

Exercise Dependence and Evaluations of Psychopathological Features

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ABSTRACT

Exercise dependence and evaluations of psychopathological features

Objective: Exercise dependence has been described as making excessive physical exercise leading to clinically significant negative consequences. Self report scales were developed for the diagnosis of exercise dependence based on DSM-IV criteria. For the diagnosis, exercise frequency, psychological factors (e.g. pathological commitment), tolerance and withdrawal symptoms should be taken into consideration. However, the diagnosis of exercise dependence has been neglected because its definition is unsatisfactory and exercise dependent subjects do not seek any help. Secondary exercise dependence is defined as compulsive exercise occurring with eating disorders. The aim of this study is to investigate the exercise dependence in subjects practicing sports regularly and to evaluate the psychopathological features and disordered eating behaviors in the exercise dependent subjects.

Method: One hundred fifteen voluntary subjects who had exercised regularly at least three times a week throughout the previous year were evaluated by Exercise Dependence Scale-21 (EDS-21), Symptom Check List 90-Revised (SCL-90-R) form and Eating Attitude Test (EAT-40). The subjects were categorized into three groups as exercise dependent, non-dependent symptomatic and non-dependent asymptomatic according to EDS-21 results and the groups were compared with each other.

Results: Exercise dependence was present in 14 (12%) of all subjects. Of the exercise dependent subjects, 85% met the physiological dependence criteria. Exercise dependent group did not statistically differ from the other groups in terms of psychopathological symptoms and eating behavior.

Conclusions: Our results showed that eating behavior and psychopathological features in exercise dependent subjects were not different from those of the non-dependent symptomatic and asymptomatic subjects. Exercise dependent subjects in the present study were categorized as having primary exercise dependence because they had no psychological and eating disorders symptoms. Psychological features and eating behavior should be evaluated together for the diagnosis of primary exercise dependence in subjects who exercised excessively and differential diagnosis should be made from the eating disorders.

Key words: Exercise addiction, eating disorders, psychopathological symptoms

ÖZET

Egzersiz bağımlılığı ve psikopatolojik özelliklerinin değerlendirilmesi

Amaç: Egzersiz bağımlılığı, klinik olarak olumsuz sonuçlar doğuran aşırı egzersiz yapma durumu olarak tanımlanır. Egzersiz bağımlılığının tanısı için DSM-IV sınıflamalarını temel alan kendini değerlendirme ölçekleri geliştirilmiştir. Tanıda egzersiz sıklığı, psikolojik faktörler (örneğin patolojik bağlanma), tolerans ve çekilme belirtilerinin bulunması dikkate alınmaktadır. Bununla birlikte, egzersiz bağımlılığı tanısı, yeterli tanı ölçütleri olmaması ve egzersiz bağımlısı kişilerin yardım aramaması nedeniyle ihmal edilmektedir. Egzersiz bağımlılığı yeme bozuklukları ile birlikte görüldüğünde ikincil egzersiz bağımlılığı olarak tanımlanmaktadır. Bu çalışmanın amacı, düzenli spor yapan bireyler arasında egzersiz bağımlılığını araştırmak ve bu olguların psikopatolojik ve yeme davranışı özelliklerini değerlendirmektir.

Yöntem: Son bir yıldır haftada en az üç kez egzersiz yapan 115 gönüllü sporcu bu çalışmaya alındı. Olgular, Egzersiz Bağımlılık Ölçeği-21 (EBÖ-21), Belirti Tarama Listesi (BTL-90-R) ve Yeme Tutum Testi (YTT-40) ile değerlendirildi. Olgular EBÖ-21 sonuçlarına göre, egzersiz bağımlısı olanlar, bağımlı olmayan semptomatikler ve bağımlı olmayan asemptomatikler olarak üç gruba ayrıldı. Bu üç grubun verileri karşılaştırıldı.

