Prevalence of Use of Anabolic Steroids by Bodybuilders Using Three Methods in a City of Iran

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Original Article

Abstract

Background: The prevalence of substance use among bodybuilding athletes has been poorly studied in Iran. This study was conducted to examine the prevalence of drug use, especially anabolic steroids, among bodybuilding athletes.

Methods: This cross-sectional study was conducted in the first half of 2013 among body building athletes referring to gyms located in Kerman, Iran. Five gyms were selected randomly and 380 athletes were invited to complete a self-administered anonymous questionnaire, consecutively. The questionnaire included two parts; baseline characteristics and substance related questions. The prevalence of anabolic steroids was estimated based on three methods; self-report, projective question, and crosswise model.

Findings: We enrolled 298 male athletes in the final analysis. Mean ± SD age of subjects was 25.9 ± 8.4. The most frequent recent (past 30 days) drug use was waterpipe smoking (45%). The second most frequently used drug was alcohol (26.5%, recent use). Based on self-reports, the prevalence of lifetime anabolic steroid use was calculated to be 24.5%. The corresponding figure based on crosswise method was obtained to be 56.8%. Participants believed that a median of 40% of athletes had used anabolic steroids in their lifetime. The prevalence of anabolic steroid was higher in single and less educated individuals (P < 0.05). The main reason for using anabolic steroids was to increase muscle size.

Conclusion: The prevalence of drug use, especially tobacco, alcohol, and anabolic steroids, was high among bodybuilding athletes. We could not rely on self-reports to examine anabolic steroid use.

Keywords: Substance abuse, Anabolic steroids, Athletes, Iran

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Introduction

Anabolic androgenic steroids, which are named anabolic steroids, are synthetic derivatives of testosterone (the male sex hormone); the history of their use reaches back to 88 years ago for medical purposes.[1] They have anabolic (increase in skeletal mass) and androgenic (masculinization) effects.[1] Usually, athletes use high doses (10 to 100 times the doses used for medical purposes) and it has been shown that in such doses anabolic steroids could have dangerous and irreversible side effects.[1] Some of the side effects include liver tumors and cancer, liver damage, increase in blood pressure and LDL, decrease in HDL, severe acne, decreased sperm count, infertility, and tremor.[1,2]

Anabolic steroid use shows an increasing trend among athletes worldwide.[3] In many countries their use is legal only as prescription drugs.[4] Many anabolic steroid users turn to these drugs to overcome their sense of body dissatisfaction and they use them with the hope of increasing their body mass and strength with less effort.[5] It has been well documented that in the general population the probability of anabolic steroid use is higher in those who exercise regularly.[3]

Most studies devoted to the prevalence of anabolic steroids are conducted in the developed world.[6,7] The prevalence of anabolic steroid use among athletes has been reported to be less than 10.0% among US athletes.[1] Lifetime prevalence of anabolic steroid use among gym users in Sweden was 3.9%.[8] Nigerian sportsmen reported a prevalence of 5.6%.[9] In Iran, the figures obtained are around 20.0%.[10] All the above-mentioned studies are based on self-reports. It has been proposed that surveys can be considered as the gold standard for estimating the prevalence of common drugs such as tobacco, but they could not be included as a reliable method for problematic drugs.[11] It may be embarrassing for athletes to report anabolic steroids use; therefore, relying merely on self-reports may mask the actual situation.[10] Several methods have been proposed to estimate the prevalence of problem drug use; most of them estimate the prevalence indirectly.[11] The crosswise model has been proposed recently as a technique for eliciting truthful answers on sensitive issues.[12] In this technique, a sensitive question and a nonsensitive question are asked from the respondent, in which the probability of the nonsensitive question is well known. The probability of answering "yes" to the nonsensitive question must be unequal 0.5.[12] Meanwhile the two questions should be unrelated. Thereafter, by using a formula the probability of the sensitive question could be computed.[12] The utility of the crosswise model has been well established in studies examining sensitive topics.[13] Since bodybuilding athletes may be treated as role models for youth, in this study we intended to estimate the prevalence of common problem drugs, with emphasis on anabolic steroids among this population in a city of Iran.

