EXERCISE AND SPORTS MEDICINE CLINIC

PREVALENCE OF THE USE OF ANABOLIC ANDROGENIC STEROIDS BY PHYSICAL EDUCATION STUDENTS AND TEACHERS WHO WORK IN HEALTH CLUBS

ORIGINAL ARTICLE

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ABSTRACT

Anabolic androgenic steroids (AAS) are chemically similar to testosterone, used for the treatment/control of various diseases. However, these substances are being used in non-therapeutic and indiscriminate purposes to improve sports performance and mainly esthetics. This study aimed to analyze the prevalence of AAS use and information of undergraduates and physical education teachers working in fitness centers in Belém-PA. A closed anonymous questionnaire was applied to 117 volunteers as an instrument. Comparison of the prevalence of use and degree of information of the respondents about AAS was performed using statistical non-parametric test X^2 (chi-square), considering the range of 95%, significant when $p<0.05$. The average age of the participants was 28.0 ± 6.3 years and the prevalence of AAS use was of 31.6%. The highest prevalence found was among specialist professionals (39.3%), the main motivation for the use of AAS was 75.6% to esthetics. Regarding the information, it was found that the drugs were classified as AAS: Durateston, Deca-Durabolin, Oxandrolona/Winstrol. However, these professionals took other substances for AAS, including: growth hormone and oils. Among the side effects, the most commonly cited were: acne, deepening of the voice and aggressiveness, but more harmful side effects such as cancer and flavor were less marked. The results of this study demonstrate that the use prevalence was significant ($p\leq0.03$) among the undergraduate and physical education professors working in fitness centers of Belém-PA, evidencing hence probable misinformation about some of the side effects of AAS use, implying the indiscriminate use of these drugs.

Keywords: anabolic agents, faculty, students, physical education, prevalence.

INTRODUCTION

Anabolic androgenic steroids (AAS) are hormones derived from cholesterol metabolization and chemically similar to testosterone. As their name suggests, they have anabolic properties responsible for nitrogen retention, increase of muscular volume and strength. The androgenic properties are responsible for the development of the masculine sexual characteristics and for many of the collateral effects[1-4].

Although the AAS have many aims for the treatment/control of many diseases, such substances are being used in a non-therapeutic and indiscriminate manner in our society, with the purpose to improve sports performance and mainly esthetics[1-3,5,6].

An investigation on the AAS use in the United States in the 1990's decade observed that about 1,000,000 of North Americans had already used such substances for non-therapeutic aims[7]. Another investigation when analyzing the use of these substances among adolescents and adults in Poland, observed prevalence of 6.2% among men and 2.9% in women[8].

A study held in Jordan (Middle East) analyzed the use of AAS among 503 university students and 154 bodybuilders through questionnaires. Out of the investigated individuals, it was observed that 4.2% of the university students and 26.0% of the athletes were current users[9]. In a scientific review on the use of AAS in Brazil, prevalence of the use of AAS ranged between 2.1 and 25.5%, according to the sample characteristics and the analyzed region. Other interesting information in this research was that AAS use prevalence was higher among physical education teachers (25.57%) when compared with other groups, such as professionals and professors from the health field, adolescents, men and women[6].

In Brazil, there are still few data about the indiscriminate use of AAS[6,10-12]. It is observed that the amount of AAS has been increasing, despite the awareness of many collateral effects, already described in the literature[7-11]. However, it is evidenced that there are few studies about the use of AAS among physical education students and professors[13-15].

Thus, considering that physical education students and teachers are individuals who make opinions, and that the level of information about the probable benefits and undesirable collateral effects may influence on the decision about using these substances and encourage the students use these drugs, the aim of this study was to verify the prevalence of the use and information about AAS by physical education students and professors who act in gyms in Belém, PA.

METHODS

Out of a sample universe of 43 gyms registered in the Regional Board of Physical Education , 8th Region (CREF8), tem of which, that is, 23.2% of the gyms of Belém do Pará - Brazil participated in the research[16]. Out of these, mean of 150 professionals was calculated in tem gyms, and this information was provided by the owners/coordinators of the gyms.

