Original Article

Prevalence and Awareness of Anabolic-Androgenic Steroids Usage Among Gym users in Majmaah, Saudi Arabia

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Abstract

Background and Aim: The use of anabolic- androgenic steroids among athletes and gym users is still prevalent despite the enforcement of regulations and penalties. The hormones are used to enhance muscle mass and performance, but frequent use is associated with various side effects. The objectives of this research were to study the prevalence, use, and level of knowledge of gym users on AAS.

Methods: The study design was ross- sectional. The sample size was 152, including males who used the gym in the last six months. The data was collected by a pre-tested questionnaire after obtaining ethics approval. The SPSS software was employed for data analysis. The chi- square test was used to compare the qualitative data and a p- value of less than 0.05 was considered significant.

Results: The age of most (85.5%) gym users was between 20 and 40 years, and the education level of most of them was university (84.2%). The prevalence of AAS use was 13.2%. The level of knowledge of 62.5% of the AAS users was poor. The advice to use was mostly provided by the gym coaches (75%). The occupation showed a significant relationship with the level of knowledge, the students have the highest level (42.9%) of AAS adequate knowledge.

Conclusion: The prevalence of the use of AAS in Majmaah Saudi Arabia is moderate.

The level of knowledge of AAS among the Gym users is inadequate. The students are the most knowledgeable about AAS. The advice to use AAS is commonly from the Gym coaches.

Keywords: Prevalence, awareness, Anabolic-androgenic steroids

Introduction

Achieving an ideal body is something that most young men aspire to. Many of them opt to use medications as an easy and rapid way to achieve their goals. Fitness enthusiasts are using anabolic steroids more often than ever to gain muscle mass. Most non-professional and non-competitive bodybuilders use drugs without understanding their potential risks. Anabolic steroids, also known as anabolic androgenic steroids (AAS), are testosterone derivatives that have been modified and created to improve their anabolic properties, which include the development and maintenance of primary and secondary sexual characteristics and also increased muscle growth and protein synthesis h

The main function of AAS is to promote anabolic processes in the body all while suppressing the androgenic process. The pharmacokinetics effect involves attachment to the nuclear androgen receptor (AR) in the cytoplasm of cells of skeletal muscles (the target tissue) after which it translocates into the nucleus. The binding causes sequential conformational changes between the steroid, receptor, and nuclear DNA. This in turn causes upregulation of the receptor, so more are exposed to the hormone, and further translation of proteins is carried out [2]. AAS in therapeutic dosage is used to treat an array of illnesses, including reproductive system dysfunction, breast cancer, and anemia. In contrast, AAS can avidly be used by athletes and bodybuilders to increase muscle mass, hence causing dangerous and irreversible side effects. AAS can cause undesirable side effects such as liver damage, increased blood blood pressure and cholesterol levels, infertility, gynecomastia, tremors, renal failure muscle atrophy, and many more [3]. The worst side effects of AAS are on the cardiovascular system causing massive intracardiac thrombosis, myocardial infarction, and sudden cardiac arrest, which is trending to be the most common cause of death among AAS users. This is because AAS initiates cardiac remodeling, which can lead to macroscopically visible hypertrophy, cardiomegaly, and microscopically fibrosis and necrosis. These alterations can together, induce cardiac arrest [4].

AAS are abused for the enhancement of performance and perceived physique boosting which is becoming a future concern; however, comprehension, knowledge, and awareness of the adverse outcomes that AAS can have on health seem to be diversified and potentially limited [5]. AAS consumption has increased in tandem with young male adults' increasing fascination with bodybuilding and fitness [6]. Most bodybuilding organizations have strict laws and policies prohibiting the use of such drugs, but drug tests are rarely performed. More stringent regulations have contributed to a surge of hidden labs producing AAS, and the ability to obtain the substance online has made efforts to restrict procurement simpler. The drugs can be administered orally, intravenously, intramuscularly, or transdermal. The Middle East has the highest prevalence rate of AAS use, accounting for 21.7% of all users[4]. Several studies have been conducted with the intent of estimating the level of awareness of AAS. Approximately 20% of athletes in the United States, 22% of users in the United

Arab Emirates, 13% of Iranian youth body-builders, and 28% of all gym users in Riyadh, KSA used AAS [3].

According to a study, friends and coaches were the primary sources of information in Saudi Arabia, Iraq, Iran, Jordan, Lebanon, Kuwait, the United Arab Emirates, and Pakistan. Gym users obtained the drugs from coaches, online, fitness stores, pharmacists, physicians, and friends [5].

