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Effect of 8 Weeks Aerobic Exercise on Depression's Level of Addicted during Treatment with Methadone

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ABSTRACT: This study examined the effects of aerobic exercise on changes in the level of depression in addicts under methadone treatment was performed. Experimental or quasi-experimental research method was a pretest-posttest control group. The study sample includes all 25-40 year old male addicts is methadone maintenance treatment with methadone addiction treatment centers located in West of Tehran in the second half of 1392. The sample size was 30 people who were randomly selected from available society based on the level of depression that were replaced in the control and experimental groups. In the first phase, participants completed the 21-item Beck Depression Inventory (BDI-21). Ultimately, 30 people who drug addicts, gained more scores on the Beck depression scale were randomly selected and divided into two experimental(N=15) and control(N=15) groups. In the second phase, experimental group participated in 8-week aerobic exercise training, and in third phase, after training implementation, two groups were evaluated by re-test. Results demonstrated that the drug addicts who have done that aerobic exercise with who have not received it, there were significant differences in depression (F=11/943 and p 0/002). The effect size or difference was 0/31, that mines 31 percent of individual differences in test scores is related to aerobic exercise. Results of analysis of covariance showed that the mean of experimental group was higher than the control group mean, so the hypothesis is confirmed. The results of the study showed that aerobic exercise can reduce the level of depression in addicts under methadone treatment.

Keywords: Aerobic Exercise, Depression, Methadone Treatment.

INTRODUCTION

Before 1964, drug abuse and drug dependence were named as addiction but with the proposition of World Health Organization, these terms replaced the word addiction in order to reduce its social burden (Sadock and Sadock 2007). Iran has long been seriously faced with this problem due to its special geographical position. In Iran, the number of drug users is estimated approximately 1.8 to 3.3 million people, mostly use opium drugs. According to the United Nations, despite the start of serious fight against production and distribution of drugs since 1980 in Iran (including death sentence for the transmission and distribution of drugs) the effectiveness of programs was not satisfactory and the drug use trend was not decreasing and in recent years it has become a serious problem. Studies show that 20 to 90 percent of treated addicts return to drug (Antoine *et al.,* 2008). Among psychiatric disorders associated with addiction, depression is very important because reduced energy and frustration caused by depression can reduce the addict's motivation to quit drug use and start treatment. Depression is one of the problems of addicts. It is one of the most common mental disorders and one of diseases that incur large costs to the healthcare system. Today, mental disorders are seen with different types and intensities. The most common of these diseases in Iran and world is depression so that about 10% of people have experienced at least one depression period within one year of their life. Its specific symptoms are dissatisfaction, loss of energy and interest, low self-esteem, feelings of sadness and guilt, and change in appetite and sleep pattern (Joe and Simpson 1991, Daniel, 2006, Smith and Elliott 2003).

Methadone maintenance treatment (MMT) is a method used for the treatment of drug addicts. In recent years, it has been highly considered, and its effect on the abstinence duration, psychological status, health and well-being has been examined. Methadone is a synthetic substance with physiological and analgesic properties similar to opium and heroin, but it is not considered euphoric. With methadone prescription and opium and heroin withdrawal, the addict does not quit but is addicted to a less dangerous substance. MMT provides satisfaction for patients and its withdrawal is easier than opium and heroin (Hensen *et al.,* 2001, Havard *et al.,* 2006).

Regular exercise training is associated with depression, and the greater number of training sessions will result in a greater reduction in depression. Longer training programs will also lead to a further reduction in depression. On the other hand, aerobic exercise serves as a rest period and keeps the individual away from all the stresses for a certain time. The secretion of endorphin hormone due to aerobic exercise and its effect on the modulation of emotional state and depression are important (Weinberg and Gold 1995).

This study is required because major research in the field of chronic diseases, psychological disorders and drug dependence reflects the positive effects of exercise in the treatment of these diseases and according to a few studies on the effect of exercise in the reduction of drug dependence and especially the lack of these studies in patients with drug dependence under methadone treatment and also due to the increasing prevalence of drug dependence in Iran (particularly risks for young and productive population). According to the research literature, the addicts' depression is one of the factors hindering the treatment progress. On the other hand, according to research results, exercise and aerobic exercise have a great impact on mood and even depression treatment progress. Therefore, this study aims to investigate the effect of eight sessions of aerobic exercise on changes in the depression level of addicts under methadone treatment.

