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Prevalence of Anabolic Steroids Usage among Gym-goers in Mosul City, Iraq

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Abstract:

Background: Anabolic steroids (AAS) are artificial derivatives of testosterone that have been used for improving performance and physical appearance, using these substances is a major concern for public health especially gym-goers, the objective of this study is to assess the prevalence of anabolic steroid use, to identify the types that are used, and the adverse effects of anabolic steroids on the reproductive system.

Method and Material: A cross-sectional study using a self-administered questionnaire was conducted and distribute it on 1375 male gym-goers from 20 different gyms which have been chosen randomly from both sides of Mosul city, from 15th October 2020 to 10th February 2021. Statistical analysis was performed using SPSS software version 26, descriptive statistics computed, independent t-test, and Chi-square test.

Results: Totally, (1375) of gym-goers were studied, (275) of them had a positive history of AAS usage, which represent the prevalence of AAS was (20%) of the gym-goers in Mosul city, the overall mean of the participants age was 26.33±5.782 years, a significantly higher weight, BMI (P. value: 0.000) was reveal among the participants of AAS users in contrast to non-users, that the most used type of AAS was Testosterone Cypionate (Depotest) 400mg, which was used by (25.45%) of gym-goers, 35.64% of the AAS users suffered from erectile dysfunction after cessation of using AAS, and 32.73% suffered from impaired libido.

Conclusion: Anabolic steroid misuse prevalent was high among male's gym-goers attending gyms in Mosul city, Iraq. community health education is required through health promotion programs for gyms-goers about the long-term adverse effects that consequence using AAS.

Keywords: Prevalence, Anabolic Steroids, Gym-goers, and Testosterone.

Introduction:

Anabolic-Androgenic Steroids (AAS) and called Anabolic Steroids is the synthetic, or human-made of chemical which works like endogenous testosterone (Briggs, 2016), that mimics the biological functions of these hormones and replicates their effects on the human body, production of male sexual characteristics, and promoting muscle growth (Anawalt, 2019).

The majority of steroid consumers are not athletes, but looking for a competitive advantage. A dissatisfaction of body and a sense of physical inadequacy, are both contributing factors to the use of anabolic steroids (Moore et al., 2020).

The primary indication for AAS use is to treat male hypogonadism, but athletes have been misusing it as a performance-enhancing drug since the 1950s (Kanayama & Pope Jr, 2018).

Since the physician administers the medication according to the patient's condition and closely monitors its harmful effects, clinical usage of anabolic steroids appears to be secure. Athletes, on the other hand, often use these medications on their own, which can have significant biological and psychosocial consequences (Piacentino et al., 2015).

Oral tablets, injectable steroids, creams/gels for topical application, and skin patches are the four most popular ways of given AAS. The most convenient method is oral administration. Testosterone is quickly absorbed when taken by mouth, but it is largely converted to inactive metabolites, with only about one-sixth remaining in active form (Dahab, 2020).

In the form of enanthate, undecanoate, or cypionate ester, AAS can be administered parenterally and has a more irregular extended absorption period and greater activation in muscle. These derivatives are hydrolyzed at the injection site to release free testosterone; the rate of absorption (and thus the injection schedule) varies by ester, but medical injections are typically performed every six to twelve weeks. To maintain a more stable amount of hormone in the system, a more regular schedule may be preferable (Hallak et al., 2020).

Commons patterns for misusing steroids include cycling (This frequently takes several doses over a period of time, pausing for a period of time, and then resuming), stacking (This allows mixing oral and injectable steroid forms and adding two or three separate steroids), pyramiding (That is, steadily rising the dosage or intensity of steroid misuse until a peak is reached, then gradually weaning off to zero), plateauing (to stop tolerance, alternate, overlap, or substitute with another steroid), However, There is no empirical evidence that any of these practices minimize the drugs' adverse medical effects (El Osta et al., 2016).