Bulgular: Katılımcılar arasında 14 kişiye (%12) egzersiz bağımlılığı olduğu belirlendi. Egzersiz bağımlılığı olanların %85'i fizyolojik bağımlılık ölçütlerini karşıladı. Egzersiz bağımlılığı olanlar ile diğer iki grup arasında psikopatolojik belirtiler ve yeme davranışı özellikleri açısından fark bulunamadı.

Sonuçlar: Çalışmamızda, egzersiz bağımlılığı olduğu saptanan kişilerin yeme davranışları ve psikopatolojik özelliklerinin, bağımlı olmayan semptomatik ve bağımlı olmayan asemptomatik kişilerden farklı olmadığı bulunmuştur. Bu çalışmada belirlenen egzersiz bağımlıları, yeme bozukluğu belirtileri göstermemeleri nedeniyle birincil egzersiz bağımlısı olarak tanımlanmıştır. Aşırı egzersiz yapan kişilerde birincil egzersiz bağımlılığının tanısı açısından, psikolojik faktörler ile yeme davranışı özelliklerinin birlikte değerlendirilmesi ve birincil egzersiz bağımlılığının yeme bozukluklarından ayrımı tanısının yapılması gerekir.

Anahtar kelimeler: Egzersiz bağımlılığı, yeme bozukluğu, psikopatolojik belirtiler

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INTRODUCTION

Regular physical activity has effects on mental health such as reducing depression and anxiety, regulating sleep, providing relief and increasing self-esteem as well as physiological benefits (1,2). However, excessive desire to spend most of the time with physical activity and excessive exercising at an uncontrollable level despite some obstacles is defined as exercise dependence (3). One of the three main components of exercise dependence is tolerance (gradually increasing amount of exercise in order to attain desired effect or decreasing effects despite same amount of exercise), second is withdrawal effect (negative effects observed when the behavior is hindered - abstinence) and third is compulsive behaviors (repetitive behaviors to avoid stress and anxiety) (1). Tolerance or withdrawal symptoms of exercise are described as physiological dependence and cases that do not show these symptoms are described as exercise dependents not showing physiological dependence.

Criteria of psychoactive substance dependence are used as base in the definition of exercise dependence. Exercise dependence is compulsive repetition of a behavior phenomenologically. This is the fundamental characteristic of dependence to chemical substances as well. Both conditions are quite similar at behavioral level. Biological processes of both psychoactive substance and exercise dependence seem to be similar along with self-satisfying characteristics (3). Exercise dependence seems to fit with excessive desire for physical activity at leisure time (craving), not being able to control excessive exercise behavior, tolerance and withdrawal symptoms, psychological symptoms and dependence phenomenon. However, it is different from psychoactive substance dependence by lack of specific substance effects. It is possible to cover exercise dependence under the category of impulse control disorders. From this point of view, it is not clear within our current knowledge where to include the definition of exercise dependence as a clinical disorder and how to evaluate it phenomenologically. In DSM-V preparation studies, it can be seen that gambling disorder is located within dependence disorders. By time, behavioral dependences may become classified under substance

dependence and dependence disorders category. Clinical signs were described by several authors for diagnosis of exercise dependence. According to data obtained from studies, characteristics such as exercising at least once a day, being humble to rest, exercising when being sick or disabled, evident abstinence symptoms when not exercising, exercising after being injured despite contrary recommendations of the physician. These were described in consistence with DSM-IV criteria on the basis of chemical substance dependence and suggested to indicate clinical decline (4).

Exercise dependence can also be examined by scales according to substance dependence criteria of Diagnostic and Statistical Manual of Mental Disorders fourth edition (DSM-IV). People exercising regularly can be classified into three different groups by Exercise Dependence Scale-21: Exercise dependent (score=5-6), non-dependent symptomatic (having symptoms – carrying dependence risk; score=3-4) and non-dependent asymptomatic (not having symptoms; score=1-2) (1,3-5). This difference describes cases with different objective burden of exercise dependence.

