

# Anabolic-Androgenic Steroids and Prohibited Substances Misuse among Iranian Recreational Female Bodybuilders and its Associated Psycho-socio-demographic Factors

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## Original Article

### Abstract

**Background:** The growing tendency to anabolic-androgenic steroids (AAS) and prohibited substances misuse by female athletes is a new public health concern. Epidemiological studies in this field are necessary to introduce an effective preventive drug control program in gyms. This study directed to evaluate the prevalence of AAS and other banned substances use and assess its association with some psycho-social and also demographic parameters among Iranian female recreational bodybuilders.

**Methods:** This study was done from January to March 2017 and 289 recreational female bodybuilders from 41 randomly-selected fitness and sports clubs in different geographic parts of Tehran, Iran, were included. Age, education level, months of sport involvement, frequency of sport participation in a week (hour), body image assessed by Multidimensional Body-Self Relations Questionnaire (MBSRQ), and history of AAS and substances intake as the psycho-socio-demographic parameters were recorded by interviews using questionnaires.

**Findings:** Subjects were all recreational female bodybuilders [mean and standard deviation (SD) of age:  $26.3 \pm 6.3$ , range: 15–52 years]. Self-report of AAS abuse was recorded in 70 bodybuilders (24.2%). Among prohibited substances, the use of stimulants (amphetamine or methamphetamine) and other illicit drugs was recorded in 10 (3.5%) and 95 (32.9%) athletes, respectively. 112 (38.8%) participants reported somatotropin use. Cigarette smoking, hookah use, and alcohol intake were reported by 42 (14.5%), 162 (56.1%), and 49 (17.0%) female bodybuilders, respectively. Among different evaluated parameters, merely the frequency of sport participation in a week and sport experience was inversely associated with AAS consumption.

**Conclusion:** Based on the subjects' self-statement, AAS and substance misuse was surprisingly common in recreational female bodybuilders. Some factors including weekly frequency of sport participation and the duration of sport involvement may influence the prevalence of AAS abuse.

**Keywords:** Anabolic agents; Substances abuse; Iran; Bodybuilding; Female

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## Introduction

Drug abuse in sports community has always been a major public health concern and there have been numerous studies regarding the patterns of substance abuse in athletes.<sup>1,2</sup> Anabolic-androgenic steroids (AAS) contain mainly testosterone and its synthetic derivatives.<sup>3</sup> Supraphysiological doses of these drugs may increase the athlete's bulkiness, even more than predictable limits.<sup>4</sup> There is a growing tendency to illicit drug abuse by athletes.<sup>5</sup> Illicit drugs and prohibited substances seem to be used by athletes to help them improve their performances.<sup>6,7</sup> A prior survey in Iran indicated that the amphetamine misuse seemed to be more than expected in male bodybuilders.<sup>8</sup>

Nowadays, millions of athletes in the world use AAS.<sup>9-14</sup> Surprisingly, many of people who use AAS also abuse other banned substances and illicit drugs including stimulants and somatotropins (growth hormone) to appear more bulky or to have a better performance.<sup>8,15-17</sup>

Numerous side effects, which some of them are life threatening, make AAS and illicit drugs a great public health concern.<sup>18-22</sup> For several decades, determining the predisposing risk factors for AAS and substances abuse have been the main subject of various studies.<sup>8,10,12,15-22</sup> Theoretically, psycho-social and demographic factors may influence AAS and substance misuse and some authors have assessed the effect of these parameters on AAS and substances intake in male bodybuilders;<sup>8,12</sup> however, there are a few studies investigating this among female bodybuilders. According to some reports, several parameters such as age, education level, frequency of sport participation, mental health, and body image are probably associated with AAS or substance abuse in male bodybuilders,<sup>8-10,12,16,17,23</sup> but this is not fully consistent in the correlated literature.

This study was designed to investigate the prevalence and related psycho-social and demographic factors of AAS and substances intake among a random sample of female bodybuilders in Tehran, Iran. This study is probably the first survey in the field of substance abuse in Iran's women gyms.

## Methods

This study was planned to assess AAS and illicit

drug abuse in 289 randomly-selected female bodybuilders from 41 sports clubs which were randomly selected in Tehran, Iran.

From January to March 2017, 41 sports clubs were recruited using simple random sampling method by means of computer-generated random numbers. Two trained medical students were presented in the selected gyms and randomly interviewed with the planned number of female bodybuilders in each club (based on the club's area and number of the club's bodybuilders). After the completion of the training session, participants were requested to do their interview.

289 female athletes who were training in the gyms at the time of study participated in the interview. Female gender and age of 13 to 60 years were considered as inclusion criteria. Exclusion criteria were the participants' request to leave the study and absence of clear answer to the questions.