METHODOLOGY

A. Population, sample and sampling method

Since this study evaluates the effect of eight weeks of aerobic exercise on the changes of depression level in the addicts under methadone treatment, it can be considered semi-empirical research with a control group and a test group. The subjects were selected with available method and were included in the test and control groups with the random matching method. The groups were matched by age, education, socioeconomic level and depression scores. The study included all 25- to 40-year-old heroin addicts referring to methadone addiction centers located in western Tehran in the second half of 2013. After collecting the necessary information through clinical interviews, demographic information was obtained by the demographic form and the information on the individuals under methadone treatment and their treatment stage was gained from the centers' officials. Among the target population, all 25- to 40-year-old heroin addicts under methadone treatment were identified. Then their contest to participate in the study was obtained. Next, for matching before the intervention implementation (aerobic exercise), Beck Depression Inventory was distributed among the subjects. Among them, 30 people with highest rates of depression were selected with targeted available sampling method and were randomly assigned to the test and control groups, each with 15 members.

Research tool: Demographic questionnaire: In order to match subjects for placement in the test and control groups, the demographic questionnaire was used. The participants were matched by marital status, education and health for doing exercises.

Beck Depression Inventory: The 21-statement inventory of Mansour and Dadsetan was used which was normalized based on the results of Iranian participants (its validity has been investigated repeatedly. The correlation coefficient of Beck Depression Inventory with Psychiatric Rating Scale for Hamilton Depression was 0.731, with Depression Self-Rating Scale of Zung 0.762 and with MMPI depression scale 0.743 (Franques, 2001). Its reliability coefficient with Cronbach's alpha for addicts was obtained 0.84, for non-addicts 0.83 and for all subjects 0.91 which is very suitable. The validity of this questionnaire has been frequently examined.

RESULTS

The total number of samples was 30 people: 15 people were randomly assigned to the control group and 15 people to the test group. In both groups, the average age of participants was 33 years, and minimum and maximum age was 25 and 40 years, respectively. About the education level of subjects, 66% had high school diploma or lower, 30% bachelor degree (or student), and the remaining had master degree. About marital status, 70% were married and 30% single. A total of 33% had government jobs and the rest had free jobs or were unemployed.

Table 1 shows the mean, standard deviation, minimum and maximum depression in the test and control groups in pre-test and post-test.

Table 1: Mean and SD, Minimum and Maximum of depression in two studied groups.

Stage	Control	Experimental	Minimum		Maximum	
			Control	Experimental	Control	Experimental
Pre-training	25.73 ± 4.71	26.32 ± 6.94	19	17	33	38
Post-training	25.87 ± 5.34	21.27 ± 25.87	17	13	35	34

Table 2: Results of Levin about equal hypothesis of variants in studied groups.

Variable	Levin statistics	The first degree of freedom (for)	The second degree of freedom (the denominator)	Sig level
Depression	1	1	27	0.076

As can be seen in Table 1, for the depression variable in the control group, the mean was 25.73 and SD was 4.71; in the test group, mean was 26.32 and SD was 6.94 in pre-test. The mean and SD in the depression variable in the control group respectively were 25.87 and 5.34, and in the test group, mean was 21.27 and SD 5.63 in post-test.

As shown in Table 2, Levine test results show that the null hypothesis for equality of variances for the scores of the two groups in the research variable is confirmed. That is, the assumption of equality of variances for the scores of the test and control groups in the post-test was confirmed for the depression variable. In other words, the assumption of homogeneity of variance is true.

Table 3 examines the homogeneity of regression slopes which is one of the conditions for the use of ANCOVA. Table 3 examines the regression slopes. Given that the significant level obtained from the F statistic is greater than 0.05, the homogeneity of regression slopes is confirmed. The significant level of pre-test also shows that the auxiliary random variable has a significant association with the dependent variable.

Table 3: Test results for regression slope of the research variable scores.

	Sum of squares	Degrees of freedom	Mean square	Statistics	significance
The corrected version	963/894	3	231/298	28/330	0/000
Source width	16/757	1	16/757	2/052	0/164
Group	3/314	1	3/314	0/406	0/530
Pre test	425/849	1	425/849	52/160	0/000
Pre test x group	29/444	2	29/444	3/606	0/069
Error	212/273	26	8/164	---	---
Total	15207/00	30	---	---	---
Total corrected	906/167	29	---	---	---

In this study, the assumptions for equality of variances, homogeneity of regression slopes and normality of variables are true, so we can use parametric tests to investigate the research hypotheses, and given that the pretest, as an auxiliary variable, has a significant relationship (beta) with the post-test, the results were analyzed using ANCOVA in order to control (adjust) the effect of pre-test.

