



Evaluating the Pattern of Anabolic Androgenic Steroid Use and Its Relation with Mental Health of Male Members of Bodybuilding Clubs of Iran, in 2015

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Received 2016 December 12; Revised 2017 April 18; Accepted 2017 June 21.

Abstract

Background: Anabolic androgenic steroids (AAS) are currently used by many athletes for skeletal muscle development. The aim of this study was to evaluate the prevalence of AAS use among bodybuilder athletes in Iran at 2015.

Methods: In this descriptive-analytical cross-sectional study 384 bodybuilders filled the study questionnaire evaluating age, education, and age at AAS use as underlying variables; pattern of AAS use as independent variable; and knowledge about AAS side effects and the relation between mental health and AAS use as dependent variables. Data was analyzed by SPSS using frequency tables, mean and standard deviation, chi-2, t-test, analysis of variances and regression.

Results: Among 920 participants, 104 (11.3%) were current users, and 210 (22.8%) had the history of usage. Physical attraction was reason of use in 57.6% and increasing power and ability to enter professional sport were reasons for use in 44 participants each (21.2%). The marital status, age and education level did not have significant effects on AAS use. Friends (76.7%) and coaches (67.4%) had significant correlation with AAS use in participants ($P < 0.000$). The simultaneous use of alcohol (46.5%) and smoking (27.9%) among AAS users was significant ($P < 0.001$). Only 4.7% of participants had proper information about AAS side effects.

Conclusions: The participants had little knowledge about AAS side effects, therefore educating adolescents and youth in high schools and universities, and also in sports clubs is necessary. Periodical assessment of coaches and athletes with regard to AAS use, and proper law enforcement in this regard is important.

Keywords: Anabolic Androgenic Steroids, Mental Health, Bodybuilding

1. Background

Anabolic androgenic steroids (AAS) are artificial substances, acting through androgen receptors (1). AAS were primarily developed for the treatment of delayed puberty, hypogonadism, hypercalcemia, hypercalcuria and some chronic states including recovery after infectious diseases (2, 3). It was shown that AAS can increase skeletal muscle development in laboratory animals, therefore this ability had encouraged its use first by bodybuilders and weightlifters and then it was used by other athletes and even the general population (2, 3).

Improving athletic performance, increasing muscle or decreasing body fat and improvement in sexual function are the reasons mentioned for AAS use in athletes (4, 5). Synthetic AAS are used in oral, muscle injectable and local forms (5). The incidence of AAS related side effects is not truly known, due to several limitations in human studies.

The severity of side effects depends on the sex, dose, duration of treatment, whether they are taken during exercise or in sedentary conditions; and the vulnerability of each specific individual to androgen exposure (6).

Adverse effects of AAS include sexual dysfunction, effects on the cardiovascular system, influence on mental health and behavior, and liver toxicity (7). Some of these side effects are acne, gynecomastia in men, heart attack, blood lipid disorders, liver cancer, and in adolescents; short stature (8), increased irritability and aggression (9, 10), and increased all type of mental disorders except phobia, paranoia and psychosis (11). Their side effects in women also included muscularity, decreased breast size and body fat, and coarse skin (7).

The prevalence of AAS use is higher among boys (12% - 40%) compared with girls (2% - 5%) (1-5). The prevalence of AAS use was reported to be 13% - 50% among bodybuilders in Iran (12). The mean reported prevalence in Iran is higher

than developed countries (13). The knowledge level of young people, people with low education and people with little athletic experience about the side effects of AAS is very low (14, 15); the rate of AAS usage has an indirect relationship with the individual's knowledge and education (16). Oxymetholone is the most common used drug in this category especially in Sweden (17). AAS use is more common among drug users (injectable or non-injectable drugs), alcoholics and those with high risk behavior (18).

2. Objectives

The aims of present study were to determine the prevalence of AAS use in Iranian bodybuilders, to assess their knowledge level about AAS side effects, and to find the relation between AAS use and mental health of athletes; the findings will help to develop proper educational programs.

3. Methods

This was a descriptive-analytical cross-sectional study which was performed to determine the prevalence and pattern of AAS use among Iranian bodybuilders in different age groups in 2015. The study population was athletes who were members of 180 bodybuilding clubs in Iran.