Oral consent was obtained from the bodybuilders and they were reassured that their data would be reserved rigorously confidential. All participants were informed about the aim of the study. To promise confidentiality, subjects' names were not recorded. This study was carried out in consistence with Ethical Principles for Medical Research and approved by Ethics Committee of Iran University of Medical Sciences, Tehran (code: 871111018).

Psycho-social and demographic characteristics of bodybuilders such as sporting activity patterns as well as the history of AAS and substances intake were gathered by the use of a 20-minute interview with each subject, via designed questionnaires which their validity and reliability were confirmed in an earlier study by the authors.<sup>12</sup>

Age, the months of sport participation, frequency of sport activity in a week (hours), education level, marital status, and history of anabolic steroid and other prohibited substance abuse (including stimulants, somatotropin, alcohol, and other illicit drugs) were considered as independent variables.

Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS), which had been formerly validated in Iran,<sup>24</sup> was used to assess the body image of bodybuilders. The MBSRQ-AS, as a self-report inventory for the assessment of body image, is a 34-item measure that contains 5 subscales of appearance

evaluation, appearance orientation, overweight pre-occupation, self-classified weight, and the Body Areas Satisfaction Scale (BASS).

AAS and substances misuse which was recorded by face-to-face interviews in this study was considered as the main dependent variable. It was assessed by using the following questions: 1- "Until now, have you ever tried any type of AAS such as testosterone, nandrolone, oxymetholone, dianabol, winstrol, and other similar derivatives?" 2- "Until now, have you ever tried any type of substances or illicit drugs such as somatotropin, stimulants like amphetamine, and other illicit drugs?"

Moreover, all participants were asked to answer to questions about present or past history of smoking cigarette, hookah use, and alcohol and permitted sport supplements consumption.

Considering an estimated prevalence of 68% for AAS abuse according to one previous epidemiological survey in Iran<sup>25</sup> and an over-all number of more than 35000 athletes, according to the estimation of the Iran's bodybuilding and power lifting federation, a sample size of 280 was determined for this study. The data were analyzed using the SPSS statistical software (version 17, SPSS Inc., Chicago, IL, USA). The Mann-Whitney U test was used to compare non-normally-distributed variables and the information was given as mean and standard deviation (SD). All independent variables were located into a multiple logistic regression model to determine the associated factors of AAS abuse in bodybuilders (forward selection method). Pearson's chi-squared test ( $\chi^2$ ) was used to test the difference for categorical data. The missing values in the analysis were relatively few. A P-value less than 0.0500 was considered significant.

## Results

Totally, 289 athletes decided to participate in the

study with mean and SD of  $26.3 \pm 6.3$  years for age (range: 15-52 years). 70 female bodybuilders (24.2%) reported a history of AAS use. Among prohibited substances, the use of stimulants (amphetamine or methamphetamine) and other illicit drugs was recorded in 10 (3.5%) and 95 (32.9%) participants, respectively. 112 (38.8%) athletes reported somatotropin use. Cigarette smoking, hookah use, and alcohol consumption were reported by 42 (14.5%), 162 (56.1%), and 49 (17.0%) female bodybuilders, respectively. 160 (55.4%) participants reported allowed sport supplements use.

The female bodybuilders who were highly educated (master of science or higher) were less likely to use AAS (40% vs. 60%,  $P = 0.0090$ ). The female bodybuilders who were married were also less likely to use AAS (24.7% vs. 75.3%,  $P = 0.0030$ ).

The female bodybuilders who abused prohibited substances (except stimulants) were more prone to use AAS (78.6% vs. 21.4%,  $P < 0.0001$ ). However, there was no association between stimulants (including amphetamine) abuse with AAs use. The female bodybuilders who used somatotropin were more prone to use AAS (74.3% vs. 25.7%,  $P < 0.0001$ ). Also the bodybuilders who used hookah and allowed supplements were more prone to use AAS (88.6% vs. 11.4%,  $P < 0.0001$  and 87.1% vs. 12.9%,  $P < 0.0001$ , respectively). It was not found any association between alcohol consumption and AAS use among female bodybuilders.

The comparison of some variables between female athletes without and with history of AAS use is shown in table 1.

The mean and SD of the different sub-scales of the body image questionnaire among female bodybuilders with positive and negative history of AAS intake are shown in table 2.

