent variables were not statistically significant ( $P > 0.05$ ). Therefore, the assumption of homogeneity variances was not rejected. Another hypothesis is the analysis of covariance. For the test of normality, the Kolmogorov-Smirnov test was used. According to Table 4, the results indicated the normality of communities ( $P > 0.05$ ). According to Table 5, there was a significant difference in all variables. In other words, compassion-focused therapy reduced blood cortisol levels and enhanced cognitive-emotion regulation among the participants in the experimental group. The effect of this intervention on the reduction of blood cortisol levels was 0.59, meaning that 59% of the variance scores were related to the therapeutic intervention. Therefore, the first hypothesis was confirmed. Also, the effect of this treatment on increasing the cognitive emotion regulation score was 0.23. This means that 23% of the variance scores were related to the intervention. Therefore, the second hypothesis was confirmed.

## 5. Discussion

The analysis of covariance results showed that both treatments had a significant effect on decreasing cortisol levels and increasing cognitive-emotion regulation. The results on the effect of compassion-focused therapy on cortisol levels are in line with the results by Brooks et al. (23), Neff and Germer (24), Goss and Allan (25), and Lowens (26). The results of the effects of compassion-focused therapy on cognitive-emotion regulation were also consistent with the studies by Kamalinasab and Mohammadkhani (27), Saeinia et al. (28), and Dashtbozorgi et al. (29).

Self-compassion plays a role in predicting treatment motivation and readiness to change drug dependence. The risk of drug use is positively associated with self-compassion, shared human experience, and mindfulness,

**Table 1.** The Content of Compassion-Focused Therapy Sessions Based on Gilbert's Treatment Plan

Session	Content
<b>First session</b>	Primary acquaintance, communication, familiarity with the general concept of self-compassion and empathy and pre-test (demographic questionnaire completion and sample collection for blood cortisol and serotonin levels).
<b>Second session</b>	Introducing the session objectives, group definition, rhythmic breathing exercise, and characteristics of a group
<b>Third session</b>	Empathy training, examining the way members deal with self-criticism or compassion (defining self-criticism and its consequences, defining compassion, training to understand and make people feel empathetic, rejection by the group is one of the biggest fears of individuals in interviews.
<b>Fourth session</b>	What is self-compassion? Its features and skills, how it affects one's mental state, the introduction of three emotion regulation systems, and how they interact. Shaping and creating more and more varied feelings about people's issues to increase their care and attention to their health.
<b>Fifth session</b>	Teaching forgiveness, teaching the concept of awareness, its logic and how it is practiced, (focusing on breathing and tracking emotions and thoughts and watching them without any reaction)
<b>Sixth Session</b>	Introducing mental imaging and its logic, imaging training and implementation in the group (color imagination, location and compassionate characteristics)
<b>Seventh session</b>	Developing self-compassion concepts: wisdom, ability, warmth, and responsibility for generating compassion, training on imaging of self-compassion, training to develop valuable and transcendent emotions to deal effectively with the environment
<b>Eighth session</b>	Self-centered compassion and identifying different aspects (attention, thinking, feeling, behavior, self-awareness)
<b>Ninth session</b>	Recalling compassion skills, the role of compassion in guiding thought, thought training responses, and compassionate behavior in the face of criticism
<b>Tenth session</b>	Receiving feedback from team members on the principles taught, reviewing, and summarizing past material, and post-test implementation (evaluation of blood serotonin and cortisol levels)

**Table 2.** Descriptive Statistics of the Study Based on Variables and Type of Test<sup>a</sup>

Dependent Variable	CFT	Control
<b>Cortisol levels</b>		
Pre-test	17.37 ± 0.944	17.55 ± 1.110
Post-test	15.52 ± 0.938	17.60 ± 0.981
<b>Cognitive emotion regulation</b>		
Pre-test	67.85 ± 8.755	69.05 ± 9.034
Post-test	75.00 ± 11.872	69.30 ± 7.560

<sup>a</sup>Values are expressed as mean ± SD.