The goal behind excessive exercising behavior of exercise dependents may be remaining thin or preserving weight. From this point of view, it is possible that it can coincide with eating disorders and particularly anorexia and bulimia nervosa (3). Exercise dependence seen with eating disorders is defined as secondary exercise dependence (3,6). Frequent psychopathological characteristics in cases with secondary exercise dependence are another feature of this condition (3).

Aim of this study is to detect exercise dependence among people sporting regularly and determine their psychopathologies and eating behavior patterns.

METHODS

Sample

One hundred and nineteen volunteers who regularly exercise three times a week during the last year participated in the study. Sample was selected from athletes to access the groups with highest risk of exercise

dependence. Four participants who did not fill the scale properly were excluded from the study. A total of 115 participants were recruited. Seventy-four participants were students at physical training and sports department, 23 participants were volunteers regularly attending gyms and 18 participants were contestant athletes exercising regularly. Common characteristic of the sample was being selected from people who are interested in sports. Age range of participants was between 18 and 57.

Tools

Exercise Dependence Scale-21 (EDS-21): EDS-21 is a Likert-type self-rating scale consisting of 21 items designed to determine exercise dependence (1,7). Test aims to determine exercise dependence without fixing to one type of exercise. People are classified into 3 categories according to symptom score averages as dependents, non-dependent symptomatics and dependent symptomatics and also are evaluated according to presence of physiological dependence. Dependence range is determined as getting 5 or 6 points from an item making up criteria; scores between 3 and 4 are classified as symptomatic. These individuals are thought to carry risk of exercise dependence. Finally, scores between 1 and 2 are classified as asymptomatic. Validity and reliability study for Turkish version of the scale was done by Yeltepe and İkizler (8). In Pearson correlation analyses during test-re-test implementations, significant correlation at a level of $p < 0.001$ was found for all items. Cronbach alpha coefficient was calculated as $\alpha = 0.96$ for the first application and $\alpha = 0.97$ for the second application (8). Exercise dependence criteria, in accordance with substance dependence criteria of DSM-IV, are implemented and assessed as clinically-evident disorder and multi-dimensional impaired exercise behavior model causing significant disorder and disturbance, and showing 3 or more characteristics below.

1. Tolerance: Increasing amount of exercise in order to reach desired effect or decreasing effects despite the the same amount of exercise.

2. Abstinence: Presence of typical abstinence symptoms (e.g., anxiety, fatigue) related with exercise,

due to not exercising or performing same amount (or close to it) of exercise to avoid abstinence symptoms and getting relief.

3. Intention effect: Frequently, exercising more or exercising for longer period of time than previously thought.

4. Loss of Control: Excessive desire to exercise or failure to control or terminate exercise.

5. Duration: Spend excessive amount of time for exercising.

6. Decreasing Other Activities: Reducing or terminating social, occupational or recreational activities for exercising.

7. Continuity: Continuing exercising (such as continuing running despite injury) despite being aware of an ongoing physical or physiological problem.

Exercise Dependence Scale-21 is based on 7 criteria that were mentioned above. Individuals having 3 or more of DSM-IV criteria are classified as exercise dependents. Dependence range is determined according to the scores of each item making up the criteria receiving 5 or 6 points; scores received between 3 and 4 are classified as symptomatic. These individuals are thought to carry risk of exercise dependence theoretically. Finally, receiving scores in 1-2 range are classified as asymptomatic.

Symptom Check List (SCL-90-R): This scale was developed to determine general psychopathology. It is a Likert type self-rating scale (9). It determines 10 sub-group characteristics as somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, anger, phobia, paranoid and psychotism. Furthermore, general symptom index (GSI), positive symptom total score (PST) and positive symptom distribution index (PSDI) scores are also obtained. Validity and reliability study of Turkish version of SCL-90-R was done (10).