Table 4 shows the summary results of one-way ANCOVA in the context of MANCOVA in the depression variable for hypothesis saying "Eight weeks of aerobic exercise is effective on the depression level in addicts under methadone treatment.

Table 4: Summary of one-way ANCOVA in the context of MANCOVA.

Variable	Source Changes	Total squares	Degrees of freedom	Mean square	F	Sig	Chi Eta	Statistical power
Depression	Pre-test	428/818	1	428/818	33/768	P < 0.001	0/565	1/000
	Group	151/544	1	151/544	11/934	P < 0.002	0/315	0/914
	Eroor	330/174	36	12/699	---	---	---	---

As can be seen in Table 4, the result confirms that with pre-test control, there is a significant difference in depression between drug addicts who received eight weeks of aerobic exercise (control group) and drug addicts who did not receive them (control group) (F=11.943, P<0.002). The effect of difference amount is 0.31, i.e. 31% of the individual differences in post-test scores relate to aerobic exercise. Statistical power is close to one, i.e., there is no possibility of type II error which implies that the sample size is sufficient. Therefore, the hypothesis is confirmed. In other words, aerobic exercise has reduced depression in drug addicts of the test group.

DISCUSSION AND CONCLUSION

Aerobic exercise is effective on changes in the level of depression in addicts under methadone treatment. Aerobic exercise changes the level of depression in addicts under methadone treatment. The results showed that eight weeks of aerobic exercise will reduce the level of depression among addicts under methadone treatment. These results are consistent with some previous studies (Brown *et al.*, 2014, Taru *et al.*, 2010, Haji Rasouli and Haji Rasouli 2009, Haji Rasouli *et al.*, 2012, Haji Rasouli 2011, Hajisasouli *et al.*, 2013).

It is shown in the above-mentioned research reports that exercise, physical motions and other physical activities will reduce the level of depression in different populations including drug and alcohol addicts.

Depression illness is a disorder associated with addiction that can occur before, during or after it. Therefore, depression control or reduction is important in the treatment of drug addicts. In several studies conducted in some communities, especially, adolescents, the relationship between depression and addiction (substance use disorder) has been observed. On the other hand, depression can occur independently of drug use and perhaps one can prove that it is a risk factor for addiction and drug use disorder. We should know that depression can also be regarded as a secondary disorder, so that in some patients suffering from chronic depression, signs of drug abuse tendency are not seen. This is also true about the non-depressed addicts. According to psychologists, exercise is considered the best proposed way with low cost and minimal side effects and a prevention method and even a treatment method for minor depression. Depression symptoms decrease with exercise and promote a sense of well-being by improving mood. In another study aiming at determining the level of depression and its relationship with women's exercise, it was found that there is a difference between female athletes and non-athletes in the level of depression. The results of a study showed that, there is a significant relationship between increase in aerobic fitness and decrease in depression (Mokri, 2002, Williams and Strean 2004).

Depression is often treated with medication, but many researchers suggest that new alternative methods should replace conventional treatment methods. Over the past two decades, many researchers have preferred exercise over traditional methods commonly used in depression treatment and have studied it. A group of researchers showed that endurance training can quickly improve mood disorders, especially major depression (Daley *et al.*, 2007, Larun *et al.*, 2006, Martinsen *et al.*, 1989, Trivedi *et al.*, 2006). In explaining the said research results, it should be noted that, drug addicts especially those under methadone treatment, with aerobic exercise, can gain the ability to manage and control their depression. Thus it can be concluded that their level of depression will change for the better. Given that exercise as an appropriate, non-invasive physical activity with minimal side effects and low cost is the best way for health promotion and minor depression reduction, it can be used as a way to prevent diseases in order to reduce healthcare costs. According to the results, psychotherapists can also use exercise along with other treatment methods or as an alternative method for the treatment of minor to moderate depression. On the other hand, the role of exercise in the reduction of mental disorders, such as depression, in addicts and non-addicts has been proven and the positive effects of exercise in increasing avoidance of smoking and reducing marijuana and cocaine consumption and reducing alcohol consumption has been observed. Animal studies also confirm the effect of exercise in reducing the need for methadone in methadone-dependent rats. Thus exercise may be used as a helpful valuable factor in addiction treatment and recovery of addicts. Due to the side effects of medication in addiction treatment, exercise is a non-pharmacological method that can have interaction with the dopaminergic reward system. Exercise leads to activation of the same system in the brain which is activated after the use of drug such as cocaine through increasing dopamine and its receptors. Thus exercise is a protection method against the return to drug and causes neuronal-hormonal adaptation (Moor KA, Blumenthal, 2002, Ussher, 2004, Lynch *et al.*, 2010).

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