Steroids increase muscle mass, but they come with a lot of health risks. Muscle bulge, abdomen ripple, and quads balloon while on the steroids, however, that is just surface effect (Huang & Basaria, 2018). Users of anabolic steroids may be happy with themselves when they flex in the mirror, but they may cause issues on the inside. They will be harmed for the remainder of their lives as a result of these issues. In reality, steroid use has been shown to reduce their lives (Gay, 2009).

Misuse of anabolic steroid may leads to a dangerous, temporarily or permanent, health complications such as liver damage and tumors, kidney problems or failure, high blood pressure, enlarged heart, and blood cholesterol level changes, as well as increase stroke and heart attack risks, even in young people, increased risk of clots formation, and in men especially can cause decreased sperm count, shrinking testicles, development of breasts, baldness, and increased risk of prostate cancer (Hoffman & Ratamess, 2006; Horwitz et al., 2019).

In the United States, AAS misuse has become a major concern, with more than million residents abusing these medications. The lifetime prevalence of AAS use among adolescents has been estimated to range from 1 percent to 5 percent, according to studies (Sagoe et al., 2014). The number of gym goers who use anabolic steroids is increasingly rising in the Middle East. Anabolic steroids were reportedly used by 26 percent of bodybuilders in Jordan, according to recent reports. Anabolic steroid use was reported to be 22 percent among gym users in the United Arab Emirates, and 13 percent among Iranian youths training to be bodybuilders. In Kuwait, AAS is used by 22.7 percent of the general population and 4.2 percent of college students.(Sagoe & Pallesen, 2018).

Method and Materials:

A cross-sectional study was conducted from 15th October 2020 to 10th February 2021 to assess AAS usage prevalence rate. Before answering the questionnaire, all participants were informed about the study. This research included every male gym-goer who was willing to participate, incomplete responses were ruled out. A total of 1375 gym-goers from more than 20 gyms distributed on both the left and right sides of the Tigris River in the city of Mosul.

For data collection, self-administered questionnaire was used, tis questionnaire was distributed to gym-goers, and the questionnaire was clarified, and responses were obtained, with all participants signing an informed written consent form. Almost all of the questions and responses were in Arabic. There were single-response questions and one multiple-response question and it is composed of two parts, part one focused on the demographic information (participant code, age, educational level, marital status, and job status), weight, and height was measured, which we used to compute body mass index (BMI). Part two focused on the type of AAS, the pattern of use, the reasons for abusing AAS and sources of obtaining it, side effects that the players suffered due to the misuse of AAS.

Statistical Analysis:

Statistical analysis of data was done by (SPSS) version 26. A descriptive approach was applied. Mean ± SD, frequency, and percentage were computed. The independent t-test was used for numerical variables and the Chi-square test was used for categorical variables which is normally distributed variables, to compare AAS users with non-users.

Results:

Totally, (1375) of gym-goers were studied, (275) of them had a positive history of AAS usage, which represent the prevalence of AAS was (20%) of the study sample, as shown in table (1), the overall mean and standard deviation of total study sample age was 26.33±5.782 years, height was 171.72±7.737 cm, wight was 84.57±10.172 kg, and BMI was 28.779±3.805 (kg/m^2), all of these variables were a highly significant among the AAS users and non-users, as shown in table (2). Level of educational, job status, and smoking status of the participants shows a highly significant among the AAS users and non-users, as shown in table (3). Figure (1) showed that the most used type of AAS was Testosterone Cypionate (Depotest) 400mg, which was used by (25.45%) of gym-goers, and 35.64% of the AAS users suffered from erectile dysfunction after

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cessation of using AAS, 32.73% suffered from impaired libido or sexual desire, as shown in figure (2).

Table: 1 The overall prevalence of AAS usage among gym-goers.

Total Number of participants	History of AAS usage	
	Positive	Negative
1375	275 (20)*	1100 (80)

Note: AAS: Anabolic androgenic steroids, *Number (percentage).

