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SUBSTANCE USE AND MISUSE AMONG RECREATIONAL FITNESS ATHLETES: GENDER-SPECIFIC PREVALENCE AND FACTORS OF INFLUENCE

UPORABA IN ZLORABA SUBSTANC PRI ŠPORTNIKIH, KI SE UKVARJAJO Z REKREACIJSKIM FITNESOM; RAZŠIRJENOST GLEDE NA SPOL IN DEJAVNIKI VPLIVA

ABSTRACT

Although physical exercising is promoted as a protective factor against substance use and misuse (SUM), little is known about the association between participation in recreational fitness sports and SUM. This study aimed to provide evidence of the prevalence of SUM among recreational athletes involved in gym training, and to define associations between certain activity-related factors and SUM. The sample comprised 760 recreational-gym athletes (470 males and 290 females; 33.41 ± 4.5 and 32.11 ± 6.9 years of age for males and females, respectively). The variables included socio-demographic variables, recreational-activity-related factors (experience, programme of participation), and SUM data (cigarette smoking, binge drinking and dietary supplement usage). The consumption of cigarettes and alcohol in recreational fitness athletes is lower than the prevalence reported for the overall population. Males are more oriented to binge drinking ($KW = 19.95$; $p < 0.01$), while smoking is more common among females ($KW = 54.33$; $p < 0.01$). Moreover, there is an evident relationship between programme preferences and the consumption of substances. In females, participation in group training (dance aerobics, Pilates) is recognised as a risk factor for cigarette smoking, while the lowest incidence of SUM is revealed in those females involved in cardio-fitness training. Although our results support the hypothesis that recreational sport is protective against SUM, it seems that the leading motives for physical exercising should be regarded as the most important factors influencing SUM.

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IZVLEČEK

Čprav se telesna vadba promovira kot dejavnik zaščite pri uporabi in zlorabi substanc (UZS), je bolj malo znanega o povezavi med rekreacijskim fitnesom in UZS. Namen raziskave je bil ugotoviti razširjenost UZS med rekreacijskimi športniki, ki vadijo v telovadnicah, ter opredeliti povezave med nekaterimi dejavniki, povezanimi z aktivnostjo, in UZS. Vzorec je vseboval 760 rekreacijskih fitnes športnikov (470 moških in 290 žensk; $33,41 \pm 4,5$ let moški in $32,11 \pm 6,9$ let ženske). Med spremenljivkami so bile družbeno-demografske spremenljivke, dejavniki, povezani z rekreacijsko aktivnostjo (izkušnje, program sodelovanja), in podatki o UZS (kajenje, verižno popivanje in uporaba prehranskih dodatkov). Razširjenost uporabe cigaret in alkohola pri športnikih, ki se ukvarjajo z rekreativnim fitnesom, je manjša kot v splošni populaciji. Moški so bolj nagnjeni k verižnemu popivanju ($KW = 19,95$; $p < 0,01$), kajenje pa je pogostejše pri ženskah ($KW = 54,33$; $p < 0,01$). Poleg tega pa se je pokazala očitna povezava med preferencami v programu in uživanjem substanc. Pri ženskah je sodelovanje v skupinski vadbi (plesna aerobika, pilates) prepoznano kot dejavnik tveganja za kajenje, najnižja pojavnost UZS pa se je pokazala pri tistih ženskah, ki se ukvarjajo s kardio-fitness vadbo. Čprav naši rezultati podpirajo hipotezo, da je rekreativni šport zaščitni dejavnik pred UZS, pa se je pokazalo, da so glavni motivi za telesno vadbo najpomembnejši dejavniki, ki vplivajo na UZS.

INTRODUCTION

Substance use and misuse (SUM), including the consumption of alcohol, cigarette smoking, the consumption of drugs and other behaviours, and is a significant public health issue. In addition to it being serious, health-threatening behaviour, SUM is often associated with detrimental consequences and creates certain difficulties not only for the individuals misusing the substances but also for their parents, families, peers and society as a whole. It is therefore particularly important to find any possible protective factors or risk factors for SUM (Radacsi & Hardi, 2014; Sekulic, Ostojic, Ostojic, Hajdarevic, & Ostojic, 2012).

The importance of physical activity is well known. Physical activity helps reduce the risk of a number of critical health problems, including obesity, heart disease, stroke, colon cancer, diabetes and osteoporosis (Stahl, Rutten, Nutbeam, & Kannas, 2002; Steinbeck, 2001). In addition, participation in physical activity and sports has been shown to promote social well-being, physical and mental health, academic achievement, self-discipline, and socialisation (Moore & Werch, 2005; Dugdill, Crone, & Murphy, 2007).

