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Anabolic Steroids Use and Perceived Side Effects Among Gymnasium Attendees In Benha And Shebin Al-kom Cities.

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A B S T R A C T

Background: Young people strive to achieve optimum body condition in an easy manner using dietary or anabolic steroids supplements without proper knowledge of their adverse effects. **Objective:** To determine prevalence and factors associated with Androgenic Anabolic Steroids (AAS) use. **Method**: A cross-sectional study using a self-administered questionnaire was conducted at six gyms in Benha and Shebin al-kom cities. The total participants were 200. **Results**: The mean age of the studied population was 23.09 ± 5.13 years. Out of 200 participants, 114 (57%) used anabolic bodybuilding supplements. Seventy-eight (78) out of 114 used nutrient supplements, 14 used AAS and 22 used both nutrients and AAS. There was a significant difference between AAS users and nonusers regarding age (19.22 ± 1.93 *vs.* 23.88 ± 4.90 respectively; p = <0.001), income (100 % of AAS users had enough or more than enough income vs. 84.6 % of nonusers; p= <0.001). They also significantly differed considering the aim of practice (83.3% of AAS users aimed at bodybuilding *vs.* 64.1% of nonusers; p = .037). Finally, 30.6% of steroids users were not aware of any side effects of these preparations. **Conclusion:** The prevalence of AAS use either alone or in combination with nutrient supplements represented 18% of the study group and 31.6% of total anabolic supplements users, one third of them were not aware of the possible side effects. Young age and high income were significantly associated with AAS use.

INTRODUCTION

Most young males strive to have a perfect body condition. Some of them develop this via exercising and a healthy balanced diet. On the contrary, many of them prefer to achieve this by easy and fast way using dietary supplements.[1]

According to the Dietary Supplement Health and Education Act (DSHEA), dietary supplements include one or more of the following ingredients: a vitamin, mineral, herb or other botanical, amino acid, concentrate, metabolite, constituent, and/or extract.[2]

Dietary supplements have been taken to improve performance, increase strength, gain muscle mass, lose weight, prevent illness and disease, treat medical problems, boost immunity, compensate for inadequate diet, provide extra energy, meet special nutrient demands for high levels of physical activity, improve fitness, increase alertness or mental activity, reduce stress, and feeling better.[3]

Anabolic androgenic steroids (AAS) are synthetic derivatives of testosterone having pronounced anabolic properties as well as relatively weak androgenic properties.[4]

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Steroids are increasingly used in bodybuilders and a large number of even non-professional and non-competitor bodybuilders use them without proper knowledge of its adverse effects to increase their body mass.[5] Anabolic steroids can have dangerous and irreversible side effects. Some of the side effects include liver tumors as well as cancer, liver damage, increased blood pressure and LDL, decreased HDL, severe acne, decreased sperm count, infertility, and tremor.[6]

In the United States, approximately 20% of athletes use AAS.[4] Studies on the prevalence rate in the Middle East and North Africa (MENA) region are few, the prevalence rate is estimated to be~22 % among gym users in the United Arab Emirates[7], and ~13 % of Iranian youth body builders[8] ~28% of the general population of gym users in Riyadh, Saudi Arabia.[9]

Using the Anabolic Androgenic Steroid (AAS) agents is evident within both the competitive athletes and in non-sporting contexts to improve their physique. Many studies documented side effects and health hazards with the misuse of anabolic steroids, where these were accused as a cause of deaths among athletes. However, no accurate data is available for the prevalence of AAS misuse among athletes in Egypt.

The aim of the current study is to determine prevalence and factors associated with androgenic anabolic steroids use.

METHOD

This was a cross-sectional study, conducted in the period from January to March 2020 using a self-administered questionnaire.

Qalyubia and Menoufia governorates were chosen for convenience because they are the place of residence of researchers, and this choice enables them to visit gyms on a daily basis throughout the study period.

The total number of authorized private gyms in Benha & Shebin Al-Kom cities are 61. Ten percent (10%) of the total number was selected by simple random sampling technique. The chosen six gyms were: Active gym, Golden gym, Body art gym, World gym, Heroes gym and Hall gym. Oral permission was obtained from the gym administrators agreeing to participate in the study. The researchers were available to supervise the distribution and collection of the questionnaires and respond any inquiries posed by participants.