The data are scarce in the Middle East, including Saudi Arabia, on the prevalence, attitude, and knowledge about AAS use among gym athletes but to the best of my knowledge no study was conducted in Majmaah, Saudi Arabia

The objectives of this research were to study the prevalence, use, and awareness of Anabolic-Androgenic Steroids among gym users in Majmaah, Saudi Arabia.

Materials and Methods

Study Design: A cross-sectional, questionnaire-based study was conducted to study the prevalence and awareness of Anabolic-Androgenic Steroid use among gym users in Majmaah, Saudi Arabia.

Study Population: This study involved the registered male members of two gyms in Majmaah city, aged 18 to 50, who have been regularly using the gyms for the past six months. These are the only registered gyms in the city.

Sampling: Simple random sampling was used in this study. The Sample Size was calculated by: using the formula $n = Z^2P(1-P)/d^2$

Z = Standard normal deviation, taking prevalence (P) at 10%, d = error accepted as 0.05.

n= 140

To guard against nonresponse, the sample size was taken as 152.

Data Collection: Data were collected by a pre-tested, self-administered questionnaire. To assess the level of knowledge about AAS, the Likert scale was used, and 14 questions were asked to the respondents. If the respondent answered correctly 10 to 14 questions, he is considered to have a good level of knowledge. If the respondent answered correctly 6 to 9, or less than 6 questions, he will be considered as having average and poor levels of AAS knowledge respectively.

Data Analysis: Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 25 (IBM Corp., Armonk, N.Y., NY). Descriptive statistics such as frequency, and percentage (%) were used to present the data. The chi-square test was used to test the significance of qualitative data. A p-value of less than 0.05 was considered as significant.

Ethical Consideration: The present study protocol was conducted according to the Declaration of Helsinki and approved by the Institutional Review Board of Majmaah University.

Gym users received a briefing on the purpose of the study before the commencement of the survey and were informed of the advantages of participating in the survey not only to themselves but to the community. An informed written consent was obtained from the respondents before enrollment in the survey. Confidentiality of personal data was protected and assured. Each participant

had the right to withdraw from the study at any time.

Results

The majority of male gym users were between 20 and 40 years of age (85.5 %). More than two-thirds of the participants were university graduates (84.2%), 82.2% were single, and 64.5 % were students **(Table 1).**

Table (1) Demographic characteristics of the population

(n=152)

Characteristic	No.	%
Age:		
<20	11	7.2
20-40	07	4.6
40-50	134	88.2
Total	152	100
Education level:		
High	4	2.6
Intermediate	1	0.7
Secondary	19	12.5
University	128	84.2
Marital Status		
Divorced	2	1.3
Married	25	16.5
Single	125	82.2
Occupation		
Students	98	64.5
Government	26	17.1
Private	11	7.2
Others	17	29.1

Table (2) shows the use of anabolic-androgenic steroids. Participants who used anabolic-androgenic steroids were 20 (13.2%). The oral was the main route of administration (70%). The main source for the steroid was online (50%) followed by the Gym coach (25.0%). Advice to use the AAS was coming from the Gym coach (75.0%). The reason behind the use of AAS is to increase muscle size (80.0%). Fourteen (68.6%) of the subjects conduct Regular medical check-ups.

Table (2) The use of anabolic-androgenic steroids

Use	No.	o/o
Use of any kind of hormone:		
No	132	S6.8
Yes	20	13.2
Total	152	100
Route of Intake:		
Oral	14	70.0
Intramuscular	4	20
Transdermal	2	10
Total	20	100
Source:		
Friend	1	6.6
Gym Coach	5	24.5
Gym Store	4	18.9
Online Store	10	50.0
Total	20	100
Who advised you:		
Friend	4	1S.9
Gym Coach	15	74.5
Health Professional	1	06.6
Total	20	100.0
Why do you use it:		
Increase muscle size	16	81.1
Increase muscle strength	3	12.3
Increase endurance	1	6.6
Total	20	100
Regular medical checkups:		
No	6	31.4
Yes	14	6S.6
Total	20	100

Table (3) shows the Knowledge of participants about the effect of anabolic-androgenic steroids. Ninety-four participants (61.8%) were aware that anabolic steroids are being used in body-building. Ninety participants (59.2%) think the gym atmosphere can affect anabolic steroid use decisions. Fifty-nine of the sample (38.8%) believed that AAS can affect the blood pressure. The results showed that 36.2%, 39.5%, and 33.6% of the sample agreed that the use of AAS can affect the heart, the liver, and the kidneys respectively. The effect of AAS on fertility and sexual functions was reported by 42.8% and 38.8% of the respondents respectively.