It is hypothesised that participation in sports and physical exercise will reduce the tendency to abuse substances. However, the literature to date has not consistently validated the perception that sport factors (e.g., physical activity, exercise, and athletic participation) are protective factors against SUM (Sekulic et al., 2012).

Most studies that dealt with the association between physical activity and SUM examined competitive sports (Ford, 2007; Henchoz et al., 2014; Modric, Zenic, & Sekulic, 2011). On the other hand, little is known about the association between participation in recreational sports and SUM. Studies conducted so far have primarily focused on the use of anabolic steroids in recreational sports (Copeland, Peters, & Dillon, 2000; Schwingel, Zoppi, & Cotrim, 2014). However, in most cases investigators only sampled males and investigated attitudes toward doping (e.g. anabolic androgenic steroids). At the same time, 'everyday substances' such as alcohol and cigarettes have rarely been studied (Schwingel et al., 2014).

Moreover, we found no recent study which systematically examined the influence of different types of recreational sports in relation to SUM. Greater knowledge of this topic would assure the more accurate identification of the protective/risk effects of participation in contemporary recreational sport activities with regard to SUM, and consequently promote a healthy lifestyle and well-being.

The aim of this study was to provide evidence of the prevalence of SUM among recreational athletes of both sexes. Further, we wished to examine differences between certain activity-related factors and SUM among the sampled subjects. We hypothesised that recreational fitness athletes have specific attitudes toward (and against) SUM.

METHODS

Subjects

This study enrolled 760 recreational-fitness athletes involved in gym training (470 males and 290 females). The subjects were randomly sampled from within the five largest fitness centres in the Split-Dalmatia region (Adriatic Coast region) in Croatia.

Variables

The surveys were performed using an extensive self-administered questionnaire, which was previously applied and found to be valid in a similar sample of subjects (Zenic et al. 2010.). Although the questionnaire included a broad variety of questions, the study focused on socio-demographic variables, recreational-activity-related factors, and SUM data.

The socio-demographic data included age, gender, and educational level achieved.

Activity-related factors assessed the type of activity a participant is primarily involved in (weight-training; group programmes such as aerobics and Pilates; cardio-fitness training). The subjects were also asked about their experience with recreational fitness activities (in years).

To evidence SUM, the subjects were asked about their smoking habits, alcohol consumption and drug (e.g., opiate) usage. Smoking was tested on a six-point scale ranging from “never smoked” to “smoking more than a pack daily”. Alcohol consumption was measured using the binge drinking scale (i.e. a five-point scale ranging from “don’t drink alcohol at all” to “binge drinking more than once a week”). The scale for drug consumption included four possible answers (never – experimented – occasionally – regularly). In addition, we asked the subjects about dietary supplement usage (DS; never – occasionally – regularly).

Testing

The testing was strictly anonymous, meaning that no personal data were collected (e.g., date of birth, city of birth). Multiple-choice answers were offered where possible. Testing occurred in a group of at least three examinees. Each examinee was told that the testing was strictly anonymous, that he/she could refuse to participate and that he/she could leave some questions and/or the entire questionnaire unanswered. Each examinee received two questionnaire forms and one envelope. When the testing had been completed, each examinee placed one form (answered or unanswered) in the envelope and sealed it. He/she immediately destroyed the second form in a paper shredder. On the next day, the envelopes were opened by an investigator who had not tested the subjects. Before the study commenced, the complete procedure and aim of the testing were explained to the subjects. Informed consent was obtained. The response rate was over 99%. The study was approved by the Institutional Ethics Committee.

Statistics

In the first phase of the statistical processing, those variables that were theoretically normally distributed were assessed using the Kolmogorov-Smirnov test for normality of the distribution to establish their parametric/nonparametric nature. As results, the descriptive statistics included a calculation of the counts and frequencies (for nonparametric) and means \pm standard deviations (for parametric ones). Differences between genders were established using the Chi square and Kruskal-Wallis ANOVA (KW) with additional z' multiple comparisons (for nonparametric) and a one-way ANOVA (for parametric variables). The relationships between and within the studied factors and SUM were examined using the Chi square test and Spearman’s rank-order correlation.

RESULTS

There is no significant difference between the genders in the age (33.41 and 32.11 years of age for males and females respectively; F test = 1.42, $p > 0.05$), and training experience (7.6 and 6.3 years of age for males and females respectively; F test = 2.00; $p > 0.05$). Among the males, 85% are involved in weight training (machines and free-weight), and the remaining 15% primarily use cardio-fitness-equipment. In the females, an equal proportion participates in group trainings (aerobics, Pilates etc.), and weight training (35% and 37%, respectively). The remaining 28% of females mainly use cardio-fitness equipment (Table 1).