The sample was composed of 117 individuals: 30 students and 87 teachers, with maximum sample error of 4.3% and confidence level of 95%. Only students from the physical education course older than 18 years and physical education teachers who work in gyms in Belém, PA were included, with no sex restriction.

The Free and Clarified Consent Form (TCLE) was signed by the gyms owners and individuals in the sample. The study was approved by the Ethics in Research Committee of the University of the State of Pará/Physical Education Course. (document # 0060.0.412.000-10) according to norms of the legal opinion 196/96 of the National Board of Research Involving Humans.

The participants were randomly selected since the gym's choice depended only on its registration in the CREF8 and authorization of the one responsible for the premises for application of the study. The questionnaires were made available in unidentified envelopes, after the individuals had accepted to participate in the research. After the filling out, the questionnaires were placed again in the envelopes by the volunteers and handed to the researchers.

Data collection was performed with a closed questionnaire, with the following questions: 1) Age; 2) Educational status; 3) Has used or use AAS?; 4) What is the goal for the AAS use?; 5) Which of these substances are classified as AAS?; and 6) Which are the possible collateral effects caused by AAS use?

Characterized as anonymous and voluntary, the instrument was specifically designed for the present study, following some references for it[10,13,17,18]. A pilot-study was used to analyze the questionnaire's reproducibility in four gyms of Belém. Ten students and 23 teachers participated in it but they did not make part of the sample of the present study. Thus, the results obtained guaranteed reproducibility of the questionnaire.

STATISTICAL ANALYSIS

Use prevalence and information on AAS were compared according to the following selections: use prevalence x educational status; use prevalence x motivation; information on AAS x educational status; AAS information x use prevalence.

Mean and standard deviation of the ages of the participants were calculated. Subsequently, AAS use prevalence and level of information of the volunteers on AAS were compared through non-parametric statistics, χ^2 proof (chi Qui-square), considering confidence interval of 95% and significant p when lower than 0.05.

The statistics calculation, tables and charts were performed in the Microsoft Excel 2007 and SPSS software.

RESULTS

Mean age of participants was 28.0 ± 6.3 years. Data presented in table 1 demonstrate that the majority of the subjects has university level enough to answer the questionnaire.

The results presented in figure 1 demonstrate that in the total of researched individuals, 31.6% have already used or use AAS.

However, none of these investigations related the use of AAS among physical education teachers with a degree, and our research stated that specialists (39.3%) were the individuals who presented the highest se prevalence of AAS (figure 2).

Concerning the goal for AAS use, the esthetical factor was predominant (table 2).

Table 1. Distribution of the individuals interviewed by educational level.

Educational level	N	%
Students	30	25.6%
Undergraduates	31	26.5%
Specialists	56	47.9%
Total	117	100%

Note: n = frequency; % = percentage.

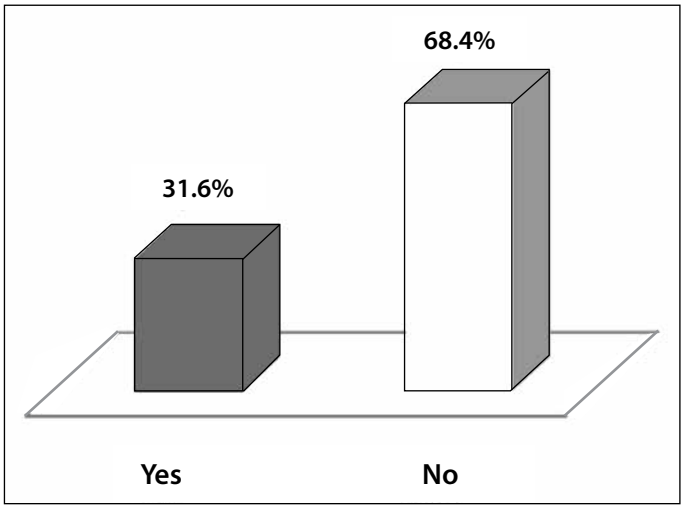

Figure 1. Percentage of interviewed individuals who used or not AAS.

