



The comparison of the effectiveness of contingency management and trans-theoretical model on the risk of sexual behaviors in cocaine users: A short report study

Mehdi Panahi¹, Tayebeh Honarvar², Negar Sadegh-Esfahani³, Leila Salari-Moghadam⁴, Sara Salari-Moghadam⁵, Roghayeh Jamali⁶, Fatemeh Aslani³, Paria-Sadeghi⁷

- 1 Department of Rehabilitation, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran
- 2 Department of Clinical Psychology, Kashmar Branch, Islamic Azad University, Kashmar, Iran
- 3 Department of Clinical Psychology, Karaj Branch, Islamic Azad University, Karaj, Iran
- 4 Department of Psychology, Arak Branch, Islamic Azad University, Arak, Iran
- 5 Department of Psychology, Roudehen Branch, Islamic Azad University, Tehran, Iran
- 6 Department of Psychology, Ardebil Science and Research Branch, Islamic Azad University, Ardebil, Iran
- 7 Department of Psychology, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran

Abstract

Short Communication

BACKGROUND: A transtheoretical model (TTM) can be considered as a cognitive and motivational view, a component which plays a significant role in addiction. Further, the theoretical basis of contingency management (CM) treatment is the origin of behaviorism and relies on operant conditioning. The present study is performed aiming to determine the effectiveness of TTM and CM on cocaine use and sexual risk behaviors in cocaine users.

METHODS: In this randomized clinical trial with 6-month follow-up, which was performed from 15 December 2014 to 20 November 2015, 75 male cocaine users were selected based on a respondent-driven sampling (RDS) method and were randomly divided into three groups by block randomization. The experimental group received a 12-week CM protocol and TTM and the control group was placed on the waiting list. Pre-test, post-test (after 12 weeks of training), and follow-up (six months) were administered. Data analysis was carried out using repeated measures analysis of variance (ANOVA), Scheffe's post hoc test, and chi-square test through SPSS software.

RESULTS: The mean age of the CM group, TTM group, and control group was estimated 26.12, 25.31, and 23.91, respectively. The primary outcome showed that CM and TTM had a significant effect on decreasing the sexual thoughts, sexual hyperactivity, and high risk behaviors. This effectiveness was stable until six months ($P = 0.008$), however there was not a significant difference between the two treatments ($P = 0.200$). The secondary outcome showed that in the changing stages, TTM (F-72%) and CM (F-60%) had a significant effectiveness which maintained until the follow-up stage.

CONCLUSION: The findings more enhance the hope to integrate the theoretical approaches into the clinical interventions.

KEYWORDS: Cocaine; Dangerous Behavior; Behavior Therapy

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Introduction

Cocaine is a highly addictive drug that increases the level of alertness, attention, and energy.¹ It is made of the coca plant, which is

native to South America. Cocaine consumption can cause structural and hormonal changes in the brain that can lead to high risk behaviors.^{2,3} Individuals who have an experience of cocaine use report increased feelings of alertness, energy, sociability, and emotional expressiveness. The use of cocaine has been associated with risky sexual behaviors,

Corresponding Author:

Paria Sadeghi; Department of Psychology, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran
Email: pysadeghi@gmail.com

indicating its clinical importance.

One of the emerging therapies with clinical trials that are tested in the field of drug abuse is contingency management (CM). CM in the form of using secondary positive reinforcers, such as coupons, goods and services. CM has reported promising results in the treatment of methamphetamine and cocaine abuse.⁴ CM has also been effective in reducing the high risk sexual behavior associated with human immunodeficiency virus (HIV). Shoptaw *et al.*⁵ showed that CM was able to produce similar effectiveness to cognitive-behavioral therapy in reducing the high risk sexual behavior in methamphetamine users.

On the other hand, transtheoretical model (TTM) was developed by Prochaska *et al.* with the goal of designing smoking cessation therapy.⁶

Regarding the increasing prevalence of cocaine use among young people and the high risk of transmission of HIV to cocaine users, and according to the effectiveness of CM and TTM in the addiction area, the present study was performed with the aim to evaluate the effectiveness of TTM and CM on cocaine use and sexual risk behaviors in cocaine users.

Materials and Methods

The present study was a randomized clinical trial with 6-month follow-up. The population of the study included all male cocaine users who lived in Tehran, Iran. The study data were collected from 15 December 2014 to 20 November 2015, using a respondent-driven sampling (RDS) method.^{7,8} 75 participants were randomly assigned into three groups by block randomization method.⁹ The experimental

group received a 12-week CM protocol and TTM and the control group was placed on the waiting list. The Data Matching Software was employed for data cleansing, standardization, matching, and record merging.

Coupon was allocated for negative urine samples (urine without cocaine). The rewards for the negative urine testing were \$1, \$3, and 5\$ for the first, second, and third samples, respectively, and at subsequent stage, a further \$1.25 was added to the coupon values.