Methods

This cross-sectional study was conducted in Kerman city, the center of Kerman Province as the largest province of Iran. The research protocol was approved by the Ethics Committee of Kerman University of Medical Sciences. Five bodybuilding gyms were selected randomly out of 50 gyms of the city using stratified random sampling. Based on the results of a relatively similar study, a sample size of 285 individuals was calculated to be adequate to find a prevalence of 20% of anabolic steroid use.[10] A self-administered questionnaire was completed by a consecutive sample of bodybuilding athletes. The questionnaire consisted of two parts; baseline characteristics (such as age, marital status, and education), and a substance related part, which included questions about lifetime and recent use of cigarettes, waterpipe, opiates, alcohol, and anabolic steroids (e.g., nandrolone, dianabol, winstrol, testosterone, oxymetholone, oxandrolone, primobolan, and sustanon). The name of common anabolic steroids was extracted from interviews with athletes, trainers, and drug sellers.

The participants were also asked: "Why are you using anabolic steroids?" and "By whom was it introduced to you?". To estimate the prevalence of anabolic steroid use, two other techniques were also utilized. Using the projective question "How high do you guess the prevalence of anabolic steroid use is among bodybuilders?" the perceived prevalence of anabolic steroid use among friends was calculated indirectly.[14] Using crosswise model, a nonsensitive question ("Is your birth in spring?") was asked accompanied with a question related to lifetime prevalence of

anabolic steroid use as an embarrassing question.[12] The content validity and reliability of the questionnaire was confirmed in previous studies.[15] After completion of the questionnaire in a private area, they were requested to drop the anonymous questionnaire into a sealed box.

To compare anabolic steroid use based on categorical and ordinal variables chi-square, and chi-square test for trend were used, respectively.

Results

Of the 380 questionnaires completed by athletes, 298 (78.4%) were included in the final analysis due to unacceptable completion of the rest of the questionnaires. All of them were male, mean ± SD age of participants was 25.9 ± 8.4, and 67.1% (n = 200) of them were single. Most (62.1) of them had college degrees.

The most frequent drug use reported by respondents in the past 30 days was waterpipe tobacco (45%) (Table 1). The probability of lifetime

use of anabolic steroids was 24.5% according to the self-report (Table 1). Respondents estimated that 40% (IQR: 20-60) of athletes referring to bodybuilding gyms use anabolic steroids. The crosswise model showed that 56.8% of respondents had used anabolic steroids in their lifetime.

Table 1. Frequency of substance use among bodybuilding athletes (n = 298)

Substance	Ever use	Recent use (past 30 days)
Cigarette	101 (33.9)	38 (12.8)
Waterpipe	212 (71.1)	134 (45.0)
Opiates	52 (17.4)	15 (5.0)
Alcohol	169 (56.7)	79 (26.5)
Anabolic steroids	73 (24.5)	24 (8.1)

*Numbers in parentheses are presented as percent

The main reasons for use of anabolic steroids are shown in figure 1. Among those who had ever used anabolic steroids (n = 73), 41.1% of them were recommended to use it by peers (Figure 2).
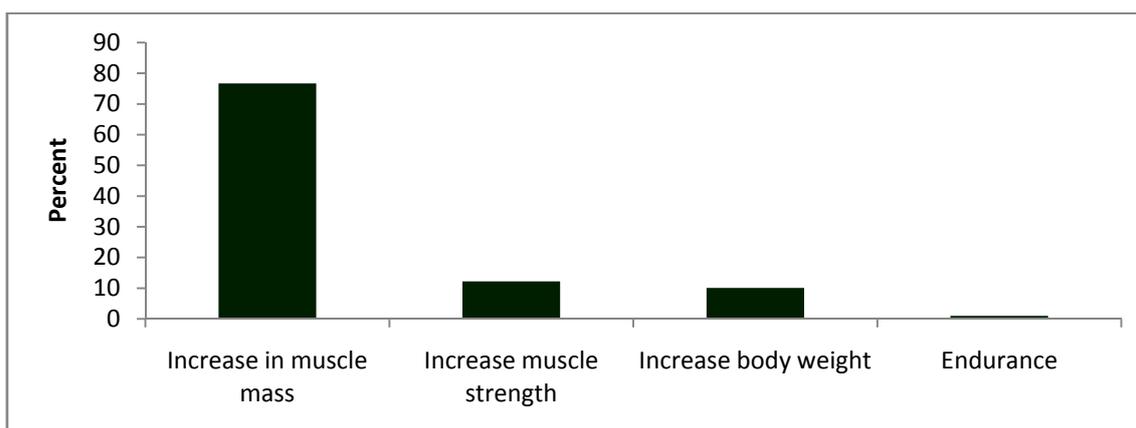