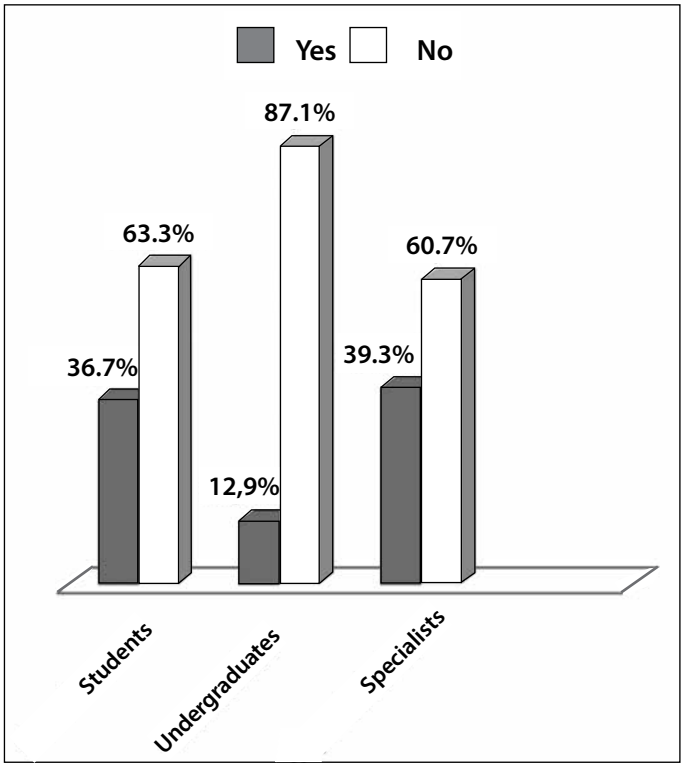

Figure 2. Researched individuals who used or not AAS according to the educational level.

Table 2. Goal for AAS use, according to the interviewed individuals.

Goal	N	%
Esthetics	28	75.6%
Professional marketing	9	24.3%
Strength gain	10	27.0%
Physical wear	4	10.8%
Treatment	4	10.8%
Other	6	16.2%

Note: n = frequency; % = percentage.

When they were asked about the substances classified as AAS, the three most mentioned were: Durateston®, Deca-Durabolin®, oxandrolone/Winstrol®, ranging their percentage according to the educational status. Nevertheless, we highlight some substances classified as AAS by the total of volunteers, which are not: GH (38.4%), clembuterol (20.5%) and ADE (17.9%) (table 3).

Among the most harmful collateral effects we name cancer. However, it was mentioned only by 62.3% of the total of researched subjects. Other collateral effects considered irreversible such as gynecomastia, aromatization and clitoris hypertrophy were mentioned by 73.5, 35.0 and 72.6%, respectively, of the total of volunteers (table 4).

Table 3. Substances classified as AAS, according to the researched individuals.

Substances	Students (%)	Undergraduates (%)	Specialists (%)	Total (%)*	Total (n)*
Deca-Durabolin®	70.0	83.8	85.7	81.1	95
Dianabol®	46.7	58.0	64.2	58.1	68
Hemogenin®	56.7	64.5	66.0	63.2	74
Winstrol®	66.7	80.6	73.2	73.5	86
Synthol®	6.7	6.4	14.2	10.2	12
Ephedrine	3.3	12.9	7.1	7.7	9
Oxondrolone	66.7	61.2	83.9	73.5	86
Durateston®	80.0	93.5	85.7	86.3	101
GH	40.0	32.2	41.0	38.4	45
ADE	30.0	16.1	12.5	17.9	21
Primobolan®	23.3	35.4	50.0	39.3	46
Estanozolol	56.7	58.0	57.1	57.2	67
Clembuterol	26.7	9.7	23.2	20.5	24

Note: n = frequency; % = percentage; GH = growth hormone; ADE =liposoluble vitamin A. D and E in oily vehicle; * = sum of researched individuals.

Table 4. Possible colateral effects of AAS use according to the researched individuals.