Sample size calculation was done according to the following formula

$$SS = \frac{Z^2 * p(Þ 1-p)}{C^2}$$

SS = minimum sample size required for the study.

z = 1.96 at 95% level of significance

p = prevalence of anabolic steroids use, which was considered to be 5 % according to *Hanem et al.,2018.*[10]

C = degree of precision (0.05)

So, the minimum sample size required for the study was 73 participants. Every researcher was responsible for one city. The chosen gym were visited on alternative day pattern along the week except on Friday for 2 months (from 1st of January to the beginning of March 2020). Every gym was considered as a cluster and all registered male trainee above the age of 16 years was selected to participate in the study. After obtaining the written consent, 210 questionnaires were distributed. Incomplete or wrongly answered questionnaires were excluded and the total valid questionnaires were 200.

A self-administered anonymous questionnaire, consisting of 12 questions was developed based on a previously published study by Usman et al. [5], It was reviewed and evaluated for readability and content validity by two staff members in public health department, Benha University. A pilot study enrolled 20 participants was done to assess logistics and collect information before the large-scale study. Almost all of the questions were close ended. The questionnaire comprised four main sections: first, socio demographic data including age, education level, job & income; second, data on the participant's practice regarding aim and frequency of practice ; third, questions about nutritional supplements intake and its types (nutrients supplements & anabolic steroids), onset of steroids intake , who give advice for steroid use and willing to recommend steroid use to others and finally, awareness of the side effects of nutritional supplements and hormones. Questionnaires were distributed and collected by researchers on the same day.

Data analysis: Descriptive analysis included calculation of means and standard deviations (SDs) for continuous variables and frequencies and percentages for categorical variables. Significant differences in categorical variables such as age, education, and income were tested using the student t test, Chi-square test (X^2) and Fisher Exact teat

(FET); p <= 0.05 was considered statistically significant. All statistical analysis were performed using SPSS (Statistical Package for Social Sciences version 20.0, SPSS Inc. Chicago, IL; 2010).

RESULTS

The results of this study showed that the mean age of the studied population was 23.09 ± 5.13 years, ranging from 16 to 41 years, university students represented33.0% while34.5% were employed. As regard income, the majority (74.5 %) have enough income (Table1).

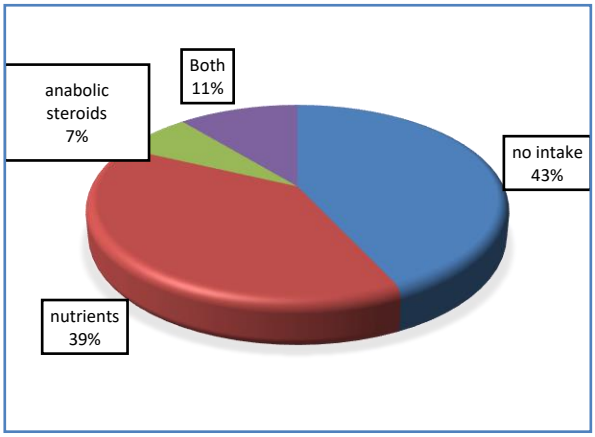
The purpose of attending gym and fitness centers in nearly half of the studied population (50.5 %.) was for body building at a frequency of2 to 4 times a week in 50% of them. It was noticed that 43% of total study participants did not use any supplements, while 57% used body building supplements (39% nutrient supplements , 7 % anabolic steroids and 11 % both nutrient supplements& anabolic steroids)(Figure 1).

With respect to the supplements' users (114 persons) ,78 (68.4%) used nutrient supplements, 14 (12.3%) used anabolic steroids alone and 22 (19.3%) used both nutrient and anabolic steroids for body building. Most of the steroid users (86.1%) started anabolic steroids intake between the age of 15-25 years and the majority of them (66.7%) received advice from their coaches to use anabolic steroids as a method to assist them increase muscle mass and strength. However, 88.9% of them would not recommend others to use anabolic steroids (Table 2).