Figure 1. Main reasons for use of anabolic steroids among bodybuilding athletes
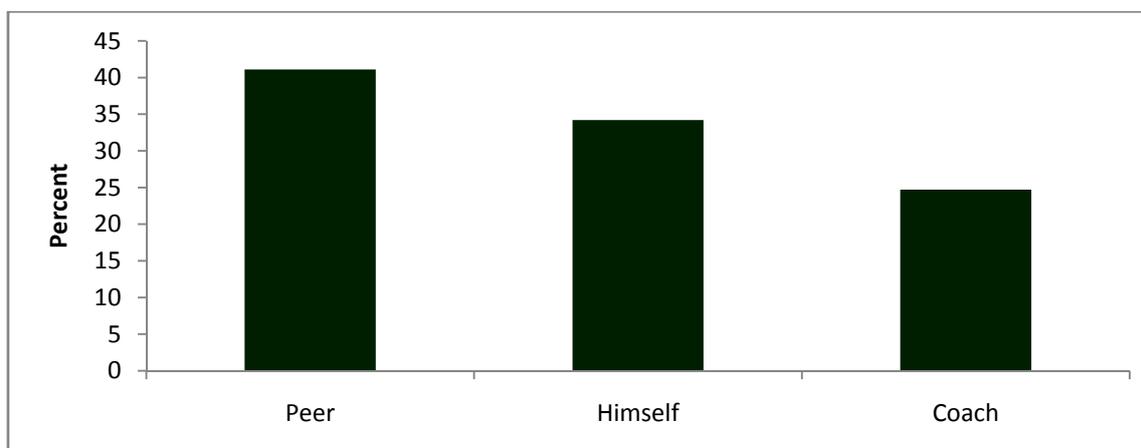

Figure 2. Main source of recommendation to use anabolic steroids by bodybuilding athletes

Comparison of recent anabolic steroid use among bodybuilders according to baseline characteristics revealed significant differences between subgroups except for age (Table 2).

Table 2. Frequency of recent anabolic steroid use according to baseline characteristics

Characteristics	Frequency (%)	P
Age group (years)		
≤ 20	4 (5.6)	0.354
21-30	14 (8.4)	
> 30	6 (10.0)	
Education		
Less than secondary	8 (16.3)	0.018
Completed secondary	5 (7.8)	
College	11 (5.9)	
Marital status		
Single	13 (13.3)	0.021
Married	11 (5.5)	
Years of bodybuilding		
≤ 1	3 (3.6)	0.021
1-2	2 (4.1)	
> 2	19 (11.5)	

Discussion

This study revealed that a significant proportion of bodybuilding athletes have used substances both in the past 30 days and during their lifetime. Understanding the pattern and prevalence of drug use in different groups of the community can guide policymakers toward informed decisions on tailoring preventive measures.

Waterpipe tobacco and alcohol were the most prevalently used substances by athletes. Compared to a study on university students conducted in the same city, the rate of problem drug use was higher in athletes.[16] Opiates were used in 5% of cases, which was the least prevalent. A study performed on a sample representative of the general population of the same city revealed a higher prevalence rate of opiate use.[17] Therefore, except for opiates, other drugs were shown to have higher proportion of users, comparing to other subgroups of the same population. In Iran, waterpipe tobacco seems to be the most popular substance among adolescents and this pattern was also seen in athletes. Surprisingly, the prevalence of alcohol use was high (26.5%, in the past 30 days) considering the prohibition on the use of alcohol in Islamic culture; alcohol use in any form is totally prohibited in the Quran. A recent review showed that 43.0% and 21.8% of Iranian high school students have a lifetime history of cigarette and waterpipe smoking, respectively.[18]

In this study, the most frequently abused drug was alcohol (except for tobacco).[18] Therefore, we can conclude that the rate of substance use among bodybuilding athletes showed the same pattern as high school students, but all figures showed a higher rate proportionally. In a Nigerian study, it was shown that alcohol was the most frequently abused drug by sportsmen for sports performance.[9] A possible explanation for the high rate of alcohol consumption in our sample may be the perceived expectation regarding performance enhancement, though we did not examine the reasons for use.

