


# The role of physical activity in life happiness of Greek drug abusers participating in a treatment program

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## Abstract

**Purpose** Exercise may offer a further opportunity to achieve pleasant conditions, without the use of substances or addiction supporting the promotion of a healthy lifestyle that is incompatible with the use of drugs. The aim of the present study was to explore the influence of physical activity on the degree of happiness among drug abusers in Greece.

**Methods** Permission was asked from five Greek rehabilitation institutes and was granted from three of them. A total of 150 participants were approached, of whom only 73 finally filled in the questionnaires. To determine participants' happiness with life, the Oxford Happiness Questionnaire (OHQ) was used. The respondents' physical activity intensity and frequency was measured with Godin Leisure-Time Exercise Questionnaire. SPSS 20.0 for Windows was used for statistical analysis of the data gathered. Descriptive statistics (means and standard deviations) were conducted.

**Results** As for the dimension of OHQ evaluating the happiness with life, the results showed that the respondents were only moderately happy. They also moderately exercise in terms of intensity and frequency. Regression analysis was performed with the OHQ dimension as the dependent variable and the respondents' exercise intensity as the independent one. The analysis indicated that the exercise intensity did not predict the respondents'

happiness with life ( $p > 0.05$ ). On the contrary, frequency of exercise slightly (24%) predicted the respondents' happiness ( $F = 4.34$ ,  $p < 0.05$ ).

**Conclusions** Results suggest that attendants of rehabilitation centers in Greece should be motivated to participate more frequently in exercise and recreation programs to somehow improve their happiness with their life.

**Keywords** Happiness · Rehabilitation centers · Exercise · Drugs

## Introduction

Drug addiction is an important public health problem [1] and the associated costs of drug use disorders to community are remarkable [2]. The use of illicit drugs by young people has been for a long time a scientific and public concern [3, 4]. Most drug users are at high risk for both mental and physical illnesses [5]. It has been reported that severe health problems such as diabetes mellitus, hypertension, coronary artery disease, chronic pain, sleep complaints, and other health-related co-morbidities like anxiety and depression have been noticed [5, 6].

In Greece, a total of 4891 individuals have undergone treatment, of which 2089 were new participants in this treatment. More than half of clients entered treatment through an outpatient service. For 69% of all treatment clients, the primary substance of abuse was opioids, followed by cannabis at 21% and cocaine at 5%. Among new treatment clients, the primary substance of abuse was opioids at 55% (mainly heroin), followed by cannabis at 35% and cocaine at 6% [7]. Results from the European Monitoring Centre for Drugs and Drug Addiction pointed out that around a third of European citizens have tried

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illicit drugs, while overdose claimed one person's life at least every 1 h [8]. Actually, the way of increasing lifestyle balance has been incorporated in existing prevention methods [9].

Exercise is cited as a highly recommended lifestyle change mechanism providing the advantages of physical activity as a relapse prevention strategy [10]. Also, a number of researchers have agreed that lifestyle-changing factors such as sport and exercise may play a sufficient role in the treatment of addiction disorders [11, 12]. Larimer and his colleagues have described the importance of helping their clients to develop positive addictions such as exercise and meditation [13]. Fitness and exercise have been proposed as a positive prevention strategy, especially due to the potential number of positive physiological and psychological results, like improved mood state, controlled reward systems, reduced negative feelings, and improved sleep. During phase of treatment, drug users report symptoms such as anhedonia, negative affect, and craving, and relief from these symptoms is believed to be a major factor that motivates drug use. Physical activity has been proposed as a treatment for drug addiction that may acutely assuage withdrawal symptoms and reduce the likelihood of relapse [14]. However, there is a negative relationship between high workout intensity and hedonic tone, and more specifically exercise above the ventilatory threshold leads to negative feelings [15–17].

A growing number of laboratory studies have shown benefits of acute bouts of exercise on withdrawal symptoms in smokers. As for instance, Taylor and his colleagues reviewed the effects of acute bouts of exercise on cigarette craving, withdrawal symptoms and negative affect and found that there were positive effects in each of the 12 studies that compared exercise with a passive condition [14]. Roberts and his colleagues carried out a review update and meta-analysis of studies published in this field from 2006 to 2011 [18]. They identified 15 studies, out of which twelve found a positive effect of exercise on cigarette craving. Similar results were also observed on the effects of light and moderate exercise on measures of withdrawal symptoms and negative affect, although vigorous exercise in general produced increases in these measures. Additionally, a more recent study revealed that cigarette craving was reduced after an interventional exercise program which contained isometric exercise and high intensity physical activity [19]. Very little is known about the efficacy of exercise during withdrawal from drugs, although results show that it decreases measures of stress, anxiety, and depression, supporting its potential efficacy [20]. Furthermore, exercise has been found to relieve sleep disorders [21], increase self-efficacy [22] and reduce stress symptoms among drug users [23]. Roessler showed that in a sample of 38 drug users who engaged in