**Table 3.** The Results of Levene's Test of Equality of Error Variances

Dependent Variable	F	Sig.
<b>Cortisol levels</b>	0.868	0.357
<b>Cognitive emotion regulation</b>	2.255	0.141

**Table 4.** Results of the Kolmogorov-Smirnov Test of Normality

Dependent Variable	Kolmogorov-Smirnov	Sig.
<b>Cortisol levels</b>	0.363	1.000
<b>Cognitive emotion regulation</b>	0.474	0.978

but negatively correlated with isolation. These results support the protective role of self-compassion in drug use. This indicates that training to increase self-compassion among drug abusers will increase their self-control. The lack of self-control and consequently hormonal changes in

the body are the inappropriate motivational conditions for drug abuse that develops in the cognitive structure of addicts, and thereafter entices tempting thoughts about the effects of drugs on the individual's mind. Usually, these tempting thoughts cause the person to think of their existence as a failure of their treatment plan.

Often, one of the key elements in cognitive self-compassion therapy is to reinforce a sense of acceptance. Training in this program does not make addicts blame themselves for having such drug favoring thoughts with no unrealistic judgments and evaluations of it (30).

In explaining this treatment, it can be argued that compassion-focused therapy promotes kindness and understanding and avoids self-criticism and judgment. In this study, people were trained to understand their problems instead of criticizing and judging them unnecessarily. Moreover, self-compassion training for people with drug abuse disorder, on the one hand, can mitigate the distress caused by negative experiences and emotions that threaten them, and on the other hand, make people more aware of the nature of their distress and problem; thus, they can counteract it and improve self-control and hormonal regulation.

In explaining the effect of compassion-focused therapy on cognitive-emotion regulation, it should be argued that cognitive-emotion regulation empowers individuals to adjust to negative and positive emotions and to better understand the situation and learn how to manage their emotions.

**Table 5.** Results of Analysis of Covariance for Difference Patterns

Dependent Variable	Mean Square	Sum of Squares	F	df	Sig.	Partial Eta Squared
Cortisol levels	54.15	39.587	39.587	1	0.000	0.59
Cognitive emotion regulation	11.391	453.14	453.14	1	0.002	0.23

Self-compassion training enhanced the ability to postpone unpleasant emotions, the ability to get away from a negative emotion appropriately, and the ability to control emotions wisely, and by modifying negative emotions, it increased individuals' emotion regulation. Striving for emotion awareness makes people more self-conscious and self-controlled and less likely to feel hopeless, self-blamed, and uneasy. Adjusting emotions will help people adjust to the environment and make the person more efficient in dealing with the issues and causes the person to experience more emotional balance. Therefore, compassion-based therapy can promote emotional cohesion, adapt to new adaptive behaviors, evaluate positive and negative emotions, and enhance overall emotion regulation.

The limitations of this study included the inability to control variables such as drug use, lack of follow-up, and limited community of drug abusers. The strengths of this study included the high accuracy of the laboratory apparatus for measuring blood cortisol levels, the regularity of classes held, the willingness of test group participants to attend meetings, and even following up their study results. According to the results of this study, the compassion-focused therapies decreased cortisol levels and increased cognitive-emotion regulation in drug abusers. Therefore, it is proposed to use this treatment in drug addiction clinics and counseling centers.

### 5.1. Conclusions

In drug abuse disorder, detoxification comprises only 3% of the total treatment and the remaining 97% is a psychological dependence on drug use (31). Psychological therapies can be of great importance in treating drug abuse disorder. Among these therapies is the compassion-focused behavioral therapy that was used in this study. According to the results, it decreased the cortisol level and increased cognitive-emotion regulation in people with drug abuse disorder. Therefore, considering the low cost and effectiveness of this treatment in improving psychological symptoms, it is proposed to use this treatment in the post-detoxification period.

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### Footnotes

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