Collaterla effects	Students (%)	Undergraduates (%)	Specialists (%)	Total* (%)
Hair growth increase	60.0	87.1	92.8	82.9
Voice gets lower	83.3	87.1	89.2	87.2
Gynecomastia	56.7	64.5	87.5	73.5
Acne	93.3	90.3	89.2	90.6
Penis decrease	16.7	25.8	10.7	16.2
Sexual impotence	80.0	87.1	78.5	81.2
Agressiveness	76.7	83.9	87.5	83.7
Aromatization	30.0	19.4	46.4	35.0
Clitoris hypertrophy	56.7	80.6	76.8	72.6
Water retention	56.7	77.4	83.9	75.2
Amenorhea	16.7	32.3	55.3	39.3
Cancer	60.0	51.6	69.6	62.3
Hair loss	43.3	38.7	57.1	48.7
Libido loss	36.7	48.4	55.3	48.7
Libido increase	23.3	22.6	42.8	32.4
Infertility	66.7	51.6	60.7	59.8
Testicle atrophy	46.7	48.4	51.7	48.7

Note: % = percentage; * = sum of researched individuals.

DISCUSSION

Prevalence of AAS use was statistically significant ($p \leq 0.03$) among physical education students and teachers, since 31.6% have already used or use AAS. In further research which also involved physical education students and teachers, lower results which pointed out 25.5 and 19.2%, respectively, were found[13,15].

Among the users, the main motivation for use was esthetical improvement, corroborating the findings of other authors[8,10,13,15,17-20]. Palma and Assis[13], when researched the AAS use among physical education teachers who act in gyms, indicated as main motivation "personal *marketing*", since many times their bodies act as a kind of "curriculum", through which it is possible to associate good physical fitness to professional quality.

In the studied sample, higher AAS use prevalence among specialists was verified (39.3%). However, no research which related AAS use by physical education teachers and educational status was found.

Concerning the information about substances classified as AAS, we observed that Durateston®, Deca-Durabolin®, oxandrolone/Winstrol® were the most mentioned. When these results were compared with the literature, we observed that these substances have also been mentioned by lay individuals as AAS[10,17,19-21].

We also highlight some mentioned substances, regardless of the educational status, a being AAS: GH (38.4%), clembuterol (20.5%) and ADE (17.9%). Nonetheless, such substances are respectively: growth hormone; bronchodilator, generally used in asthma treatment; and medication of veterinary use/local oil[3,17,20,22].

Araújo[10] warned that ADE was among the mostly known substances by high school students of the Federal District, being the third most mentioned drug as AAS by the interviewees. Moreau and Silva[20] observed that AAS users and former users also seem to get confused when using medication and other substances as AAS, being clembuterol and ephedrine among the most mentioned. In another investigation, diuretics, ephedrine and GH were found as substances used in association with AAS[17]. Concerning the collateral effects caused by AAS, it was verified that cancer was mentioned by 62.3% of the total of researched individuals and 51.6% by undergraduates. Al-Falasi *et al.*[18], when analyzed the AAS information and use prevalence among gyms goers in the Arabic Emirates, observed that the most mentioned collateral effects were: gynecomastia (41.0%), growth deficit (29.0%) and cancer (20,0%).

The data previously mentioned do not emphasize studies with physical education students and teachers who act in gyms concerning the use and information about AAS, corroborating hence the demand for this study.

It is observed that physical education students and teachers presented information level incompatible with the AAS use prevalence. Even with a certain level of information, the use prevalence was high among these professional, and may result in encouragement to their students to use these drugs, since these professionals have popular opinions.

According to these results, we suggest the demand for further investigations with bigger samples in order to favor better statistical analyses. In an attempt to decrease possible embarrassment to

the interviewees who may feel uneasy to fill out the questionnaire about AAS, since they are substances which when used without medical prescription, are illicit, future studies should be conducted with collection instruments which can be sent by electronic mail or any other medium which decreases direct contact between the researcher and the volunteers. Another limitation was the difficulty found by the researchers to collect the data, especially due to the resistance from the part of the gyms owners/coordinators to allow access to the businesses.

CONCLUSION

Thus, the data presented demonstrate a possible significant prevalence of AAS use among physical education students and teachers who act in gyms in Belém, PA, revealing hence their probable misinformation about some of the collateral effects, being able to imply in the indiscriminate use of these drugs.

All authors have declared there is not any potential conflict of interests concerning this article.

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