At first, 18 clubs were selected as a cluster and from each club 22 athletes were randomly picked. The study goals were explained for them, and those who had agreed to participate received the questionnaire. If the samples in each club had not reached 22, the next person was selected from the list until the number reached 22 and in the case of lack of enough samples in one club, the sampling was continued from the nearest club.

Since the results of studies which had been performed about AAS prevalence in Iran were different and the prevalence of use is different based on the drug type, in this study the prevalence was considered 50% ($P = 0.5$). Therefore with considering an alpha level of 0.05 the required population size was calculated to be 1123. The study tool was a questionnaire including three parts; the first part was related to demographic information, the amount and pattern of AAS use and the reasons for using it, the second part was related to users' knowledge about AAS side effects and the third part was in regard to general health; GHQ 28. The GHQ 28 is a self-reported questionnaire used for evaluating mental disorders in adolescents with the minimum age of 12 years (19, 20). The GHQ-28 has four sub-scales: physical signs, anxiety and insomnia, social dysfunction and depression. Each sub-scale has 7 questions

which have one score, and all scores together make the final score, therefore this questionnaire provides us with 5 scores (4 from 4 sub-scales and one total score).

The questions were answered by participants based on their health status in the last month. The scoring was based on Likert scale (0-3 scores); scores 5 - 6 in each sub-scale were considered as a person with a problem and scores 14 - 21 showed the severity of illness. The maximum score was 84 and the best cut off point was 23. The sensitivity and specificity of GHQ in best cut off point was 86.5% and 82% respectively. The reliability of the questionnaire was calculated with α Cronbach, which was 88.93% for knowledge level and 92.86% for mental health.

Demographic variables like age, education level and age at the beginning of AAS use were considered as underlying variables, the pattern of AAS use was appointed as independent variable, and knowledge about AAS side effects and the relation between mental health and AAS use were considered as dependent variables. The data was described by frequency tables, charts and mean indexes, and standard deviation. The data analysis was performed using chi2 test, t-test, analysis of variances and finally regression was used for confounding factors. The significant level was considered 0.05 in all the calculations.

All the participants received information about study goals and signed an informed consent form before. To ensure the confidentiality, the questionnaires had no name.

4. Results

Among 1123 questionnaires, 920 were returned. Among those 819 (89.0%) were current users, and 210 (22.8%) had the history of use. The most common reasons for using AAS were change in appearance and physical attractiveness (534 persons, 57.6%), and increasing power and ability to enter professional sport (each 193 participants, 21.2%). Among drugs dianabol, testosterone and oxandrolone were respectively the most common used drugs (Table 1). 7.82% of AAS users were single, 7.2% were younger than 25 years old, and 4.78% had a university degree (Table 3). The simultaneous use of AAS with alcohol and smoking was 5.32% and 3.04% respectively (Table 4).

In regard to knowledge level, only 4.7% of participants knew more than 10 side effects, and 62.8% of participants knew only less than 5 side effects. Considering the types of known side effects; mood disorders, sexual dysfunction and gynecomastia had the first to third position. The lowest level of participants' knowledge regarding side effects were about infertility (3 persons), growth disorders in those who have unclosed epiphyseal disks and hair loss (Table 2). Evaluating the relation between background variables like age, marital status and education, and AAS use by

Table 1. The Prevalence of AAS Use and Frequency of Used Drugs

| Variable | Number | Percent |
|----------------------------|--------|---------|
| Current AAS use | | |
| - | 819 | 88.8 |
| + | 101 | 11.2 |
| History of AAS use | | |
| + | 210 | 22.9 |
| - | 710 | 87.1 |
| Reasons for AAS use | | |
| Power | 193 | 21.2 |
| Professional sport | 193 | 21.2 |
| Appearance | 534 | 57.6 |
| Type of drug | | |
| Depo testosteron | 12 | 1.33 |
| Nonperson | 25 | 2.7 |
| Sostanol | 31 | 3.36 |
| Neo Durabolin | 42 | 4.5 |
| Stanazol | 69 | 7.5 |
| Vinestral | 69 | 7.5 |
| Methyltestosterone | 69 | 7.5 |
| Darabolin | 75 | 8.15 |
| Anaderol | 93 | 10.1 |
| Oxandrolone | 126 | 13.69 |
| Testosterone | 148 | 16.08 |
| Dianabol | 161 | 17.5 |

chi-2 test showed no significant correlation, however AAS usage by friends, coaches and simultaneous use of alcohol and smoking had an important role in using AAS drugs (Tables 3 and 4). The logistic regression determined that athletic history did not have relation with AAS use. No relation was observed between AAS use and mood disorders in this study (Table 4).