Eating Attitudes Test (EAT-40): This test was developed to determine impaired eating behavior by Garner and Garfinkel (11). Validity and reliability study of Turkish version was done by Savaşır and Erol (12). Scale was found valid to differentiate cases with eating disorder from healthy control group and other patients and showed high reliability coefficients in validity and

reliability study. It is a Likert-type self-rating scale consisting of frequently used 40 items to determine impaired eating behavior, characteristics and thoughts. Cut-off point is 30.

Process

Details of the study were explained to each participant and their written consents were taken. Study was approved by local ethical committee. Participants were divided by EDS-21 into three groups: exercise dependent, non-dependent symptomatic and non-dependent asymptomatic. Age, height, weight, starting age to sports and duration of weekly physical activity were determined by an evaluation form. Presence of a physical or psychiatric disease was examined by the same form. Reports of psychiatric disease or use of a psychiatric medication were examined by cross-examination for the same topic. People reported a psychiatric disease or uses of a psychiatric medication were excluded.

Statistical Evaluation

Data suitability for normal distribution was examined by single sample Kolmogorov Smirnov test. In inter-group comparisons, for variables showing normal distribution, at independent groups t test (number of groups=2), one way analysis of variance (number of groups=3); for variables not showing normal distribution, Mann Whitney U test (number of groups=2) and Kruskal Wallis test (number of groups=3) were used. Chi-square test was used to examine inter-group differences of

categorical variables. Statistical significance value was taken as $p < 0.05$. Statistica 7.0 package software was used for statistical analyses.

RESULTS

Distribution of exercise types which subjects participated in the study were doing regularly in the last year was as follows: 45 people doing team sports such as football, volleyball, handball and basketball (39%), 20 people running (17.4%), 11 people doing judo, taekvan-do and karate (10.5%), 12 people doing wrestling (13%), 9 people swimming (7.8%), 5 people doing tennis (4.3%), one person doing body-building (1%) and 8 people doing archery (7%).

When subjects at each of the three groups were examined according to gender distribution, no difference was found between groups. When cigarette smoking was examined, there were 3 smokers in exercise dependent group (21.4%), 9 smokers in non-dependent symptomatic group (12.7%), 7 people in non-dependent asymptomatic group (23.3%) and there was no significant difference between groups ($p > 0.05$). When alcohol consumption of the groups was examined, there were 5 people consuming alcohol in exercise dependent group (35.7%), 13 people in non-dependentsymptomatic group (18.6%), 8 people in non-dependent asymptomatic group (27.6%) and there was no significant difference between groups for alcohol consumption ($p > 0.05$). Body mass index (BMI) values were statistically significantly higher in the dependent group than the non-dependent group ($p < 0.05$) (Table 1).

Table 1: Demographical and sportive characteristics of three groups

	Exercise Dependents n=14	Symptomatic Non- dependent n=71	Asymptomatic Non- dependent n=30	Statistical test value	df	p
Men/women ratio (%)	9/5 (64.3)	33/38 (46.5)	20/10 (66.7)	4.11	2	0.12
Age (years)	22.4 ± 5.3	22.7 ± 5.8	25.7 ± 10.4	0.61	2	0.73
BMI (kg/m ²)	23.3 ± 2.8 [^]	21.6 ± 3.3	23.0 ± 3.9	6.17	2	0.04
Age of onset to sports (years)	9.7 ± 3.4	11.7 ± 5.1	12.6 ± 6.1	2.15	2	0.34
Duration of exercising (years)	11.2 ± 5.0	9.1 ± 4.3	8.2 ± 4.8	4.38	2	0.11
Weekly frequency of exercise (ex/wk)	5.2 ± 1.6 ^{^,†}	4.3 ± 1.6	4.0 ± 1.9	6.12	2	0.04
Weekly duration of exercise (hr/wk)	10.36 ± 5.15 [†]	8.2 ± 4.8 [*]	6.0 ± 4.3	10.58	2	0.005

BMI: Body Mass Index; Values were given as mean ± SD.