an exercise program, 20 of them completed their exercise trial and 15 of the 20 reduced drug injection [24]. In a 12-week exercise program of outpatient drug users, Williams reported that 11 out of 20 participants who completed the intervention claimed that exercise was helpful to maintain their abstention from drug use [25]. Another study proved that the efficacy of exercise showed a decrease of 50% in use of cannabis [26]. Studies in animals also showed that long-term physical activity decreases sensitivity to the positive reinforcing effects of cocaine [27] and that aerobic exercise during an abstinence period decreases subsequent rats' cocaine seeking [28].

Taking into consideration that exercise participation leads to a negative feelings' reduce and an improvement of mood, and that these effects may help drug addicts manage their withdrawal symptoms and reduce their likelihood to relapse, authors chose to study the happiness levels of drug users and how these levels differentiate according to their level of exercise. Happiness is an important construct, though its factorial structure is still under investigation [29]. According to Argyle and Crossland, happiness may be conceptualized through three facets: (i) the frequency and degree of positive affect and joy; (ii) the level of satisfaction over a period; and (iii) the absence of negative feelings [30]. The Oxford Happiness Questionnaire was devised as a measure of personal happiness, while its short version was formed for use when time is limited or when the studied population is special as in our case [31].

The aim of the study was to investigate whether the drug addict's level of happiness is determined by his/her level of exercise participation. Our research questions are summarized as follows: (i) the Oxford Happiness Questionnaire filled in by drug addicts will present sufficient internal reliability, (ii) drug addicts' levels of happiness will be low and (iii) the drug addicts' level of exercise participation will predict their level of happiness.

## Materials and methods

### Participants

A bilateral agreement dealing with ethical procedures between the researchers and the Central Institution of Drug Rehabilitation was signed. One hundred and fifty (150) participants were approached, of whom only 73 finally filled in the questionnaire, reducing the response rate to 48.6%. Oral and written consent was obtained from all individuals participating in the study. Most of the respondents were under a drug treatment (61.6%), while the rest were following a reintegration program (38.4%). Sample's demographics are analytically presented in Table 1.

**Table 1** Demographic characteristics of the sample

Age (%)		Sex (%)		Profession (%)	
20–29	9.6	Males	86.3	Public servant	4.1
30–39	67.1	Females	13.7	Private employee	23.3
>40	20.5			Unemployed	72.6
Educational level (%)		Marital status (%)		Children (%)	
Elementary school	6.8	Married	11.0	With children	21.9
Secondary education	39.7	Divorced/to be divorced	13.7	Without children	53.4
Technical School	50.7	Single	75.3		
University	1.4				

### Study protocol

Permission was asked and granted from the Central Institution of Drug Rehabilitation. The permission allowed only one of the researchers to enter the facilities of three Greek Rehabilitation Institutions, to gather the questionnaires. As the representativeness of the sample was not a priority of the research, a non-probability sampling method was used with a rather convenient sampling. The data were collected on February till June of 2014. Not all the attendants of the centres' programs filled in the questionnaires, either because they did not wish to or as they were under a restrict program of therapy.

### Measures

As our sample consisted of a special population of participants in drug treatment programs, an evaluation tool selecting data from special populations was selected. The Oxford Happiness Inventory (OHI), when first designed, followed the format of Beck Depression Inventory [32], which was designed for clinical application, purposing to diagnose manic and depressive states of mind. The OHI provided a set of 20 multiple-choice items, relevant to subjective well-being. As designed for clinical application, the Inventory was not well applied in non-clinical populations [33]. For this, a more compact instrument, the Oxford Happiness Questionnaire (OHQ) was devised, consisted of 29 single items that can be answered on a six-point Likert scale. This instrument showed a very good construct validity, especially when its short version was tested [31]. This OHQ's short version was developed by Hills and Argyle in to be used in cases where time and/or space is quite limited [33]. Both the long (29 items) and the short version (8 items) of OHQ have demonstrated high scale reliabilities and good psychometric properties [29, 33], and have also been adapted in Greek population [34, 35] with high internal consistency. Analysis also provided evidence of the short-OHQ uni-dimensionality.

This short version was selected for the purposes of this research, to get completed by the rehabilitation centers' attendants, without causing sentiments of boredom and discomfort.