Table 2: Participant's characteristics

Variable	Total (n=1375)	AAS User (n=275)	AAS Non-user (n=1100)	P. value
Age (years)	26.33±5.782*	25.37±5.264	26.57±5.883	0.003**
Height (cm)	171.72±7.737	169.14±7.022	172.37±7.776	0.000
Weight (kg)	84.57±10.172	74.37±10.090	87.12±8.452	0.000
Body Mass Index (kg/m^2)	28.779±3.805	26.093±3.879	29.450±3.478	0.000

Note: AAS: Anabolic androgenic steroids, *Mean±SD, **Independent t-test.

Table 3: Marital Status, Level of Education, Job Status, and Smoking Status of participants

Variables		Total (n=1375)	AAS User (n=275)	AAS Non-user (n=1100)	P. value
Marital Status	Single	481 (35)*	89 (32.4)	392 (35.6)	0.309**
	Married	894 (65)	186 (67.6)	708 (64.4)	
Level of Education	Primary School	280 (20.4)	90 (32.7)	190 (17.3)	0.000
	Secondary School	349 (25.4)	123 (44.7)	226 (20.5)	
	Institute	424 (30.8)	62 (22.5)	362 (32.9)	
	College	242 (17.6)	0 (0)	242 (22)	
	Postgraduate	80 (5.8)	0 (0)	80 (7.3)	
Job Status	Employed	434 (31.6)	56 (20.4)	378 (34.4)	0.000
	Free-Job	180 (13.1)	35 (12.7)	145 (13.2)	
	Student	540 (39.3)	105 (38.2)	435 (39.5)	
	Unemployed	221 (16.1)	79 (28.7)	142 (12.9)	
Smoking Status	Not Smoker	795 (57.8)	185 (67.3)	610 (55.5)	0.000
	Smoker	580 (42.2)	90 (37.7)	490 (44.5)	

Note: AAS: Anabolic androgenic steroids, *Number (percentage), ****** Chi-squared test

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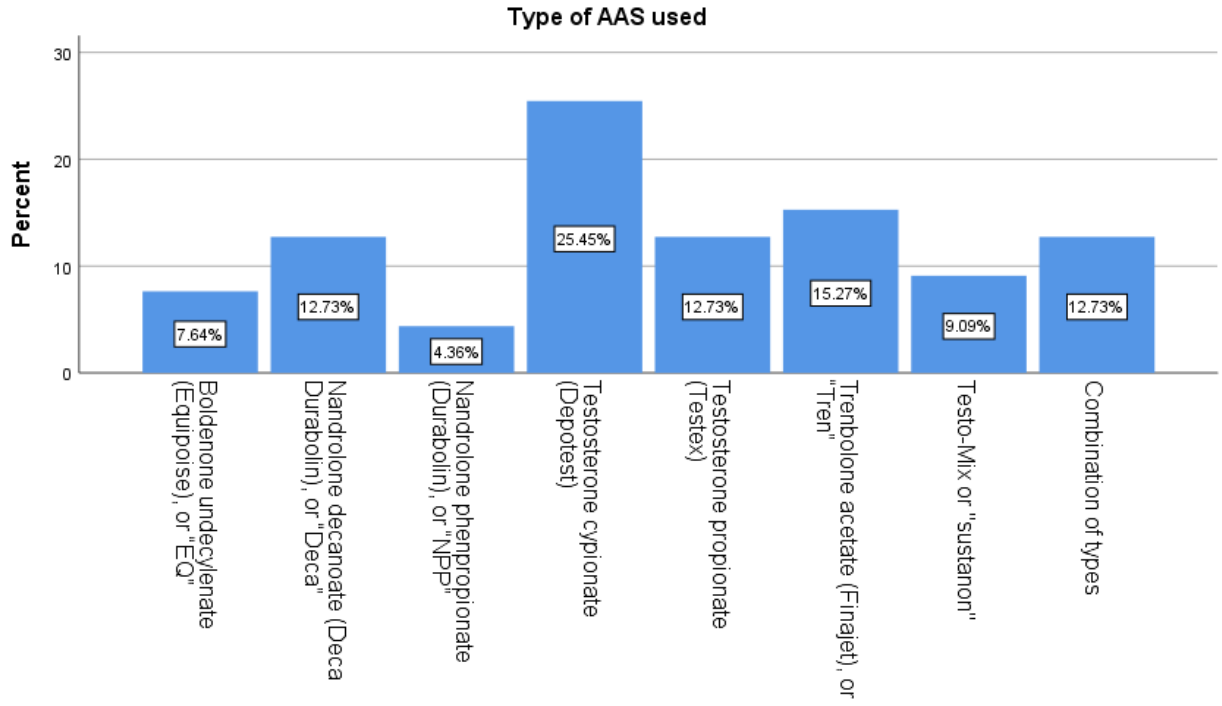