Table 1: Socio-demographic characteristics of the studied population

Age (in year)		
Minimum	16	
Maximum	41	
Mean ± SD	23.09±5.13	
Other Socio-demographic data	**No. (200)**	**%**
Education		
Intermediate	40	20
High school	42	21
University student	66	33
University graduate	52	26
Job		
Student	69	34.5
Employed	69	34.5
Unemployed	62	31.0
Income		
Less than enough	31	15.5
Enough	149	74.5
More than enough	20	10

Comparison between participants who used



anabolic supplements and those who did not, a statistically revealed that there was significant difference as regarding age (mean ± SD: 22.41±4.72 *vs.*24.00± 5.53 respectively; p = .03), job (42.1% of supplement users were employees *vs.* 24.4% of nonusers; p= .025) , income (89.5% of supplement users had enough or more than enough income *vs.* 77.9 % of nonusers ; p= .000). They also significantly differed considering the aim of practice (70.2% of supplement users aimed at bodybuilding *vs.* 24.4% of nonusers; p = <0.001) (Table 3)

Figure 1: Prevalence of anabolic supplements use among the studied group(n=200)

There was a statistically significant difference between anabolic steroids users and nonusers regarding age (mean ± SD:19.22 ± 1.93*vs.*23.88 ± 4.90 respectively; p = .000), income (100% of steroids users had enough or more than enough income vs.84.6 % of nonusers had only enough income; p= <0.001). They also significantly differed considering the aim of practice (83.3% of steroids users aimed at bodybuilding *vs.* 64.1% of nonusers; p = .037).While there is no statistically significant difference with respect to education and work (Table 4&5).

Knowledge about side effects of anabolic steroids differed significantly between users & nonusers (39.7 % of nonusers *vs.* 30.6% of steroids users mentioned that there is no side effects for steroids intake. On the contrary, 33.3% of steroids users *vs.* 12.8% of nonusers reported that there are multiple side effects for steroids; p= .018) (Table 5).

DISCUSSION

The main objective of this research paper was to determine the prevalence as well as factors associated with the use of androgenic anabolic steroids (AAS) among gym users. Socio demographic characteristics revealed that the mean age of the participants was 23.09 ± 5.13 years. The

Table 2: Distribution of studied population according to gym attendance and supplements intake.

Body building practices	No. (200)	%
Aim of practice		
Weight loss	99	49.5
Bodybuilding	101	50.5
Frequency		
Daily	36	18
2 to 4 times a week	100	50
< 2-4times/week	64	32
Supplements intake		
Yes	114	57
No	86	43
Type of supplements (n=114)		
Nutrients	78	68.4
Steroids	14	12.3
Both	22	19.3
Onset of steroids intake (n=36)		
Before 15 years old	5	13.9
15- 25 years old	31	86.1
Who give advice for steroid use(n=36)		
Coach	24	66.7
Friend	12	33.3
Willing to recommend steroid use to others(n=36)		
Yes	4	11.1
No	32	88.9

findings of the current study agreed with a similar previous study conducted to determine the knowledge, awareness and practices of anabolic steroids amongst body builders of Rawalpindi and Islamabad,2015where the mean ±SD of age was 24.7 ± 3 years.[5]

University students constituted 33.0% of the participants and 34.5% were employed. The majority of participants (74.5%) had enough income and these findings were in a good agreement with a cross-sectional study among gym users in Riyadh, Saudi Arabia, 2020 where 35.5% of participants were government employees, whereas 31.1% were students.[11]

Body building for increasing muscle mass and strength was found to be the main purpose from attending gym and fitness centers in nearly half of the studied population (50.5%). There was a statistically significant difference between users and nonusers regarding the aim of practice; as the main purpose of going to gym in the majority of steroid users (83.3%) were body building. This was supported by results of Nakhaee et al. [6] who studied the prevalence of use of anabolic steroids by bodybuilders using three methods in a city of Iran, 2013 and stated that the main reason for using anabolic steroids was to increase muscle size.