After 12 treatment sessions based on the CM and TTM, all participants in the study were evaluated by the Sexual Behavioral Inventory and the Stages of Change Readiness Scale. The data were analyzed using analysis of variance (ANOVA), Scheffe's post hoc test, and chi-square test in SPSS software (version 20, IBM Corporation, Armonk, NY, USA).

All stages of the study were carried out after obtaining informed consent and based on the latest version of the Declaration of Helsinki (DoH) [with the Iranian Registry of Clinical Trials (IRCT) code: TRCT20180329002].

Results

The demographic status of the participants in the study is presented in table 1. Additionally, the mean age of the CM group, TTM group, and control group was estimated 26.12, 25.31, and 23.91, respectively ($P > 0.080$).

The results of the repeated measures ANOVA showed that both treatment approaches were effectiveness on all three subscales of sexual thoughts, sexual hyperactivity, and high risk behaviors ($P < 0.010$ for all).

Table 1. Demographic information of the study participants

Variables	Level	CM (n = 25)	TTM (n = 25)	Control (n = 25)	P
Education [n (%)]	Lower than diploma	9 (36)	11 (44)	8 (32)	0.037
	Higher than diploma	16 (64)	14 (56)	17 (65)	
Age (years) [n (%)]	18-25	17 (68)	16 (64)	15 (60)	0.043
	Above 25	8 (32)	9 (36)	10 (40)	
Occupation status [n (%)]	Employed	19 (76)	15 (60)	14 (56)	0.046
	Unemployed	6 (24)	10 (40)	11 (44)	
Monthly income [n (%)]	Less than one million Tomans	15 (60)	14 (56)	13 (52)	0.049
	More than one million Tomans	10 (40)	11 (44)	12 (48)	

For assessment of the difference among the sexual thoughts, sexual hyperactivity, and high risk behaviors, the Scheffe's post hoc test was used. The results revealed that there were significant differences between the mean values of precontemplation, ccontemplation, preparation, action, maintenance, termination in sexual thoughts, sexual hyperactivity, and high risk behaviors ($P < 0.010$). But there was no significant differences between the two treatment groups ($P > 0.200$).

The results of the chi-square test to compare the difference of groups in the key component of the change stages (precontemplation, ccontemplation, preparation, action, maintenance, termination) showed that TTM (F-72%) and CM (F-60%) had a significant effectiveness, which was stable until the follow-up stage.

Discussion

The findings showed that both treatment approaches were effective on sexual thoughts, sexual hyperactivity, and high risk behaviors. TTM also produced significant efficacy on the change stages in the above therapy group. On the other hand, CM had a significant effect on reducing cocaine use.

Consistent with our findings, the results of the study by Higgins et al.¹⁰ showed that CM could lead to an increased avoidance period for cocaine users, and the duration of avoidance to follow-up lasted to 6 months. Our findings are in contradiction with the results of the study by Heil et al.¹¹ They found that the effectiveness of CM on simultaneous consumers of cocaine-alcohol was similar to that of control. Compared with the current study, nonalcoholic cocaine-dependent subjects and codependent patients exhibit a wider array of problems, many of which merit professional attention. Alcoholic cocaine-dependent subjects may require extra treatment efforts for successful outcomes.

In contrast, the study by Rash et al.¹² showed that CM treatment has been effective

in drinking cocaine users. The methodological and demographic differences as contradictory in the findings can be regarded important. Our findings contradict the results of Killeen et al.¹³ who examined the efficacy of CM with community-based standard therapies in marijuana consumers. In this regard, new studies have shown that marijuana consumption affects psychological indicators such as delay discounting and reinforcement sensitivity.^{14,15} Moreover, the results of the study by Pirnia et al.¹⁶ indicated that CM has been effective in cocaine craving, but did not have a significant effect on increasing negative urine test of the stimulant.

One of the findings of this study is the effect of CM on the reduction of high risk sexual behaviors. In line with our findings, the study by Higgins et al.¹⁷ suggested that participation in cocaine abuse treatment programs leads to a reduction in risky sexual behaviors. These results systematically replicate and extend the prior findings that the availability of alternative, nondrug reinforcers can significantly decrease cocaine use.

This study was an attempt to indirectly compare two main paradigms in the field of clinical psychology and behavioral approach in the form of CM and cognitive approach in the form of a TTM. It is suggested that consideration be given to savings on potential costs in CM in future studies.

This study had some limitations. The most important limitation was that because of security and legal issues, paying in cash was not performed immediately, but late at night through paying on-line.

Conclusion

Based on the results of the present study, CM and TTM had a significant effect on the increase in using condoms. This effectiveness lasted for six months in the follow-up period. These findings can be applied to the acceptance and implementation of CM and

TTM as an evidence-based approach.

Conflict of Interests

Authors have no conflict of interests.

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