[^]Exercise dependent group significantly different from symptomatic group, [†]Exercise dependent group significantly different from asymptomatic group,

^{*}Symptomatic group significantly different from, asymptomatic group

Table 2: Comparison of SCL-90-R and eating attitude test results of three groups

	Exercise Dependents n=14	Symptomatic Non- dependent n=71	Asymptomatic Non- dependent n=30	Statistical test value	P
SCL-GSI	64.4 ± 39.5	79.6 ± 55.8	52.8 ± 46.2	0.49	0.78
SCL-PST	36.6 ± 15.3	47.9 ± 22.7	32.7 ± 21.3	2.34	0.31
SCL-PSDI	0.7 ± 0.4	0.9 ± 0.6	0.5 ± 0.5	0.78	0.67
Somatization	0.88 ± 0.70	0.81 ± 0.70	0.72 ± 0.80	2.02	0.36
Obsessive compulsivity	0.87 ± 0.62	1.08 ± 0.73	0.98 ± 0.66	1.04	0.59
Inter-personal sensitivity	0.64 ± 0.54	0.90 ± 0.69	0.77 ± 0.85	1.80	0.40
Depression	0.50 ± 0.54	0.86 ± 0.69	0.75 ± 0.79	3.52	0.17
Anxiety	0.61 ± 0.42	0.70 ± 0.69	0.72 ± 0.81	0.77	0.96
Anger	0.90 ± 0.62	0.84 ± 0.74	0.80 ± 0.87	1.16	0.55
Phobia	0.31 ± 0.39	0.42 ± 0.60	0.31 ± 0.43	0.47	0.78
Paranoid features	0.77 ± 0.58	0.87 ± 0.67	0.88 ± 0.93	0.49	0.78
Psychotism	0.34 ± 0.33	0.52 ± 0.49	0.47 ± 0.53	1.38	0.50
Additional symptoms (appetite-sleep)	0.82 ± 0.61	0.85 ± 0.69	0.90 ± 0.83	0.02	0.98
Eating Attitude Test	21.00 ± 12.13	17.26 ± 10.08	18.93 ± 6.96	3.29	0.19

SCL-GSI: General Symptom Index, SCL-PST: Positive Symptom Total Score, SCL-PSDI: Positive Symptom Distribution Index. Values were given as mean ± SD.

Table 3: Distribution of physiological dependence (tolerance or withdrawal symptom of exercise) according to groups

	Exercise Dependents n=14	Symptomatic Non- dependent n=71	Asymptomatic Non- dependent n=30	Pearson χ^2
Ones showing physiological dependence	12 (%85.7)	17 (%23.9)	2 (%6.7)	p <0.01 df=2
Ones not showing physiological dependence	2 (%14.3)	54 (%76.1)	28 (%93.3)	

χ^2 : Chi-square test

Out of 115 subjects participated in the study, exercise dependence was found in 14 (12%). Seventy participants (62%) were classified as non-dependent symptomatic, 30 participants (26%) were classified as dependent symptomatic. GSI, PST and PSDI scores assessed according to SCL-90-R and all sub-component scores and eating attitude test score were all found similar (Table 2).

When ones showed tolerance symptoms (ones increasing amount of exercise in order to each desired effect or reporting decreasing effects due to continuing same amount of exercise) or abstinence symptoms related with exercise (ones reporting anxiety and increasing tiredness when not exercised) were compared, more physiological dependence (tolerance or abstinence) was found in people with exercise dependence (Table 3).

DISCUSSION

Frequency of exercise dependence was found 12% (14 people) among athletes participated in our study.