Table (3): Knowledge of participants about the effect of anabolic-androgenic steroids (AAS)

(n=152)

Item	Correct answer	%
Are you aware that anabolic steroids are being used in body-building?	**94**	**61.S**
Do you think ±e gym atmosphere can affect your anabolic steroid use decision?	**90**	**59.2**
Do you think that if you spend tune at the gym. the hormones will compensate for your little effort	**45**	**29.6**
Are anabolic steroids easily accessible?	**20**	**13.2**
Do you think that anabolic steroid use can affect blood pressure?	**59**	**3S.8**
Do you think that anabolic steroid use can cause certain cancers?	**54**	**35.5**
Do you think that anabolic steroid use can affect cholesterol levels?	**41**	**27.0**
Do you think that anabolic steroid use can stunt growth?	**51**	**33.6**
Do you think ±at anabolic steroid use can cause breast development?	**19**	**12.5**
Do you think that anabolic steroid use can affect the heart?	**55**	**36.2**
Do you think that anabolic steroid use can affect the liver?	**60**	**39.5**
Do you think that anabolic steroid use can affect fertility?	**65**	**42.8**
Do you think that anabolic steroid use can affect sexual function?	**59**	**38.8**
Do you think that anabolic steroid use can affect the kidney"	**51**	**33.6**
Is a medical checkup necessary when you use hormones?	**100**	**65.8**

The overall level of Knowledge of participants about anabolic-androgenic steroids was poor (62,5%), Average 28.3%), and excellent (9.2%) as shown in Fig. (1).

Fig. (3) Knowledge of participants about anabolic-androgenic steroids

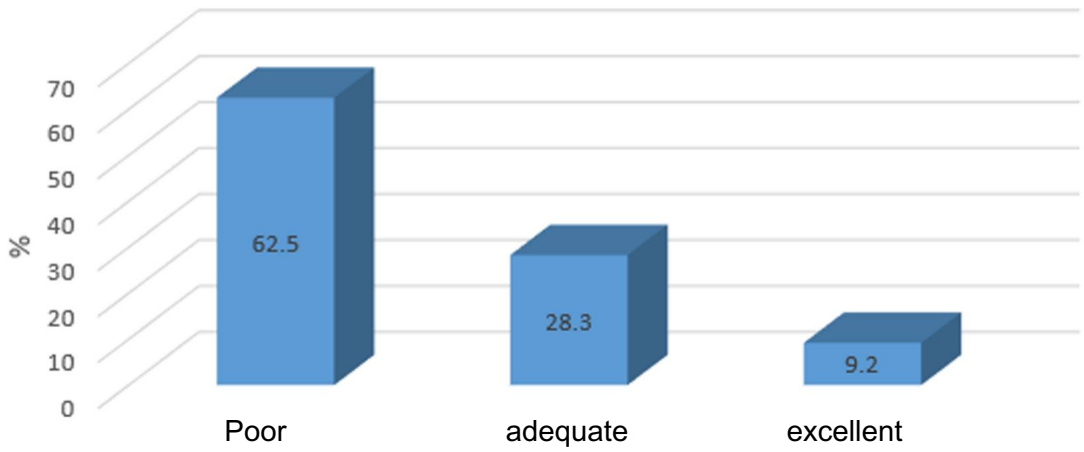

Table (4) shows the association between the knowledge of the participants and their social factors. The participants who were less than 40 years of age and had poor compared to adequate knowledge were 62.2% and 37.8% respectively. For the participants aged 40 years and more, 77.8% and 22.2% had poor and adequate knowledge of AAS respectively. The participants who had Intermediate and Secondary school education and had poor and adequate knowledge of AAS were 80% and 20% respectively. The participants who had University and high education and had poor and adequate knowledge of AAS were 60% and 40% respectively.

The single participants who had poor and adequate knowledge of AAS were 60% and 40% respectively. The married participants who had poor and adequate knowledge of AAS were 74.1% and 35.9% respectively. The students who had poor and adequate knowledge of AAS were 57.1% and 42.9% respectively. The Government employees who had poor and adequate knowledge of AAS were 65.4% and 34.6% respectively. The private employees who had poor and adequate knowledge of AAS were 90.9% and 9.1% respectively.