Use of anabolic steroids whether alone or with other nutrient supplements represented 18% of total study participants. This percentage of steroid users was close to the findings of a study of the frequency of anabolic steroids abuse in bodybuilder athletes in Kerman City, 2009 where the frequency of anabolic steroid abuse was 18.8%.[12]

Compared with other countries, prevalence of AAS use in this study was higher than that found in Saudi Arabia where prevalence of hormone use was 7.9%, while it was lower than was found in Al Ain, UAE (22%).[13,7] These differences could be due to economic and lifestyle variations between countries.

In this study 57% of the participants used anabolic supplements and this percentage was close to a previous study in Riyadh, 2017 in which 47.9% of participants reported using nutritional supplements.[12]

The majority of AAS users (66.7%) received advice to use anabolic steroids as a method to help them to increase muscle mass and strength from their coaches and this percentage was higher than that reported in a previous study conducted in Riyadh, 2019, as 38.8% of participants reported obtaining AAS from their coaches.[14]

It was noticed that 88.9% of AAS users would not recommend anabolic steroids to others. This was similar to Usman et al.[5] who stated that it was interesting to note that the bodybuilders who were themselves addicted to steroids are not willing to recommend it to others.

Assessing factors associated with AAS use revealed that most steroid users (86.1%) in this study started anabolic steroids intake between the age of 15-25 years. These results are consistent with Alsaeed and Alabkal[4] who conducted a cross-sectional study of usage and perceptions of anabolic-androgenic steroids among male fitness center attendees in

Kuwait, 2015 where the 19–25 age group had th e highest occurrence (46.8 %) of first-time AAS use. This finding could be explained by the greater importance of body image for youth than old adults

Table 3: Relationship between supplement intake and some contributing factors

Contributing factors	Supplement intake		Test of significance	*P-value*
	Yes (114)	No (86)		
Age\year (Mean ± SD)	22.41± 4.72	24.0 ± 5.53	t=2.18	.030*
Education				
Intermediate	24(21.1%)	16(18.6%)		
High school	27(23.7%)	15(17.4%)		
University student	32(28.1%)	34(39.5%)	X^2=3.15	0.368
University graduate	31(27.2%)	21(24.4%)		
Job				
Student	37(32.5%)	32(37.2%)		
Employed	48(42.1%)	21(24.4%)	X^2=7.41	0.025*
Unemployed	29(25.4%)	33(38.4%)		
Income				
Less than enough	12(10.5%)	19(22.1%)		
Enough	97(85.1%)	52(60.5%)	X^2=16.57	.000**
More than enough	5(4.4%)	15(17.4%)		
Aim of practice				
Weight loss	34(29.8%)	65(75.6%)	X^2=41.05	
Bodybuilding	80(70.2%)	21(24.4%)		.000**
The frequency of attending gym				
Daily	19(16.7%)	17(19.8%)		
2 to 4 times a week	58(50.9%)	42(48.8%)	X^2=0.320	0.852
Less than 2-4times\week	37(32.5%)	27(31.4%)		

** Significant, **Highly significant*

together with higher susceptibility to engage in risky behavior. There was a statistically significant difference between anabolic steroids users and non-users with regard to income; higher income was associated with AAS as 100% ASS users had enough and more than enough income, which ascertain the relationship between financial ability and use of AAS. However, there were no statistically significant differences with respect to the level of education. This finding aligns with those of Al-Harbi et al., 2020.[11] In this study the most commonly reported side effect of AAS among steroid users was acne (36.1%)

Table 4: Comparison between anabolic steroids users & non-users regarding socio-demographic characteristics

Socio-demographic data	Steroids intake		Test of significance	P value
	Yes (36)	No (78)		
Age\year (mean ± SD)	19.22± 1.93	23.88 ± 4.90	t=7.26	.000**
Education				
Intermediate	8(22.2%)	16(20.5%)		
High school	9(25%)	18(23.1%)		
University student	9(25%)	23(29.5%)	X^2=0.265	0.968
University graduate	10(27.8%)	21(26.9%)		
Job				
Student	15(41.7%)	22(28.2%)		
Employed	14(38.9%)	34(43.6%)	X^2=2.24	0.325
Unemployed	7(19.4%)	22(28.2%)		
Income				
Less than enough	0(0.0%)	12(15.4%)	FET=15.94	.000**