Table 1. Educational characteristics and program preferences of the sampled recreational athletes (F – frequency; % - percentage)

	TOTAL		FEMALES		MALES	
	F	%	F	%	F	%
PROGRAM OF MAIN INTEREST						
Group programs (aerobics, Pilates, etc.)	106	13.9	101	35	5	1
Weight-training (machines, free-weights, etc.)	507	66.7	107	37	400	85
Cardio fitness (treadmills, steppers, etc.)	147	19.3	82	28	65	14
EDUCATION						
Elementary school (1)	15	2	5	1.7	10	2.1
High school (2)	215	28.1	80	27.6	135	28.7
Student (3)	180	23.5	45	15.5	130	27.7
College/University degree earned (3)	350	45.8	160	55.2	190	40.4
Missing	5	0.7	0	0	5	1.1

Legend: Number in parentheses present numerical (ordinal) value for educational status

The females differ significantly in age with regard to their programme preferences (F test = 71.50; $p < 0.01$; 37.67, 34.43 and 25.16 years of age for cardio-fitness, weight training and aerobics, respectively). This is naturally followed by confounding differences in educational level achieved, with the highest educational level being found for those females involved in cardio-fitness training. There is no such association in the males (35.13 and 36.14 years of age for weight training and cardio-fitness, respectively).

The females consume cigarettes more frequently than the males (KW test = 54.33; $p < 0.01$), while the males are more often binge drinkers (KW test = 19.95; $p < 0.01$). However, there is no relationship between gender and the consumption of cigarettes, alcohol and drugs (cannabinoids). The females use DS less frequently than the males (KW test = 13.35; $p < 0.05$), and the female gender is recognised as a protective factor for the consumption of DS in recreational fitness athletes (Table 2).

Those males involved in weight training are more often smokers (KW test = 14.95; $p < 0.01$), consume more DS (KW test = 49.11; $p < 0.01$) and have a greater tendency to binge drink (KW test = 21.56; $p < 0.01$) than their colleagues who practise cardio-fitness. The DS consumption is most frequent in those females involved in weight training, and they also binge drink the most

Table 2. Substance use and misuse data (F – frequency; % - percentage) and gender differences (Kruskal Wallis ANOVA – KW)

	Total		Females		Males		KW
	F	%	F	%	F	%	
SMOKING							
Never smoked (1)	390	51.0	100	34.5	290	61.7	54.33*
Quitted (2)	100	13.1	45	15.5	55	11.7	
Sometimes, but not daily (3)	120	15.7	45	15.5	70	14.9	
Less than 10 daily (4)	70	9.2	70	24.1	0	0	
More than 10 daily (5)	85	11.1	30	10.3	55	11.7	
Missing	0	0.0	0	0.0	0	0.0	
BINGE DRINKING							
Don't drink alcohol at all (1)	260	34.0	125	43.1	135	28.7	19.95*
I drink alcohol but never binge (2)	180	23.5	70	24.1	110	23.4	
1-2 times per month (3)	165	21.6	45	15.5	115	24.5	
Once a week (4)	140	18.3	35	12.1	105	22.3	
More than once a week (5)	15	2.0	10	3.4	5	1.1	
Missing	5	0.7	5	1.7	0	0.0	
CONSUMPTION OF DRUGS							
Never (1)	660	86.3	270	93.1	390	83.0	2.11
Experimented (2)	60	7.8	15	5.2	40	8.5	
Occasionally (3)	10	1.3	0	0.0	10	2.1	
Regularly (4)	20	2.7	0	0.0	15	3.2	
Missing	15	2.0	0	0.0	15	3.2	
DIETARY SUPPLEMENTATION							
No (3)	365	47.7	205	70.7	160	34.0	13.35*
Yes, but not regularly (2)	185	24.2	65	22.4	120	25.5	
Yes, regularly (3)	205	26.8	20	6.9	180	38.3	
Missing	10	1.3	0	0.0	10	2.1	

Legend: Number in parentheses present numerical (ordinal) value for each of the studied variables; * denotes significant KW differences

frequently. The females involved in aerobics are more often smokers than their peers involved in weight-training and cardio-fitness. The smallest tendency to consume cigarettes and alcohol is seen among those females who practise cardio-training.

