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Brief Report

Prevalence of Anabolic Steroid Use and Associated Factors among Body-builders in Hamadan, Western Province of Iran

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ABSTRACT

Background: Androgenic-anabolic steroids (AAS) are abused by a growing number of body-builders. This descriptive cross-sectional study was conducted to determine prevalence and patterns of AAS use by bodybuilders in Hamadan, western Iran.

Methods: In this cross-sectional study, participants were recruited from five gym clubs in two area of Hamadan (a total of 10 clubs). Twenty-five bodybuilders from each club were administered. Questions investigating demographic information, sport history, education level, general knowledge about AAS, and their side effects were asked. Statistical analysis was performed using SPSS 16.

Results: The frequency of AAS use was 28.8% (72/250). Fifty-four percent of users were 25 years or younger. AAS abuse showed a significant association with duration of exercise. The drugs were suggested mostly from peers (43.1%) and coaches (36.1%). The most commonly consumed anabolic steroid was testosterone (66.7%). The most commonly reported AAS side effect was acne (18.1%). There was not significant association between general knowledge about side effects of ASS and their use.

Conclusions: The results of current survey indicate that frequency of ASS use is high in adolescents and young adult bodybuilders. Well educated bodybuilders have a higher prevalence of abuse. Awareness about the side effects of drugs is not deterrent factor for their abuse. Iranian Ministry of Sport and the Youth, and the National Council for Youth, should be urged to conduct more effective prevention strategies.

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Introduction

Anabolic-androgenic steroids (AAS) are synthetically produced variants of testosterone and have specific therapeutic indications¹. AAS adverse effects range from hirsutism, acne, clitoral enlargement and deepened voice in women to hypertension, heart hypertrophy, myocardial infarction, decreased high-density lipoprotein, fluid retention, liver failure, kidney damage, personality disturbance, mood fluctuation, prostatic hypertrophy and certain cancers¹.

Since the 1950s, competitive athletes began to use AAS for enhance their performance in competitions and body image purposes. AAS abuse has increased and its use is no longer limited to competitive athletes; high school students, adolescents, females and non-competitive athletes also use them^{2,3}. In the USA, approximately one million Americans were estimated to have abused AAS in the 1980s, men having a higher prevalence of use than women⁴⁻⁶. According to Rachoń survey in Poland, the prevalence of anabolic-androgenic steroids use was 6.2% among males and 2.9% among females⁷.

While various surveys have described the frequency, risk factors and patterns of AAS use among athletes and general population in other countries, there is a scarcity of studies with regard to AAS abuse in our region. Therefore, in an effort to obtain more insight on the profile of AAS use, this study aimed firstly, to estimate the frequency of AAS use, and secondly, to study some characteristics of AAS user bodybuilders in Hamadan, western Iran.

Methods

This cross-sectional study was conducted among male bodybuilding gym attendants in 2011 in Hamadan City; the west of Iran. The study was approved by the local Ethics Committee of Hamadan University of Medical Sciences. All subjects gave their written informed consent before participating.

By using the following sample size estimating formula and according to previous study results in past years⁸ and assuming: $P=0.20$, $d=0.05$ and 95% significant level, the

sample size was calculated 245 subjects and with assuming 10% attrition, it was 270 persons finally⁹.

Hamadan with more than 700,000 inhabitants has 2 distinct major areas. Five clubs randomly selected from each area and in the next step by simple random sampling method, 27 persons were selected from each club registering list. All attendant athletes were extensively informed about the objectives and approach of the study, and their right to refuse to participate. This included a total sample of 270 of which 250 athletes participated voluntarily in this study (response rate of 92.6%).

The participants were asked to complete a self-administered, voluntary, and anonymous questionnaire. The questions asked about age, marital status, education level, sport duration, weekly duration of the exercise, habit of administration, form and methods of abuse, and general knowledge about ASS. In the questionnaires, we had asked questions to determine participants' knowledge about the effects and side effects of AAS divided into two groups of "low" and "good" knowledge.

The major inclusion criteria were age between 15-45 years of old, and strength training experience for a minimum period of three months and, at least three sessions per week. Those who declined the participation in the study, receiving any additional medications, or developed acute or chronic illnesses that impair survey were excluded from the study.