Prevalence of exercise dependence was reported to be between 10 and 40% (13). Main obstacles to diagnose exercise dependence seem to be lack of specific diagnostic criteria of exercise dependence, lack of a clear definition of this disorder, not seeking help of people with this disorder and inclination to take this disorder not as a problem (3). Presence of physiological dependence in line with DSM phenomenology in people with exercise dependence is an important criterion. Physiological dependence was observed in 85% of people with exercise dependence different from other non-dependent groups in our study. Presence of physiological dependence may enhance confidence to clinical diagnosis of exercise dependence. Exercise dependents have abstinence and tolerance characteristics like in people with pathological gambling, compulsive shopping, psychoactive substance dependence and internet addiction (4,13).

Eating disorder was proposed to underlie secondary exercise dependence (3,4). However, how exercise dependence showed comorbidity with eating disorder could not be shown clearly. Comorbid eating disorder

was explained by compensatory excessive exercise in order to remain thin. No correlation between impaired eating behavior assessed by scales and exercise dependence in our study. From BMI point of view, ones with exercise dependence and non-dependent but symptomatic ones were found to be different. However, it is difficult to say whether exercise is done due to being overweight when all BMI values within normal limits and similar characteristics of dependent group and non-dependent group are considered. Nevertheless, when results of EAT are considered, it can be said that impaired eating behavior is not the reason. Compulsive exercising to remain thin is frequently observed in cases with eating disorder, particularly in anorexia nervosa and body dysmorphic disorder (14). Primary exercise dependence should be distinguished from this condition. Exclusion of eating disorder is mandatory for a valid exercise dependence diagnosis in cases with primary eating disorder (3,15). In our study, impaired eating behavior characteristics according to eating attitude test scores were not found to be different from non-dependents. Cases evaluated in our study were interpreted as cases with primary exercise dependence. Athletes with exercise dependence were not found to have different psychopathological characteristics from others according to SCL scale. There are conflicting data about this subject in the literature. Anxiety, depression, obsession, perfectionism and body dysmorphic disorder were reported in studies reporting psychopathologies at exercise dependents, particularly for women (16). Psychopathological characteristics observed at exercise dependents were suggested to be related with eating disorders as well (17). It can also be stated in our study that psychopathological characteristics do not exist in exercise dependents due to lack of eating disorder. Primary occurrence of exercise dependence means that it is distant from eating disorders and psychopathology. While primary exercise dependence is in accordance with DSM-IV dependence criteria, its sub-type with psychopathological characteristics is seen with secondary eating disorder. Our study seems to support this hypothesis. For this reason, different phenomenological characteristics were thought to exist although exercise dependence has similar characteristics

with substance dependence.

Although there was no alcohol dependence in sample cases, alcohol and cigarette smoking habits were also evaluated. Exercise-dependent group and other two groups were found to be similar for alcohol and cigarette consumption characteristics. This suggests that exercise dependence is a different phenomenon from psychoactive substance dependence.

Not performing clinical interview due to conducting the study with its own reporting scales and having a smaller sample size are weaknesses of the study. Sample was selected only from people doing sports so obtained data will not reflect the general population. Also there is not a homogenous sample doing sports so it will be difficult to interpret the results for athletes. Recruiting both professional and amateur athletes to the study made it difficult to comment on exercise dependence rates.

This study is important due to being first clinical study in this field. There is need to further studies with higher number of cases and collaborating with fields on dependence and sports health. We thought that this study will pioneer other studies in the field of dependence and sports health.

CONCLUSION

Prevalence of exercise dependence was found 12% among people regularly exercising. In people with excessive exercising, exercise dependence should come into mind. Investigating psychopathological symptoms and eating behavior characteristics is important for distinguishing primary and secondary causes. However, it is debatable whether exercise dependence is within dependence phenomenon or not. Detecting different psychopathological and eating behavior characteristics in exercise dependents from other groups in our study indicates that it is debatable to take this condition as a form of dependence. There is need for further clinical studies to describe exercise dependence.

Our study showed that eating behavior and psychopathological characteristics of people having risk of exercise dependence are not different from non-dependent symptomatic people and non-dependent asymptomatic people.

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