Enough	31(86.1%)	66(84.6%)
More than enough	5(13.9%)	0(0.0%)

***Highly significant*

Table 5: Comparison between anabolic steroids users & non-users regarding aim and frequency of gym attendance& knowledge about side effects

Variables	Steroids intake		Test of significance	*P value*
	Yes (36)	No (78)		
Aim of practice				
Weight loss	6(16.7%)	28(35.9%)	X^2=4.35	.037*
Bodybuilding	30(83.3%)	50(64.1%)		
Frequencyof going to gym				
Daily	5(13.9%)	14(17.9%)		
2 to 4 times a week	19(52.8%)	39(50%)	X^2=0.293	0.864
Less than 2-4times\wk	12(33.3%)	25(32.1%)		
Knowledge about side effects				
Acne	13(36.1%)	28(35.9%)		
Sterility	0(0.0%)	9(11.5%)		
Φ Multiple side effects	12(33.3%)	10(12.8%)	X^2=10.08	.018*
No side effects	11(30.6%)	31(39.7%)		

*ΦMultiple side effects (acne, sterility, hair loss, elevated blood pressure), *Significant*

similar finding was reported in a study of Prevalence of anabolic steroid use and associated factors among body-builders in Hamadan, West province of Iran,2014.[15] Knowledge about side effects of anabolic steroids were significantly higher among AAS users (33.3 % of users vs. 12.8% of nonusers mentioned that there are multiple side effects for steroids intake like acne, sterility, hair loss and elevated blood pressure. On the other hand, higher percent of nonusers (39.7%) vs. (30.6%) of steroid users reported that there are no side effects for steroids. Similar results about a lack of knowledge of the health hazards of AAS were detected in a study of knowledge, attitude and practice of anabolic steroids use among gym users in Al-Ain district, United Arab Emirates, 2008(7), as well as (Usman et al.)[(5)] who reported that few body builders were aware of the hazards of AAS use on their health such as hair loss 37 %, acne 21 %, aggression/hypertension 14%, and sterility/infertility 15% while the rest had no idea of the side effects. Also, Hanem et al.,2018[10] who studied the effect of exogenous anabolic androgenic steroids on Testosterone/ Epitestosterone Ratio and its Application on Athlete Biological Passport in Egypt reported that athletes are not aware of many side effects during steroid administration, since several unwanted health effects may be detected only after a thorough medical examination, including blood analysis.

CONCLUSION

The prevalence of anabolic steroids use either alone or in combination with nutrient supplements represented 18% of the study group and 31.6% of total anabolic supplements users. About one third of steroid users were not aware of the possible side effects. Young age and high income showed significant association with anabolic steroids use.

Ethical considerations

Ethical approval was obtained from Medical Research Ethics Committee of Faculty of Medicine, Benha University, Egypt. Written consent was obtained from all participants after explaining the purpose and nature of the study.

Recommendations

There is insufficient data on the prevalence of the use of AAS in Egypt. Therefore, we recommend further studies on this subject. Also, we recommend raising awareness about health hazards of non-medical use of androgenic steroids through mass media, social media, influencers, advertisements, posters & provision of health education programs in cooperation between ministry of health and ministry of youth & sport. Also, the atmosphere in the gym can play an important role in members' decisions. So, educating gym employees and members may have a positive influence on the use of supplements and hormones. Finally, there must be control over the markets and advertisements regarding these

products, with an emphasis on not taking these products except under medical supervision.

Study Limitations

The prevalence of AAS use may be underestimated in this study because it is likely that many participants denied using them or refused to participate in the study even after being assured of confidentiality especially because dispensing hormones without a prescription is considered illegal.