Table (4) The relationship between knowledge of the participants and their social factors

Sociodemographic factors	Level of knowledge		Total	Chi-square	P-value
	Poor No. (%)	Good (adequate) No. (%)			
Age					
Less than 40	90 (62.1)	55 (37.9)	145(95.4)	1.95	0.16
40 and more	5(71.4)	2 (28.6)	7(4.6)		
Education:					
Intermediate and Secondary	16(80)	04 (20)	20(13.2)	1.948	0.16
UniversiK and high	79 (60)	53 (40)	132 (86.8)		
Marital status					
Single	75 (60)	50 (40)	125 (82.2)	1.231	0.267
Married	20 (74.1)	7 (35.9)	27(17.8)		
Occupation:					
Student	56 (57.1)	42 (42.9)	98 (64.5)		
Government employee	17(65.4)	9 (34.6)	26(17.1)	30.1	< 0.001
Private employee	10 (90.9)	1 (9-1)	H (7-2)		
Others	12 (70.6)	5 (29.4)	17(11.2)		

Discussion

The study assessed the prevalence and awareness of anabolic-androgenic steroids among 152 male gym users from two gym centers in Majmaah, Saudi Arabia. The study reported a 13.2% prevalence of AAS use among males attending gym centers, which is higher than the 9.8% prevalence of a study conducted in Riyadh, Saudi Arabia [7]. The prevalence is a bit lower than the 13.9% reported in Iran and 14.6% in UAE [8,9]. In contrast, other studies showed a higher prevalence of AAS use at 22.7% in UAE and 22.7% in Kuwait [U2]. Higher prevalence of AAS use was found at 23.0% and 21.3% in the Eastern region of Saudi Arabia [6, 10], 54.2% in the Central Region of Saud Arabia, and 24.5% in the western part of Riyadh, Saudi Arabia [n]. This prevalence is also higher than the global prevalence of 6% [13].

The main source of AAS in the present study was online (50%) followed by 25% gym coaches and 20% gym stores. In contrast to the present study, the main sources of AAS were 62.1% and 70.4% in Jordan and, 70.4% in Jordan and Kwait [l,12]. In studies conducted in Saudi Arabia, the main source of AAS was gym trainers and friends (75.2%)[10]. The results show that 70% of the AAS users conduct regular medical check-ups needed to be done when using the AAS. This finding is consistent with a previous study[9].

The reason behind using AAS t is to increase muscle mass in a short period may be a factor in 81.1% of the users. This finding is consistent with other studies [12,14]. The findings of this study show that 75% of the AAS users were advised to use it by a Gym

Coach. This result contradicts another study which showed that 53.5% of users reported that they were advised by friends 14. The route of intake of AAS among the users was oral (70%). These findings are consistent with other studies conducted in Jordan and Saudi Arabia [1,7].

Overall, the knowledge of the AAS among the gym users was poor (62,5%).This finding is in line with a study conducted in Saudi Arabia [15]. In contrast to another study conducted in UAE, the majority of the study population were aware of the anabolic effects of AAS such as increases in muscle size and body build, increases in body weight, and muscle strength. However, only a minority were aware of the health hazards of AAS use such as hepatic dysfunction, gynecomastia, aggression, hypertension, acne, slowing of growth, hypercholesterolemia, malignancy, heart diseases, sexual dysfunction, and infertility [n> 16]. The sociodemographic factors as compared to the level of AAS knowledge reported in the current study, the occupation shows a significant statistical association with the level of AAS knowledge, the students showed the highest level of adequate knowledge compared to the other occupations. Similar results were reported by a previous study [7].

The study concluded that the rate of AAS use among Gym users in Majmaah Saudi Arabia is low (13,2%).The level of awareness about AAS side effects is poor among gym users. The study shows that there is an association between AAS use and occupation, students and employees have the highest level of knowledge compared to others.

Most of the AAS users get the drugs online and the oral route is the most popular for users.

The study recommends raising awareness of the potential risks of Gym users, students can be utilized to raise the awareness. Coaches are discouraged from suggesting the use of these agents to gym users. Further studies about AAS use are highly recommended.

Limitations of the study

The study was conducted at Majmaah city, so results can't be generalized to the population of Saudi Arabia.

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