5. Discussion

In the present study, from 920 participated athletes; 101 (11.2) reported current use and 210 (22.9) reported previous use of AAS, which altogether showed that 34 had the history of AAS use. This rate is comparable with other national studies which reported the prevalence of 13 - 50. In an American study (21) the prevalence among college students was reported 3.1. The difference between results of Iranian studies and developed countries could be related to lack of knowledge among our adolescents and athletes

Table 2. The Knowledge Level of Participants About Different ASS Side Effects

| Variable | Number | Percent |
|---|--------|---------|
| General knowledge about AAS side effects | | |
| < 5 | 570 | 62.8 |
| 5 to 10 | 299 | 32.5 |
| > 10 | 51 | 4.7 |
| Knowledge about specific side effect | | |
| Anger | 134 | 34.9 |
| Acne | 119 | 30.9 |
| Infertility | 3 | 0.3 |
| hair loss | 52 | 13.5 |
| Growth disorder | 61 | 15.8 |
| Death | 69 | 17.9 |
| Cancer | 77 | 20.1 |
| Emergency condition | 78 | 20.3 |
| Cardio-vascular | 88 | 22.9 |
| Liver | 109 | 28.3 |
| Testis | 110 | 28.6 |
| Hair lost | 116 | 30.1 |
| Gynecomastia | 122 | 31.7 |
| Sexual disorder | 158 | 41.1 |
| Psychology | 160 | 41.6 |

about AAS side effects therefore developing systematic and continuous educational programs is necessary to prevent AAS abuse in Iran.

Improving athletic performance (4) and increasing muscle tissue and power (12) in Iranian studies, and increasing muscle tissue and enhancing appearances in other countries' studies (22) were mentioned as the main reasons for AAS use. In the present study, change in appearance and increasing attractiveness in 534 persons (57.6), and increasing power and willing to enter professional sports each in 386 persons (21.2) were the main reasons for AAS use. This prevalence rate indicated that physical attraction is very important for people specially youth; therefore the ministry of youth should have a consistent agenda in this regard and conduct proper workgroups for developing healthier way for increasing physical attraction.

The most common used drugs in this study were dianabol, testosterone and oxynandrolone respectively, however in a similar study the most common drug was reported oxymetolon (12) and in a review study the most common drugs were testosterone, nandrolone, stanazolol, and methandienone (22). The difference between these results and our results could be related to factors like acces-

Table 3. The Frequency of AAS Use Based on Demographic Information

| Variable | AAS Use: Number (Percent) | | χ^2 | P Value |
|-------------------------------|---------------------------|-----------|----------|---------|
| | - | + | | |
| Age, y | | | | 0.186 |
| < 25 | 601 (65) | 67 (7.2) | 3.362 | |
| 25 - 35 | 189 (20.54) | 26 (2.82) | | |
| > 35 | 19 (2.06) | 7 (0.76) | | |
| Education | | | | 0.331 |
| Less than high school diploma | 267 (29.02) | 46 (5) | 2.213 | |
| high school diploma | 127 (13.8) | 14 (1.52) | | |
| University degree | 416 (45.54) | 44 (4.78) | | |
| Marital status | | | | 0.521 |
| Single | 603 (65.54) | 72 (7.82) | 0.412 | |
| Married | 203 (22.06) | 32 (3.47) | | |
| Friends with AAS use | | | | 0.000 |
| - | 704 (76.52) | 24 (2.6) | 90.419 | |
| + | 115 (12.5) | 79 (8.58) | | |
| Coaches with AAS use | | | | 0.000 |
| - | 716 (77.82) | 34 (3.69) | 75.636 | |
| + | 103 (11.19) | 69 (7.5) | | |

Table 4. The Relation Between Mental Disorder, Smoking and Alcohol Use with AAS Use

| Variable | AAS Use Number (Percent) | | χ^2 | P Value |
|------------------------|--------------------------|-----------|----------|---------|
| | - | + | | |
| Mental disorder | | | | 0.178 |
| - | 515 (56) | 55 (5.97) | 1.815 | |
| + | 273 (29.67) | 77 (8.36) | | |
| Smoking | | | | 0.000 |
| - | 711 (90.5) | 74 (8.04) | 6.588 | |
| + | 107 (11.63) | 28 (3.04) | | |
| Alcohol | | | | 0.000 |
| - | 656 (71.3) | 55 (5.7) | 29557 | |
| + | 160 (17.39) | 49 (5.32) | | |

sibility, price, advertisement, and friends and coaches' recommendation. The important fact is comparison between drug side effects; therefore if athletes want to use them for any reason they could pick the safest one, which this comparison will require further studies.