After suggestions were considered by the panel of experts, modifications to the questionnaire were made. Finally, a pilot study was conducted with 15 smokers. None of the respondents reported any difficulty in understanding and completing the questionnaire.

Respondents' physical activity intensity and frequency were measured with Godin Leisure-Time Exercise Questionnaire [36] with responses given in three alternatives: high, moderate, and low for the intensity and very often, rare and never, for the frequency.

Sample demographics were also gathered and presented in the aforementioned Table 1.

### Statistical analysis

The SPSS 20.0 (Statistical Package for the Social Sciences) for Windows was used to perform analyses of the study's data. As our sample was rather small, normality of all dependent variable distribution was checked through Shapiro–Wilk test. The findings suggest that our data were normally distributed ( $p > 0.05$ ). Items' reliability was measured with Cronbach's alpha. For the assessment of happiness, descriptive statistics was used (means and standard deviations) to evaluate the drug addicts' happiness with their lives. Relation among the *life happiness* factor and intensity and frequency of the sample's physical activity was examined by regressing the drug addicts' level of physical activity on to the factor of life happiness.

## Results

### Reliability analysis

The value of alpha was calculated to assess the internal consistency reliability of the OHQ scale ( $\alpha = 0.911$ ).

**Table 2** Reliability and descriptives of the questionnaire's dependent and independent variables

	Mean	St. deviation	$\alpha$ of Cronbach
OHQ dimension	3.89	0.62	0.91
Intensity of exercise	1.88	0.91	
Frequency of exercise	2	0.64	

Results dealing with the scale's reliability and descriptive appear in Table 2.

### Descriptive statistics

Descriptive statistics (means and standard deviations) were conducted. As for the dimension of OHQ evaluating the happiness with life, the results showed that the respondents were only moderately happy ( $M = 3.89$ ,  $SD = 0.62$ ). Concerning the intensity and frequency of exercise participation, the participants appear to have the same low to moderate scores (Table 2).

### Relationship between happiness and intensity/frequency of exercise

Regression analysis was performed with the one OHQ dimension as the dependent variable and the respondents' exercise intensity as the independent one. The analysis indicated that the exercise intensity did not predict the respondents' happiness with life ( $p > 0.05$ ). On the contrary, frequency of exercise slightly (24%) predicted the respondents' happiness ( $F = 4.34$ ,  $p < 0.05$ ) (Table 3). Results suggest that attendants of rehabilitation centers in Greece should be motivated to participate more frequently in exercise and recreation programs.

### Discussion

Even though there is a growing interest in the factors that enhance the quality of life of people addicted to substances, limited research has been conducted till today. Supporting these individuals by a holistic approach that recognizes the benefits of participating in regular physical activity, as well as the recording of demographic characteristics, may be beneficial. The purpose of this study was the investigation

of the relationship of physical activity and the level of happiness experienced by the participants during this specific period of their life.

In the present research, men outnumbered women in a percentage of 86.30%. Similar results were reported by a recent research that studied the differences between genders in drug users with delinquent behavior and mental disorders in a treatment program in California [37]. The above mentioned survey results were consistent with our own since the percentage of men was higher than the percentage of women. A number of studies showed that drug use occurs more frequently in men than in women, suggesting that men are more prone than women to addictions [38–40], as well they are more adventurous and more curious to experiment by nature [41]. Furthermore, the gender differences across drug addiction are highlighted with men injecting more psychoactive drugs than women [41]. Generally, research showed that men use more frequently cannabis, tobacco, and hallucinogenic drugs. Additionally men are experiment with alcohol and cocaine [42]. On the other side, women are more prone to use tranquilisers and amphetamines [42].

Concerning the parameter of "age", the majority of participants who participated in our study were between 30 and 39 years old. Similar results were found by Du et al. [33]. In their investigation, the majority of participants who were drug users ranged between 35 and 44 years old. In contrast to our research, other studies suggest that while people of all age groups are at risk, the most critical age group is between 16 and 26 years [40, 43], as it is exposed to a greater risk because of developmental changes of age, especially during the transition from adolescence to adulthood [38]. Of course, we should take into consideration that our respondents were already participating in a rehabilitation program and no question evaluated their addiction commencement.

As for the "education" and "profession" parameters, although the largest proportion of all participants, almost half (50.70%) were vocational school graduates, the unemployment rate was 72.6%. These results are congruent with those reported by Zhou and Li as their research showed that the majority of drug users have a high level of education and nevertheless are unemployed [44]. This can be partly explained by the fact that drug users are likely to be unemployed due to stigma and discrimination [45].