**Table 1.** Demographic characteristics in bodybuilders with and without history of anabolic-androgenic steroids (AAS) use

Variable	Negative history of AAS use	Positive history of AAS use	P (Mann-Whitney U test)
Age (year) (mean $\pm$ SD)	29.73 $\pm$ 6.23	26.14 $\pm$ 7.52	0.0010*
Sport experience (month) (mean $\pm$ SD)	53.87 $\pm$ 54.28	30.16 $\pm$ 43.64	0.0001*
Weekly duration of sport (hour) (mean $\pm$ SD)	5.97 $\pm$ 2.31	2.69 $\pm$ 2.11	0.0001*

\*Significant difference

SD: Standard deviation; AAS: Anabolic-androgenic steroids

**Table 2.** The mean and standard deviation (SD) of the body image sub-scales among female bodybuilders

Subscales	Negative history of AAS abuse (mean $\pm$ SD)	Positive history of AAS abuse (mean $\pm$ SD)	P
Appearance evaluation	24.11 $\pm$ 2.07	24.55 $\pm$ 1.71	0.0800
Appearance orientation	36.24 $\pm$ 1.93	36.01 $\pm$ 3.63	0.6400
Fitness evaluation	7.33 $\pm$ 1.93	7.52 $\pm$ 2.13	0.5100
Fitness orientation	36.27 $\pm$ 4.06	35.72 $\pm$ 4.01	0.3200
Self-classified weight	8.18 $\pm$ 1.55	8.52 $\pm$ 1.36	0.0800
Body areas satisfaction	34.62 $\pm$ 6.89	33.11 $\pm$ 5.13	0.0900

SD: Standard deviation; AAS: Anabolic-androgenic steroids

## Discussion

This study showed that almost one in four and one in three female bodybuilders in Tehran reported AAS and prohibited substances abuse, respectively.

Due to the kind of design of this survey which was a self-statement assessment, it is sensible to assume that the real prevalence might be higher than the reported use in this study. Furthermore, since bodybuilding and fitness has rapidly become a very popular sport activity in Iranian women, a rising number of recreational female athletes would be expected to be damaged by the troubles of these drugs.

Formerly, point prevalence and lifetime prevalence of AAS abuse in Iran was estimated as 10.7%-59.0% and 26%-100%, respectively.<sup>26-28</sup> Moreover, according to the author's previous study, a history of AAS use was reported by 16.6% of male bodybuilders in Tehran.<sup>12</sup> However, to our knowledge, the prevalence of AAS and substances misuse has not been previously investigated in Iranian recreational female bodybuilders. Since this study showed that the prevalence of AAS use among female bodybuilders was almost similar to average point prevalence of AAS abuse among Iranian male bodybuilders, it is acceptable to consider that the AAS abuse is rising up among female as same as male bodybuilders.

Certainly, rapid growth of substance and illicit drugs abuse among bodybuilders is a major public health concern. In the present study, almost 30% of female bodybuilders in Tehran reported prohibited substance abuse which is even higher than the previous report in Iranian male bodybuilders.<sup>8,29</sup> This finding is in accordance with several previous studies<sup>3,8,18,29-31</sup> which reported that a high percentage of recreational athletes were at risk of substance abuse such as cocaine, opium, heroin, hashish,

amphetamine, and alcohol. This study indicated that 3.5% of the female bodybuilders admitted stimulant use (mostly amphetamine) which is lower than previous report in the male bodybuilders in Tehran.<sup>29</sup> In addition, two previous reports in Iran demonstrated a rise in amphetamine use (especially ecstasy) among the young people.<sup>32,33</sup> It seems that substances such as amphetamine are abused by athletes not only for leisure, but also for performance improvement.<sup>34</sup>

The literature specifies a higher likelihood of illicit drug use among competitive athletes.<sup>1,35</sup> Bodybuilders may use many prohibited substances such as amphetamine, hashish, somatotropin, or other illicit substances for refreshment or for improving their performance, but evaluating all the possible motivations of drug abuse in bodybuilders is beyond the scope of the present study. Also, level of knowledge about substance was not asked from the participants of this study. This information may clarify if drug educational programs could be helpful in this population.

According to this study, several psycho-social and demographic parameters, including frequency of the sport activity, sport experience, education level, and marital status were demonstrated to be associated with AAS misuse among female bodybuilders, which is comparable to the results of a number of previous surveys.<sup>15-17,29</sup> However, none of the previous studies specifically covered this subject among female bodybuilders. Body image problems, especially muscle dysmorphic disorder (MDD), seem to be associated with AAS and substance abuse in athletes.<sup>15,17,36-38</sup> However this is not in agreement with the findings of this study in which no association was found between body image and AAS use among female bodybuilders. Most likely, using a specific questionnaire to assess muscle dysmorphia in bodybuilders instead of using



MBSRQ could have led to find a stronger relationship between body image and AAS abuse.