Since this study was performed only on men so gender comparison is not possible but similar studies indicated the higher prevalence of AAS use among men compared

with women (23). Despite that, 7.2 of AAS abusers were younger than 25 years old but no significant difference was observed between different age groups and prevalence of AAS use with chi2 test in the present study, but other national studies reported significant difference based on age (4, 12, 22); therefore further studies with larger sample size are required. The younger age increases the probability of damage to bone development, permanent tendon dam-

age, and behavior disorders, and is accompanied with risk of microtestis, oligospermia and infertility. The risk of cancer development like prostate and liver in people with family history and genetic predisposition to cancer must be considered before starting AAS, therefore athletes should know that a visit by sport medicine physician is necessary before starting AAS use.

The prevalence among singles (7.82) was higher than married participants but the difference was not significant. This is probably due to younger age of participants who also declared that educational programs during high school could be helpful. Regarding education level no significant difference was observed between those with university degree and others, which this result is similar to the results of other international studies (23) but is different from Iranian studies (4, 12).

Our results showed the simultaneous use of alcohol and smoking in AAS users and the difference between two groups of AAS users and non-users in this relation is significant ($P=0.000$). This result is similar to the results of other studies (21, 24). It seems that law enforcement with regard to AAS use can help in controlling other high risk behaviors of youth.

This study results showed that only 4.7 of athletes knew more than 10 side effects of AAS and 62.8 knew less than 5. The lack of athletes' knowledge about AAS side effects are also declared in other studies (13-15). In a review study by Morente-Sanchez the lack of athletes' knowledge about AAS side effects was emphasized and it was also mentioned that the main influence and source of information for athletes are their coaches, rather than doctors and other specialists (24).

In some studies that used educational intervention for preventing AAS abuse with pamphlets (23) and small discussion groups (21), after intervention the athletes' intention for using AAS decreased significantly and their knowledge about AAS side effects, perceived sensitivity and self-confidence, and also the their ability to reject AAS offers were significantly increased (23).

In regard to participants' knowledge about AAS side effects; mood disorders, sexual side effects and gynecostasia were the most known side effects respectfully, but participants' knowledge about infertility (one person), growth disorders and hair loss was very little.

The results of this study did not show significant correlation between mood disorders and AAS use which is different from the results of other studies that showed the higher prevalence of all mental disorders in AAS users except phobia, paranoia and psychosis (16). Also the AAS users had more often sought professional help for mental problems (10). This difference between our results and these studies could be related to study population, who

were former elite male athletes in power sports, while our population consisted of usual bodybuilding club members.

5.1. Conclusion

Based on the results of this research, educating adolescents and youth in high schools and universities, and also in sports clubs is necessary to increase their knowledge about AAS side effects. Periodical assessment of coaches and athletes with regard to AAS use, and proper law enforcement in this regard is important in keeping youth safe and preventing the occurrence of AAS side effects.

Acknowledgments

This work was supported by Mashhad University of medical sciences grant number 9311000

Footnotes

Authors' Contribution: Study concept and design, Shahin Saeidinejat and Ali Vafae Najar; analysis and interpretation of data, Hamzei Zahra and Elaheh Hooshmand; drafting of the manuscript, Elaheh Hooshmand; critical revision of the manuscript, Shahin Saeidinejat and Ali Vafae Najar.

Implication for Health Policy Makers/Practice/Research/Medical Education: By specifying the prevalence of AAS use in Iranian bodybuilder athletes, assessing their knowledge level about AAS side effects, according to the indirect relation between AAS usage and individual's knowledge; the findings identify areas that will be caused by lack of information which can have important effects on preventing problems and adverse effects of steroid usage. So the result of this study will help to develop educational programs for athletes and bodybuilders who use AAS.

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