The DS is most frequent in those females who are involved in weight training and then in those involved in cardio-fitness (KW test = 29.71; $p < 0.01$; with z' multiple comparisons being statistically significant between all groups). The weight-training group binges the most frequently (KW

test = 17.95; $p < 0.01$; with z' multiple comparisons being statistically significant between weight training and the other two groups). Girls involved in aerobics are more often smokers than their peers involved in weight-training and cardio-fitness (KW test = 17.95; $p < 0.01$; with z' multiple comparisons being statistically significant between cardio fitness and the other two groups). The lowest tendency toward the consumption of cigarettes and alcohol is evidenced among those girls who practise cardio-training.

Those males who are more educated are less likely to binge drink and smoke (Spearman's $R = 0.14$; $p < 0.05$). Among the females, there is no significant relationship between educational status and SUM.

Among the males, experience in fitness training is correlated to the consumption of DS (Spearman's $R = 0.26$; $p < 0.01$). In females, training experience is protective against smoking (Spearman's $R = -0.30$, $p < 0.01$), and the consumption of drugs (Spearman's $R = -0.19$, $p < 0.01$).

DISCUSSION

There are several key findings which will be discussed below. First, the consumption of cigarettes and alcohol in recreational-fitness athletes is lower than the prevalence reported for the overall population in the studied territory. Male recreational athletes are more oriented to binge drinking, while smoking is more common among the females. Finally, there is an evident relationship between programme preferences and the consumption of substances in both males and females.

More than half a century ago, the causal link between lung cancer and tobacco smoking was established (Doll & Hill, 1950). Although the prevalence of smoking is decreasing globally, smoking remains the most frequent form of substance misuse in the world. Reported data show that the prevalence of smoking in the territory is very high. Reports presented so far have identified 23-30% of smokers in Croatia (Samardzic, Vuletic, & Tadjian, 2012). However, it seems that the prevalence of smoking in the Dalmatia region (i.e. the Adriatic coast region from where the studied sample was drawn) is somewhat higher, and reaches 35-40% (Modric et al., 2011). Therefore, the here defined prevalence of 20% daily smokers among recreational athletes points to the fact that recreational sport activity should be regarded as a certain protective factor for cigarette smoking. However, we must note the evident differences between genders and types of fitness programmes and smoking frequency. Namely, the smoking incidence in females is even somewhat higher than that reported for the overall female population (Modric et al., 2011; Samardzic et al., 2012).

Croatia is known as a country characterised by a Mediterranean style of alcohol drinking. Generally speaking, alcohol is common, available, and consumed regularly during meals, but there is no social acceptance of drunkenness (Modric et al., 2011). Therefore, in this study we largely focused on binge drinking as a socially unacceptable form of consuming alcohol. Moreover, such a measure is already suggested as the most convenient form for evidencing alcohol consumption in cultures without related strict regulations (e.g. mandatory legal and/or religious regulations against alcohol) (Sekulic et al., 2012). Looking at binge drinking is found to be a particularly convenient method for estimating drinking among athletes (Zenic, Peric, Zubcevic, Ostojic, & Ostojic, 2010). However, it is hardly comparable to the prevalence of alcohol in the overall population where alcohol consumption is mostly measured in other values (e.g. grams of alcohol

consumed per capita). Yet, compared to studies which reported drinking habits among athletes, it is obvious that recreational athletes binge drink less than competitive athletes and/or ballet professionals from the same region (Kondric, Sekulic, & Mandic, 2010; Kondric et al., 2011; Zenic et al., 2010). There are two quite probable explanations of such findings. First, it is frequently reported that competitive athletes deal with increased competitive stress by drinking alcohol, and this is not the case for recreational sports participants (Kondric et al., 2011). Second, the energetic value of alcohol is 7 kcal/g, and weight reduction is one of the most important motives for becoming involved in recreational sports (Zaletel, Gabrilo, & Peric, 2013). Naturally, recreational athletes are highly concerned about the caloric value of alcohol, and avoid drinking it for that reason.

The above discussion on alcohol consumption is indirectly confirmed by the findings of relatively higher cigarette smoking in female and binge drinking in male recreational athletes. Of all motives for participating in recreational sport, weight reduction is the leading one among females (Zaletel et al., 2013). Therefore, it is understandable that females involved in recreational fitness are not prone to alcohol and binge drinking. At the same time, cigarette smoking is more frequent among females. In a recent study that qualitatively examined SUM among professional ballet dancers, the authors noted a similar high incidence of smoking among ballerinas (Zenic et al., 2010). Knowing that ballerinas are highly concerned about their body weight, and cigarettes increase basal metabolism and act like appetite suppressants, the high incidence of smoking, albeit health-compromising, was logical. Consequently, the results presented here about the high consumption of cigarettes among female recreational athletes point to the fact that the motive of a 'trim figure' and the accompanying cigarette smoking reaches beyond occupational- and competitive-sport duties (i.e. although not a sport, ballet is practically identical to competitive sport with regard to physical exercising).