The Student's *t*-test was used to compare means of groups. Statistical comparisons of other variants between the groups were performed by chi-square analytic test. The level of *P*-value less than 0.01 was considered statistically significant.

Results

The mean age of participants was 25.52 (ranging between 15 and 45 years of old). Twenty three point six percent (17) of AAS user were in age group of 15-20 years, 30.6% (22) in 20-25 years, 26.4% (19) in 25-30 years, 13.9% (10) in 30-40 years and 5.6% (4) were more than 40 years. The majority of participants (71.2%) were single and 23.6% of them were married.

In total, 72 athletes (28.8%) were self-reported AAS users. The most frequently used AAS was testosterone (66.7%) followed by nandrolone (15.3%), oxymetholone (5.6%), and other types of AAS (12.4%). Intramuscular injection was the most frequently used method in abuser group (63.8%) whereas oral (pill) and combination methods were each one- used by 18.1% of participants in this group. More than half of abuser group (56.9%) had not reported any type of AAS's side effects, whereas acne had been reported in 18.1% of them, changes in libido in 9.7%, some degrees of aggression in 6.9%, hair loss in 4.1%, breast enlargement in 1.4%, and other side effects in 2.8%.

The AAS users differed markedly from the nonusers on some variables (Table 1). We found a significant statistical relationship between the duration of exercise and frequency of AAS abuse ($P < 0.001$). Using χ^2 test, no significant statistical relationship was found between use of AAS and the level of athletes' knowledge about AAS and their side effect ($P = 0.150$).

According to duration of AAs abuse, 25 (34.7%) had used for less than six months, 12 (16.7%) for 6-12 months, 8 (11.1%) for 13-24 months and 27 (37.5%) for 25 months -12 years.

The drugs were recommended by peers (43.1%), coaches (36.1%), magazine (9.7%) and internet (6.9%). According to the educational level, there was no statistical significant relationship between the educational level and the frequency of AAS abuse (χ^2 test, $P = 0.052$).

Table 1: Comparisons of the variables between Androgenic-anabolic steroids users and nonusers

Number	Abuser	Non abuser	Total	P value
	72 (%)	178 (%)	250 (%)	
Duration of exercise (yr)				0.001
<1	13 (18.1)	86 (48.3)	99 (39.6)	
1-5	28 (38.8)	63 (35.3)	91 (36.4)	
6-10	21 (29.1)	22 (12.3)	43 (17.2)	
11-16	10 (13.8)	7 (3.9)	17 (6.8)	
Knowledge about ASS				0.150
Low	15 (20.9)	53 (29.8)	68 (27.2)	
Good	57 (79.1)	125 (70.2)	182 (72.8)	
Education level				0.052
Secondary school (6-8 yr)	10 (13.9)	18 (10.1)	28 (11.2)	
High school (9-12 yr)	30 (41.6)	51 (28.7)	81 (32.4)	
Academic	32 (44.5)	109 (61.2)	141 (56.4)	

Discussion

This research investigated the frequency and characteristics of androgenic anabolic steroids abusers among bodybuilders in Hamadan, Iran. The findings of this study clearly reveal that number of AAS users among bodybuilders is alarming (28.8%). It was also found that AAS use is particularly common in age range of 15-25 years. The observed frequency indicate the need for effective measures to prevent steroid abuse among youth. In literature focusing on the frequency of AAS or other controlled substances abuse among bodybuilders in Middle East, similar data has been described. For example, the prevalence of AAS abuse has been reported as 26% among Jordanian bodybuilder athletes in 2008⁹. Similarly, the data from Angoorani et al. survey in Tehran, capital city of Iran, indicated that 13.3% of bodybuilders were amphetamine user¹⁰. According to one study by Khooshabi et al. among high schools students in Tehran, 10.1% of males and 6.4% of females reported lifetime use of controlled substances use¹¹.

Several other studies have shown similar results in western countries. Abuse of AAS among college athletes in the USA is reported 17-20%¹². The prevalence rate of approximately 38%–58% among bodybuilders and weight lifters have been found in Delbeke et al. study's in Flanders¹³. Johnson et al. demonstrated that among the amateur bodybuilders, 80% of men and 40% of women had used illicit drug¹⁴.