**Table 3** Linear regression results

Criterion variable	Predictors	$B$	$\beta$	$F$	$df$	$R^2$	$R$
OHQ dimension				4.34	59	0.24	0.45
	Exercise intensity	0.11	0.09				
	Exercise frequency	0.31	0.21*				

\*  $p < 0.05$

Another possibility is that drug users are not able to cope with the responsibilities of a stable employment required in the private and public sectors [46].

Other studies strongly suggest that the most important reasons why drug users are unemployed are related to a low self-perception which possibly contributes to increased drug use as well as intensive drug use, which has resulted in reduced job efficiency [47–52]. However, it has proved that factors such as education and employment have been associated with a greater likelihood of completing a treatment program for drug addiction disorders [52].

Regarding the “marital status” and “having children” parameters, 75.3% of the participants reported “single”, while only 24% had children. Surveys indicate that the majority of drug users are single [44]. In a survey, which investigated the relationship between marital status and cessation of the use of marijuana, it turned out that the family situation contributes significantly to stop using marijuana [53]. Other studies have not reported meaningful relationship between drug use and marital status [54].

Studies have associated depressive symptoms with negative treatment outcome in patients with disorders of substance use [55–59]. However, participation in exercise has been associated with a reduction in symptoms of depression, thus resulting in reducing the risk of recidivism [57, 58]. Our research confirms this suggestion, as it proved that there is a positive correlation regarding the relationship between the frequency of participating in exercise and the degree of happiness of the participants. Also, indicated that the exercise intensity did not predict the respondents’ happiness in life. On the contrary, another study suggests that an exercise prescription of 20 min per day, three times per week, at a moderate intensity is sufficient to significantly reduce symptoms of depression [60–62]. Regarding, the intensity and the types of physical activity, which have better results on drug abusers, research has not reached a conclusion. Often, drug addiction is characterized by an extremely sedentary lifestyle. Probably an interventional program of light-to-moderate intensity physical activity is better than a vigorous physical activity, and as a result adherence in an exercise routine may be greater [63–65].

Physical activity can benefit patients who depend on drugs to recover from the problems caused by harmful substances through a number of different mechanisms of action. Lynch and his colleagues found that exercise can positively reduce craving for drug abusers, producing important effects on rehabilitation and prevention from drug use disorders [66]. Also, another study proved that drug addicts, who are engaged in exercise programs or planning to engage in physical activity during treatment, report lower levels of drug use than those who are not engaged in exercise [67]. Participation in exercise can provide addicted patients, the ability to experience positive

emotions, without using drugs. Researches showed that, due to the reduction of dopamine, the addicted patients may have a reduced ability to experience pleasure at the beginning of their treatment [68, 69]. These positive reinforcing properties of exercise can affect partly the endogenous dependency system and strengthen the dopaminergic system mainly associated with increased mood and pleasure [70], although the application of techniques of neuroscience to exercise is complex and requires strong research designs [71]. Furthermore, participation in activities with others provides opportunities for socialization and development of friendship networks, thus reducing social isolation [72–74].

Future studies should try to identify demographic and personal characteristics of addicts from substances which could reduce patient participation in structured exercise programs in order to develop appropriate interventions physical activity by private and public organizations. However, this study showed that the frequency of exercise is feasible to have a positive impact on drug users. Exercise may offer a further opportunity to achieve pleasant conditions, without the use of substances or addiction [75], supporting the promotion of a healthy lifestyle that is incompatible with the use of drugs [76]. Indeed, those who engage in regular physical activity often say they “feel better”, and experience a “sense of success” and “pleasure” [77]. Nevertheless, the effectiveness of a personalized exercise intervention program requires further research through randomized clinical efforts.

## Limitations and conclusions

Limitation of the present study could be the small sample size, because permission was granted only from three out of the five rehabilitation centers working in the Greek territory. Furthermore, not all the attendants of the centers’ programs filled in the questionnaires, either because they did not wish to or as they were under a restrict program of therapy. Also, there is limited ability to understand if mediating mechanisms enhanced the degree of happiness among Greek drug abusers. However, the current study has demonstrated that frequency of exercise slightly predicted the respondents’ happiness with life. On the contrary, the exercise intensity did not predict the respondents’ happiness. Results suggest that attendants of rehabilitation centers in Greece should be motivated to participate more frequently in exercise and recreation programs. In addition, future studies should attempt to identify demographic characteristics, different types of exercise and exercise intensities to develop physical activity interventions that will be able to enhance the degree of happiness among drug abusers patients.



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#### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent** All of the subjects provided written consent to participate in the study, after the study procedure and methods were explained to them.

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