Anabolic steroids were reported to be used by 24.5% during their lifetime. The figure obtained by crosswise model was 56.8%. To find out which method gives a more accurate value, their perceived prevalence among friends was also questioned. This method yielded a figure of 40%, which is in the midpoint between the two figures (i.e., 24.5% and 56.8%). Hence, it seems that direct questioning does not yield valid estimates of the prevalence of anabolic steroid use. In this study, three methods were used to estimate the prevalence of anabolic steroid use; burying the sensitive question in a series of questions concerning other drugs, perceived prevalence of anabolic steroid use by peers, and the crosswise model. All methods were used to lessen the embarrassing nature of straightforward questioning. All figures obtained by these three methods showed a higher rate comparing to a similar study conducted in the same population and setting (i.e., 18.8%).[18] Therefore, it can be concluded that self-reports based on straightforward questioning are not a valid method to estimate the prevalence of anabolic steroid in the setting of bodybuilding gyms. Moreover, among the three abovementioned methods to resolve the sensitivity of questions the crosswise model seems to be more valid. A possible reason for this finding may be the fact that bodybuilders want to have a more muscular physique, and they desire to show that the increase in muscle mass is due to regular exercise not doping.[8,19]

As expected the main reason for anabolic steroid use was increase in muscle mass (Figure 1). It has been shown that anabolic steroid use is strongly motivated by social influences and males

associate their attractiveness to increased muscle mass and a muscular body shape.[19] Peers were the main source of recommendation (Figure 2). This was in line with findings of a study conducted in United Arab Emirates.[2] The prevalence of use was higher in less educated, single, and those with higher duration of gym use (Table 2). A similar finding was obtained by Al-Falasi et al.[2]

The main limitation of this study was the lack of a gold standard, such as laboratory serum analysis,

to confirm the anabolic steroid use objectively.

Conclusion

In conclusion, the prevalence of drug use seems to be high among bodybuilders. Self-reports could not be included as a valid method for estimation of anabolic steroid use in Iranian settings.

Conflict of Interests

The Authors have no conflict of interest.

References

1. Fisher GL, Roget NA. Encyclopedia of substance abuse prevention, treatment, and recovery. Thousand Oaks, CA: SAGE Publications; 2009. 72-5.
2. Al-Falasi O, Al-Dahmani Kh, Al-Eisaei Kh, Al-Ameri S, Al-Maskari F, Nagelkerke N, et al. Knowledge, attitude and practice of anabolic steroids use among gym users in Al-Ain District, United Arab Emirates. The Open Sports MedicineJournal 2008; 2: 75-81.
3. Logothetis CJ. Organ preservation in bladder carcinoma: a matter of selection. J Clin Oncol 1991; 9(9): 1525-6.
4. Sando BG. Is it legal? Prescribing for the athlete. Aust Fam Physician 1999; 28(6): 549-53.
5. Goldfield GS, Woodside DB. Body image, disordered eating, and anabolic steroids in male bodybuilders: current versus former users. Phys Sportsmed 2009; 37(1): 111-4.
6. DuRant RH, Rickert VI, Ashworth CS, Newman C, Slavens G. Use of multiple drugs among adolescents who use anabolic steroids. N Engl J Med 1993; 328(13): 922-6.
7. Buckman JF, Farris SG, Yusko DA. A national study of substance use behaviors among NCAA male athletes who use banned performance enhancing substances. Drug Alcohol Depend 2013; 131(1-2): 50-5.
8. Leifman H, Rehnman C, Sjoblom E, Holgersson S. Anabolic androgenic steroids--use and correlates among gym users--an assessment study using questionnaires and observations at gyms in the Stockholm region. Int J Environ Res Public Health 2011; 8(7): 2656-74.
9. Molobe ID. Knowledge, attitude and practice on drug abuse among sports men and women in Lagos State, Nigeria. International Journal of Medicine and Medical Sciences 2012; 2(3): 77-85.
10. Sepehri GH, .Moosavifar M. The frequency of anabolic steroid abuse in bodybuilder athletes in Kerman City. J Rafsanjan Univ Med Sci 2003; 2(3): 213-21. [In Persian].
11. Hickman M, Taylor C, Chatterjee A, Degnhardt L, Frischer M, Hay G, et al. Estimating the prevalence of problematic drug use: a review of methods and their application. Offprint from Bulletin on Narcotics 2002; 54(1-2): 15-32.
12. Yu JW, Tian GL, Tang ML. Two new models for survey sampling with sensitive characteristic: design and analysis. Metrika 2008; 67(3): 251-63.
13. Jann B, Jerke J, Krumpal I. Asking sensitive questions using the crosswise model an experimental survey measuring plagiarism. Public Opin Q 2012; 76(1): 32-49.
14. Bustamante IV, Carvalho AM, de Oliveira EB, de Oliveira Junior HP, Santos Figueroa SD, Montoya Vasquez EM, et al. University students' perceived norms of peers and drug use: a multicentric study in five Latin American countries. Rev Lat Am Enfermagem 2009; 17 Spec No: 838-43.
15. Nakhaee MR, Pakravan M. Prevalence, opinions and reasons for nutritional supplement use among athletes in body building gyms, Kerman 2012. J Rafsanjan Univ Med Sci 2013. [In Press]. [In Persian].
16. Sabahy AR, Divsalar K, Bahreinifar S, Marzban M, Nakhaee N. Waterpipe tobacco use among Iranian university students: correlates and perceived reasons for use. Int J Tuberc Lung Dis 2011; 15(6): 844-7.
17. Nakhaee N, Divsalar K, Meimandi MS, Dabiri S. Estimating the prevalence of opiates use by unlinked anonymous urine drug testing: a pilot study in Iran. Subst Use Misuse 2008; 43(3-4): 513-20.
18. Momtazi S, Rawson R. Substance abuse among Iranian high school students. Curr Opin Psychiatry 2010; 23(3): 221-6.
19. Komoroski EM, Rickert VI. Adolescent body image and attitudes to anabolic steroid use. Am J Dis Child 1992; 146(7): 823-8.