The findings of current study showed that 54% of users were 25 years or younger. This is important and represents that adolescents and young adults are main risk groups for AAS abuse. Effective AAS prevention therefore needs to focus on this age group. The association between AAS use and younger age is consistent with previous data published by others^{3, 7, 15}. Rachoń et al. also reported that the abuse of AAS is a serious health problem among adolescents and young adults in Poland⁷.

The most commonly abused drugs in current study were testosterone, nandrolone, and oxymetholone. In our country, AAS are prescription drugs; still abusers can easily acquire them. It is reasonable to assume that abusers can obtain drugs through the pharmacist, without prescription. Abusers may also receive them on the black market, supermarkets or by vendors. Efforts and intervention should be also expanded for prevention of the easy access to these drugs.

This study showed a wide duration range of AAS use among 72 AAS abusers (six months -12 years), but it is a very grave situation that the majority of abusers (37.5%) were using them more than two years. This study showed, not surprisingly, that most of the abusers had been offered to use AAS by their friends and coaches. This revealed that abusers are highly influenced by groups and trainers, important factor that should be taken into consideration for preventive strategies. Importantly, there was significant association between duration of practice and AAS use. In other words, attitudes towards anabolic administration increased with the more year of physical training. It seems that abuse of androgenic anabolic steroids can be decreased by preventive work concentrated on whom with more sport history.

The present findings demonstrated that AAS users did not differ significantly from nonuser group on educational attainment variable. Interestingly, well-educated bodybuilders have a higher prevalence of abuse. This means that having higher education necessarily is not a protective factor for anabolic steroid use. In line of this finding, a recent study in Iranian body builders, demonstrated higher educational degree was associated with a higher likelihood of amphetamine use¹⁰. In contrast, results obtained by some authors pointed out that abuse of AAS was associated with lower education^{15, 16}.

As in some previous studies^{17,18}, this survey reveals more than one half of the abuser participants were using AAS in the form of intramuscular injection. Baker et al. indicated that nearly 100% of AAS users were self-administer intramuscular injection¹⁹. Parkinson et al. and Baker et al. pointed out that, 10 and 13% users respectively, reporting hazardous injection techniques^{16, 19}. In addition, in current work more than half of AAS users (56.9%) reported subjective AAS side effect. Acne, sexual disorder, some degrees of aggression and hair loss were the most commonly reported subjective AAS side effect. This is less than expected and may be due to low doses administered in abusers, since we did not investigate doses used by steroid users. In study by Parkinson et al., 99.2% (496/500) of AAS users reported subjective side effects¹⁶.

It should also be mentioned that the majority of abusers had high knowledge about drug's side effects. Therefore use of androgenic anabolic steroids seems to be related to various factors other than educational attainment and awareness about the adverse effects of AAS. Our findings concur with one previous study by Goldberg et al. that indicated appropriate educational programs increased abuse of androgenic anabolic steroids among adolescents²⁰.

Several limitations of current study should be considered. First; we might have underestimated frequency of AAS abuse and their side effects, because all data were self-reported, and some of the study participants who used AAS might have not disclosed their use or side effects. Second; the main reason for taking and sources of obtaining AAS

among abuser group has not been investigated. Third; the relationship between the use of AAS and other performance-enhancing agents, supplements, alcohol and other illicit drug use have not shown in this study. Further studies are needed in order to consider bias of current work.

Conclusions

Findings of this study indicate that frequency of ASS use is high in adolescent and young adult bodybuilders. Awareness about the side effects of AAS and university qualifications is not deterrent factor for their abuse. Why this is so needs to be investigated by further surveys. Further studies are also needed in order to investigate underlying and psychological reasons for AAS use. Abusers are highly influenced by groups and coaches, effective AAS prevention therefore need to focus on this important factor as well. Finding of current study highlights that Iranian Ministry of Sport and the Youth and the National Council for Youth need to implement the effective measures to prevent steroid abuse among Iranian youth. Efforts should be also expanded for prevention of the easy access to these drugs.

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Conflicts of interest

The authors have nothing to be declared.

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