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REFERENCES

1. Allahverdipour, H., Jalilian, F., &Shaghaghi, A. (2012). Vulnerability and the intention to anabolic steroids use among Iranian gym users: An application of the theory of planned behavior. *Substance use & misuse*, *47*(3), 309-317.
2. Morrison, L. J., Gizis, F., & Shorter, B. (2004). Prevalent use of dietary supplements among people who exercise at a commercial gym. International journal of sport nutrition and exercise metabolism, 14(4), 481-492.
3. Shekelle, P. G., Hardy, M. L., Morton, S. C., Maglione, M., Mojica, W. A., Suttorp, M. J., ... &Gagné, J. (2003). Efficacy and safety of ephedra and ephedrine for weight loss and athletic performance: a meta-analysis. Jama, 289(12), 1537-1545.
4. Alsaeed, I., &Alabkal, J. R. (2015). Usage and perceptions of anabolic-androgenic steroids among male fitness centre attendees in Kuwait-a cross-sectional study. Substance abuse treatment, prevention, and policy, 10(1), 1-6.
5. Usman, H. B., Rashid, F., Ayub, H., Ayub, A., Akram, N., Walter, S., & Matin, S. (2015). Knowledge, awareness and practices of harmful effects of anabolic steroids among body builders in Rawalpindi and Islamabad. Pakistan Armed Forces Medical Journal, 65(2), 282-285.
6. Nakhaee, M. R., Pakravan, F., &Nakhaee, N. (2013). Prevalence of use of anabolic steroids by bodybuilders using three methods in a city of Iran. Addiction & health, 5(3-4), 77.
7. Al-Falasi, O., Al-Dahmani, K., Al-Eisaei, K., Al-Ameri, S., Al-Maskari, F., Nagelkerke, N., & Schneider, J. (2008). Knowledge, attitude and practice of anabolic steroids use among gym users in Al-Ain district, United Arab Emirates. Open Sports Med J, 2, 75-81. http://benthamopen.com/ABSTRACT/TOSMJ-2-75.
8. Bahrke, M. S., Yesalis, C. E., & Brower, K. J. (1998). Anabolic-androgenic steroid abuse and performance-enhancing drugs among adolescents. Child and Adolescent Psychiatric Clinics, 7(4), 821-838. http://www.ncbi.nlm.nih.gov/ pubmed/9894044
9. Alhekail, O., Almeshari, A., Alabdulkarim, B., Alkhalifa, M., Almarek, N., Alzuman, O., & Abdo, A. (2018). Prevalence and patterns of the use of protein supplements among gym users in Riyadh, Saudi Arabia. Int J Pharm Res Allied Sci, 7(1), 80-86.
10. Hanem A. Khalil a , Dina M. Abo-Elmatty b , Rosa V. Alemany c , Noha M. Mesbah. Effect of Exogenous Anabolic Androgenic Steroids on Testosterone/ Epitestosterone Ratio and its Application on Athlete Biological Passport in Egypt. Records Of Pharmaceutical And Biomedical Sciences.2018.
11. Al-Harbi, F. F., Gamaleddin, I., Alsubaie, E. G., & Al-Surimi, K. M. (2020). Prevalence and Risk Factors Associated with Anabolic-androgenic Steroid Use: A Cross-sectional Study among Gym Users in Riyadh, Saudi Arabia. Oman medical journal, 35(2), e110.
12. Sepehri, G., Fard, M. M., &Sepehri, E. (2009). Frequency of anabolic steroids abuse in bodybuilder athletes in Kerman city. Addiction & health, 1(1), 25.
13. Alshammari, S. A., AlShowair, M. A., &AlRuhaim, A. (2017). Use of hormones and nutritional supplements among gyms' attendees in Riyadh. Journal of family & community medicine, 24(1), 6.
14. Alharbi, F. F., Gamaleddin, I., Alharbi, S. F., Almodayfer, O., Allohidan, F., Alghobain, M., ... & Al-Surimi, K. (2019). Knowledge, attitudes and use of anabolic-androgenic steroids among male gym users: A community based survey in Riyadh, Saudi Arabia. Saudi Pharmaceutical Journal, 27(2), 254-263.
15. Razavi, Z., Moeini, B., Shafiei, Y., & Bazmamoun, H. (2014). Prevalence of anabolic steroid use and associated factors among bodybuilders in Hamadan, western province of Iran. Journal of research in health sciences, 14(2), 163-166.

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