Figure 1

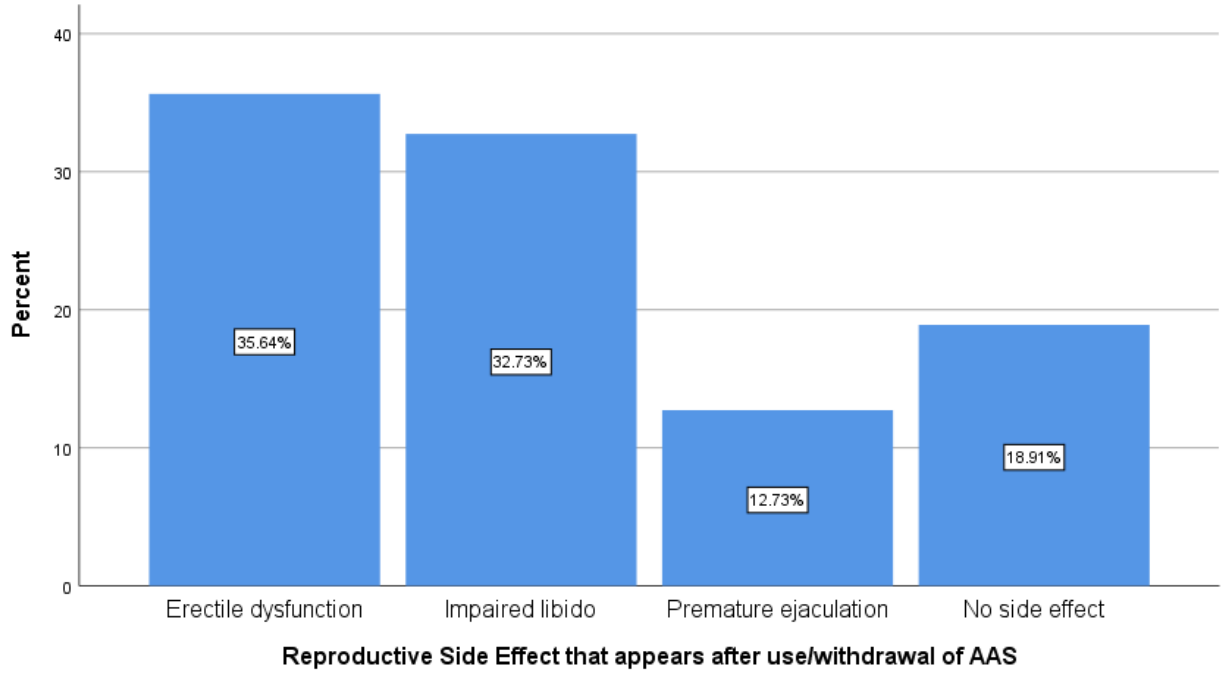

Figure 2

Discussion:

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In this study, table 1 shows that among the (1375) participants, (275) of them had a positive history of AAS usage, which represent the prevalence of AAS was (20%) among gym-goers in Mosul city, The prevalence of AAS misuse in Mosul was higher than the prevalence of AAS use among Iranian bodybuilders, according to our findings when compared to studies conducted in other countries (13 percent) (Saati Asr et al., 2018), Also, AAS use ratio was approximately the same results were seen in related studies conducted in United Arab of Emirates and Kuwait (22 %) (Al-Falasi et al., 2008; Alsaeed & Alabkal, 2015), whereas the prevalence of AAS users in the Saudi Arabia was high as 31 % (Bahri et al., 2017). The use of AAS among gym-goers in Mosul is thought to be widespread. The rivalry among gym users to develop muscles in a short period of time may be one reason, another factor may be the lack of awareness campaigns for gym patrons.