Previous studies noted that the majority of male recreational athletes are not concerned about their body weight, while their chief motives for exercising are masculinity (through an increase in lean body mass), and strength conditioning (Sibley, Hancock, & Bergman, 2013). Consequently, although data on the general population show that smoking is more frequent among males than females (Modric et al., 2011; Samardzic et al., 2012), in recreational fitness athletes this is evidently the opposite and female athletes are more likely to be smokers.

The use of opiates and cannabinoids is found to be relatively rare. Namely, about 5% of the participants use some kind of drug occasionally, while an additional 8% has experimented with drugs. Although national data on drug use are scarce, the incidence we found is similar to that reported for the overall population (Tkalic, Miletic, & Sakoman, 2013). However, we must stress that we sampled athletes from fitness centres located in the second largest Croatian city. Drug use is more common in cities than in rural communities. At the same time, national data encompass both urban and rural populations. It therefore seems reasonable to conclude that drug consumption in recreational athletes is less than expected according to population surveys in Croatia.

To the best of our knowledge, this is one of the first studies to evidence differences between participants in different recreational fitness programmes with regard to SUM. Of all recreational athletes studied, the smallest tendency to use any studied substance is seen among females who practise cardio-training. Cardio-training in fitness centres has become more popular with technological advancements offering solutions that allow different types of activities to be ef-

fectively simulated while using stationary training equipment (e.g. rowing, running, cycling, Nordic skiing, roller-skating etc.). Of all training activities available in contemporary fitness centres, cardio-fitness training allows the most accurate determination of the training workload. This assures targeted training, but also maximal safety (Howley & Franks, 1986). It is common for such a training modality to be used by former competitive athletes (because of the precise training), but also by individuals who have suffered a cardio-vascular insult, injury and/or are in a certain rehabilitation programme (due to reasons of safety).

As long-standing fitness professionals, the authors of this study are quite convinced that cardio-fitness training can hardly be called 'socially attractive' (e.g. it is maximally individualised training with little social contact between exercisers). As a result, individuals involved in cardio-fitness are activity-focused, aware of the health threats posed by SUM, and in some circumstances (e.g. ex-athletes and convalescents) not initially predisposed to SUM. At the same time, they often consume DS since they are well aware of their specific nutritional and hydration needs.

Among females, those involved in group programmes such as dance aerobics and/or Pilates are more likely to be smokers. It is reported that the leading motive for those activities is body fat reduction and weight control (Zaletel et al., 2013). Further, people involved in these types of training are more prone to gather socially after training (Sekulić, Rausavljević, & Zenić, 2003). This altogether leads to increased cigarette consumption.

The males who practise weight training are at the highest risk for SUM of all athletes observed in this study. Their increased consumption of DS is understandable because of their high nutritional needs (Saeedi, Mohd Taib, & Saad, 2012). Meanwhile, although they smoke and binge drink more often than other subjects from this study, their consumption of both substances is much lower than that reported for the general population, and therefore should not be seen as alarming (Modric et al., 2011; Samardzic et al., 2012).

CONCLUSION

The main limitation of this study arises from the fact that we only studied athletes involved in recreational training in fitness centres. Therefore, the results should only be generalised to such samples of subjects. However, this is one of the first studies to deal with SUM in recreational athletes and we thus believe that the reported and discussed data will add to the body of knowledge in the field.

The data demonstrated that recreational gym-fitness training in general should be judged as valuable with regard to preventing SUM. Generally, although we did not study how the exercising itself influenced SUM but only the prevalence and association between observed factors, it is clear that the overall social climate among fitness enthusiasts is non-accepting of SUM habits.

Group training participation in females was found to be a risk factor for cigarette smoking. Body-weight reduction is the primary motive for physical exercising in those females, while cigarette smoking increases basal metabolism and acts like an appetite suppressant. Accordingly, recreational-sport organisations and authorities should pay special attention to those groups of recreational athletes in order to reduce their smoking tendency. Since those recreational programmes are largely organised in closed facilities and gymnasiums, public-health- and fitness-authorities are able to develop a targeted anti-smoking campaign for those groups (e.g. placing

anti-smoking material such as posters and/or fliers in gymnasiums where training is organised etc.).

Although our results support the hypothesis that recreational sport is protective against SUM, it seems that the leading motives for physical exercising should be regarded as the most important factors influencing SUM. For example, in those athletes who highly prioritise body-weight reduction, smoking will be frequent regardless of the known health hazards of such behaviour.

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