It is generally accepted that AAS and substances use is a difficult topic to study. This study was faced a number of limitations that restricted the scope of the study. For instance, some missing data on the details of the body builders' substances abuse precluded us from analyzing clearly their drug use patterns. The data were all self-reported, and the cross-sectional design of the study rendered us unable to define a causative relationship between AAS and substances use with the associated factors. However, as the athletes in the present study were all females who were interviewed about AAS and substances use in a setting outside competitions and there was no fear of doping regulations, the results of this study should be relatively close to reality.

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## Conclusion

AAS and substances abuse showed quite high prevalence in recreational female bodybuilders in Tehran. Some psycho-social and demographic parameters seem to be associated with AAS abuse in female bodybuilders. The determination of predisposing factors for AAS and substances abuse in female bodybuilders may be helpful to provide the educational and preventive policies against the drug abuse in gyms.

## Conflict of Interests

The authors have no conflict of interest.

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## مصرف استروئیدهای آنابولیک – آندروژنیک و مواد غیر مجاز در بانوان بدنساز تفریحی ایرانی و عوامل دموگرافیک و روانی – اجتماعی آنان

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### مقاله پژوهشی

### چکیده

**مقدمه:** تمایل روزافزون بانوان ورزشکار به استروئیدهای آنابولیک- آندروژنیک (Anabolic-androgenic steroids یا AAS) و مواد غیر مجاز، این پدیده را به هشدار جدی برای سلامت عمومی تبدیل کرده است. مطالعات اپیدمیولوژیک در این حوزه، سنگ بنای برنامه‌های مؤثر کنترل و پیشگیری در جامعه ورزشی می‌باشد. پژوهش حاضر با هدف ارزیابی شیوع سوء مصرف AAS و سایر مواد غیر مجاز و سنجش همراهی آن با برخی عوامل روانی- اجتماعی و دموگرافیک انجام شد.

**روش‌ها:** نمونه‌های این مطالعه از دی سال ۱۳۹۵ تا خرداد سال ۱۳۹۶ از میان بانوان بدنساز تفریحی ۴۱ باشگاه آمادگی جسمانی و بدنسازی در بخش‌های مختلف جغرافیایی شهر تهران به صورت تصادفی انتخاب شدند. برخی عوامل از جمله سن، سطح تحصیلات، سابقه ورزشی (ماه)، مدت فعالیت ورزشی در هفته (ساعت)، تصویر بدنی [با استفاده از پرسش‌نامه چند وجهی ارتباطات شخصی با بدن (Multidimensional body-self relations questionnaire یا MBSRQ)] و سابقه مصرف AAS و مواد غیر مجاز از طریق مصاحبه فردی و استفاده از پرسش‌نامه مورد سنجش قرار گرفت.

**یافته‌ها:** شرکت‌کنندگان همگی بانوان بدنساز تفریحی با میانگین سنی  $26/3 \pm 6/3$  سال و بازه سنی ۱۵ تا ۵۲ سال بودند. خوداظهاری سوء مصرف AAS در ۷۰٪ بدنساز (۲۴/۲ درصد) عنوان شد. از میان مواد غیر مجاز، سوء مصرف محرک‌ها (آمفتامین یا مت‌آمفتامین) و سایر داروهای غیر مجاز به ترتیب در ۱۰ نفر (۳/۵ درصد) و ۹۵ نفر (۳۲/۹ درصد) ثبت گردید. ۱۱۲ شرکت‌کننده (۳۸/۸ درصد) استفاده از هورمون رشد را گزارش کردند. مصرف سیگار، قلیان و الکل به ترتیب در ۴۲ (۱۴/۵ درصد)، ۱۶۲ (۵۶/۱ درصد) و ۴۹ (۱۷/۰ درصد) مشارکت‌کننده گزارش گردید. از میان عوامل روانی- اجتماعی و دموگرافیک، مدت فعالیت ورزشی هفتگی و سابقه ورزشی ارتباط معکوسی را با مصرف AAS نشان داد.

**نتیجه‌گیری:** سوء مصرف AAS و مواد غیر مجاز در بانوان بدنساز تفریحی بر اساس خوداظهاری آن‌ها به نحو غیر قابل انتظاری بالا است. برخی عوامل از جمله مدت ورزش هفتگی و سابقه ورزشی ممکن است بر شیوع سوء مصرف تأثیرگذار باشد.

**واژگان کلیدی:** عوامل آنابولیک، سوء مصرف مواد، ایران، بدنسازی، زن

**ارجاع:** انگورانی هومن، جلالی مریم، حلبچی فرزین. مصرف استروئیدهای آنابولیک- آندروژنیک و مواد غیر مجاز در بانوان بدنساز تفریحی ایرانی و عوامل دموگرافیک و روانی – اجتماعی آنان. مجله اعتیاد و سلامت ۱۳۹۷؛ ۱۰ (۴): ۲۲۲-۲۱۶.

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