The mean age of participants was 26.33±5.782 (in the range of 19 and 38) year. In total,52.5% of them were 19-23 years of age, 22.5% were 24-28, 15% were 28-33, and 10% were 34-38 years old, A study conducted by (Lafta & Mohammad, 2012) agreed with our study when they found that most of the AAS users ages ranging from (15-24) years old, with an age mean (25.4±6.1), this result can be explained as a difference between the age of interest to use the AAS, which those in the twenties age are usually more interested in their appearance of the body and performance, while those in the mid to late thirties usually don't have the same interests.

Table 4.2 shows the participant's height means was (171.72±7.737) cm, weight mean was (84.57±10.172) kg, and concerning body mass index (BMI) most of the participants were overweight with a mean of (28.779±3.805) kg/m2. A significantly higher weight, BMI (P. value: 0.000), it was discovered that, when comparing AAS users to non-users, agreed our finding the study conducted by (Fijan et al., 2018).

In table 3, the AAS users showed a highly significant difference at (P. <0.01) concerning the level of education (P.=0.000), in which (44.7%) of AAS users have under diploma education level. In contrast, more than half of the non-users AAS have a diploma and above the educational level. This finding may refer to the AAS's awareness and its adverse consequences among the non-users AAS more than the AAS users. Similar data were obtained from another study conducted by(Khullar et al., 2016).

About 57.8 % were non-smoker, and 39.3% of the participants were students, this finding agreed with a study conducted by (Alharbi et al., 2019), and it is highly significant (P. value: 0.000).

Figure 1 shows that some of the AAS users used only one type of injectable testosterone derivatives, while others use different types in each period, while some of them tend to use a mixture of several types. The results showed that the most used type of AAS was Testosterone Cypionate (Depotest) 400mg, which was used by (25.45%) of gym-goers, and (12.73%) used a mixture of several types. While a similar topic study conducted by (Bahri et al., 2017) found that 57.6 % used Nandrolone Decanoate (Deca-Durabolin)100 mg, and the same type was used in the study of (Al-Janabi et al., 2011; Tatem et al., 2020), these results may suggest that both Depotest and Deca-Durabolin are preferred by bodybuilders because they increase the size and number of myofibrils, the basic component of muscle mass, as well as available and easily accessible.

Another study conducted by (Odoardi et al., 2021) reported that the presence of some preparations consisted of a mixture of active ingredients, from more than one compound, instead of the single one declared and named as "Synthol," that used to shape muscles.

Figure 2 shows that 35.64% of the study participants who were taking AAS suffered from erectile dysfunction after cessation of using AAS, 32.73% suffered from impaired libido or sexual desire, and 18.98% has no reproductive side effects, agreed with these results study of (Armstrong et al., 2018) that used the International Index of Erectile Function (IIEF) and reported that (69.4%), mild (22.1%), mild-moderate (5.4%), moderate (1.4%), and severe ED (0.5%) among AAS users, this result can be explained as the over-dependence on AAS interferes with the body's capacity to produce testosterone, which may lead to ED.

Conclusion:

The results of this study provide clear evidence that the prevalence of AAS use is high among male gym-goers in Mosul city. Therefore, there is a strong need for health policy reforms to reduce the rise of AAS use among young adults. Testosterone Cypionate (Depotest) was the most common types of AAS used. One-third of study participant were suffered from erectile dysfunction after cessation of using AAS, and other third of them suffered from impaired libido or sexual desire. Considering the increasing prevalence of AAS misuse, study recommended to health education of community through health promotion programs for gyms-goers about the long-term adverse effects that consequence using AAS, and especially on reproduction health, and the consequences of AAS misuse on gym-goers health.

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