شیوع مصرف استروییدهای آنابولیکی در ورزشکاران بدنسازی با استفاده از سه روش در یکی از شهرهای ایران

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مقاله پژوهشی

چکیده

مقدمه: مطالعه پیرامون شیوع سوء مصرف مواد در ورزشکاران بدنساز در ایران به اندازه کافی صورت نگرفته است. این مطالعه به منظور بررسی شیوع سوء مصرف مواد با تأکید بر استروییدهای آنابولیکی در ورزشکاران بدنساز انجام شد.

روش‌ها: مطالعه مقطعی حاضر در زمستان سال ۱۳۹۱ و بهار سال ۱۳۹۲ در ورزشکاران مراجعه کننده به باشگاه‌های شهر کرمان انجام شد. پنج باشگاه به طور تصادفی انتخاب شدند و از ۳۸۰ ورزشکار بدنساز جهت تکمیل یک پرسش‌نامه خودایفا به شیوه متوالی دعوت به عمل آمد. پرسش‌نامه شامل دو بخش خصوصیات زمینه‌ای و سؤالات مرتبط با مصرف مواد بود. شیوع مصرف استروییدهای آنابولیکی با استفاده از سه روش خودگزارش‌دهی، سؤالات تصویری و روش ضربدری ارزیابی شد.

یافته‌ها: تعداد ۲۹۸ مرد ورزشکار وارد تحلیل نهایی شدند. میانگین ± انحراف معیار سن آنان ۸/۴ ± ۲۵/۹ سال بود. بیشترین ماده مصرفی در ۳۰ روز گذشته قلیان (۴۵ درصد) و دومین ماده پرمصرف الکل (۲۶/۵ درصد) بود. بر اساس خودگزارش‌دهی شیوع حداقل یک بار مصرف استروییدهای آنابولیکی ۲۴/۵ درصد بود؛ در حالی که این رقم بر اساس مدل ضربدری ۵۶/۸ درصد به دست آمد. شرکت کنندگان بر این باور بودند که میانه مصرف استروییدهای آنابولیکی در ورزشکاران بدنساز حدود ۴۰ درصد بود. شیوع مصرف استروییدهای آنابولیکی در افراد مجرد و با تحصیلات کمتر بیشتر ($P < 0/05$) به دست آمد. علت اصلی استفاده از استروییدهای آنابولیکی افزایش اندازه ماهیچه‌ها گزارش گردید.

نتیجه‌گیری: شیوع مصرف تنباکو، الکل و استروییدهای آنابولیکی در ورزشکاران بدنسازی بالا بود. نمی‌توان بر نتایج حاصل از خودگزارش‌دهی در زمینه مصرف استروییدهای آنابولیکی اعتماد نمود.

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