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# Usage and perceptions of anabolic-androgenic steroids among male fitness center - a cross-sectional study

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## ABSTRACT:

**Background:** With the rising popularity of bodybuilding and the increasing prevalence of anabolic androgenic steroid (AAS) use among bodybuilding enthusiasts , there is a need for comprehensive research on the patterns, knowledge, attitudes, and practices related to AAS among the at-risk population. This study aims to investigate the frequency, knowledge, attitudes, and practices of AAS use among male attendees of fitness centers.

**Methods:** A cross-sectional survey employing a self-administered questionnaire was conducted. The questionnaire included demographic information and assessed participants' knowledge of and attitudes towards AAS use. Ten fitness centers across were randomly chosen, and questionnaires were distributed to individuals leaving the centers on randomly selected days and times. A total of 400 questionnaires were distributed.

**Results:** Out of the distributed questionnaires, 194 were returned completed, representing approximately 49% of the sample. Among the respondents, 22.7% reported using AAS. The age group of 19-25 years had the highest proportion (46.8%) of first-time AAS users. Compared to non-users, a majority (70.5%) of AAS users believed that achieving an optimally muscular body necessitates AAS use, while only a small minority (6.8%) expressed concerns about the health risks associated with AAS use. Furthermore, only 18.2% of AAS users demonstrated adequate knowledge regarding the side effects of AAS. Both AAS users and non-users showed limited awareness of the potential side effects of AAS.

**Conclusion:** The prevalence of AAS use is notable among male gym attendees , indicating a potential strain on healthcare services. Effective strategies to address AAS abuse should target attitudinal changes rather than solely focusing on raising awareness of the adverse effects of AAS.

**Keywords:** Sports Medicine, Anabolic Androgenic Steroids, Substance Abuse, Public Health

## INTRODUCTION

Anabolic androgenic steroids (AAS) are synthetic compounds derived from testosterone, primarily known for their strong anabolic effects and weaker androgenic properties. While medically prescribed for conditions involving testosterone deficiency or muscle wasting, they have been widely misused since the 1950s by professional bodybuilders and increasingly by young adults for enhancing physical appearance. However, non-medical use of AAS poses significant health risks, including cardiovascular, hepatic, endocrine, psychosocial, psychiatric disorders, and even mortality. (Al-falasi et al., 2008)

Recent reports indicate that about 20% of athletes in the United States use AAS, with a lifetime prevalence ranging from 1% to 6% in Western countries, primarily among males. In gym settings, the prevalence of AAS use is estimated at around 38%. While data on AAS use in the Middle East and North Africa (MENA)

region are limited, prevalence rates of approximately 22% among gym users in the United Arab Emirates and 13% among Iranian youth training as bodybuilders have been reported. Regarding usage patterns, an internet-based survey found that most users self-administer injectable AAS and experience subjective side effects, with 25% concurrently using AAS, growth hormone, and insulin for anabolic purposes. Similarly, a study of Canadian college students revealed that AAS users often combine various substances like caffeine, painkillers, stimulants, and beta-blockers to enhance performance. (Baker et al., 2006)

Numerous studies have explored the knowledge and attitudes of fitness center attendees toward AAS use. A Danish survey of around 5,000 individuals found that AAS users generally hold more favorable views on AAS compared to non-users across different sports. In Sweden, a study involving approximately 4,000 male adolescents indicated that fewer AAS users perceive AAS as harmful, while more believe that larger muscles are preferred by females. Additionally, AAS users in this study were more likely to frequent gyms, consume alcohol, and use narcotics compared to their peers. Another survey in the United Arab Emirates found that 7% of non-users were considering future AAS use. A recent study reported an AAS use prevalence of 11.8% among gym members, with all users initiating AAS before the age of 20. (Hall, 2005)

Despite the growing popularity of bodybuilding and the increasing trend of AAS use among enthusiasts , there remains a notable gap in scientific research regarding the knowledge, attitudes, and practices related to AAS among the population susceptible to misuse, particularly attendees of fitness centers. This study aims to fill this gap by investigating the knowledge, attitudes, and practices of AAS use among male fitness center attendees . (Kious, 2008).

## METHODS

### Participants:

This study employed a cross-sectional survey targeting male attendees of fitness centers . The selection of fitness centers was random and based on entries from the national telephone directory. Self-administered questionnaires were distributed to individuals leaving each center on randomly selected days and time periods, with variations for each center. A total of 400 questionnaires were distributed, and 194 were returned completed, representing approximately 49% of the sample.

### Measures/Instruments:

The survey questionnaire design was broadly modeled and included sections on demographics, knowledge, attitudes toward, and usage of AAS. The questionnaire comprised 34 closed-type questions, categorized as follows: demographics (n = 3), AAS usage (n = 4), knowledge and attitudes toward AAS (n = 12), AAS practice habits (n = 5), healthy lifestyle (n = 7), and miscellaneous (n = 3). Answer choices were a combination of Likert scale and tick-box types. Upon receiving a completed questionnaire, the investigator checked for missing answers, and participants were prompted to fill in any gaps. One question assessed knowledge about AAS side effects using a list of 11 adverse effects, some related to AAS use and some not. Participants were categorized based on their responses as having 'appropriate knowledge,' 'inadequate knowledge,' or 'some knowledge' about the potential harms of AAS.

### Procedure:

Ethical clearance was obtained from the Ethics Committee . Participation was voluntary, and all participants provided written consent before taking part. Confidentiality of responses was ensured throughout the study.

### Statistical Analysis:

Statistical analysis was performed using the SPSS package (version PASW Statistic 18.0.3). The chi-square test was utilized to assess significant differences among groups.

In our analysis, non-users of AAS were further categorized based on their intentions regarding future AAS use into three groups: 1) non-users with intentions to use AAS, 2) non-users with undetermined intentions regarding AAS use, and 3) non-users with no intentions of using AAS in the future.

## RESULTS

### Usage and Demographics:

The age distribution among users and non-users of Anabolic Androgenic Steroids (AAS) is presented in Table 1. A statistically significant difference in age distribution was observed between users and non-users

($X2 = 7.941$, $df = 4$, $p < 0.05$). The proportion of individuals who reported using AAS ("AAS users") in the sample was 22.7% (Fig. 1). Among responders, the age group with the highest AAS initiation rate was 19–25 years (46.8%), followed by 14–18 years (27.7%), 26–34 years (17%), and >35 years (6.4%). Regarding education, 4.6% of participants had a primary school education, 23.7% had a high school education, 22.2% had an Associate's degree, and 49.5% had a Bachelor's degree or higher. There was no statistically significant difference in education level between AAS users and non-users ($X2 = 1.963$, $df = 3$, $p = 0.58$).

**Attitudes toward AAS:**

A high percentage of AAS users (70.5%) and non-users with intentions to use (67%) agreed that achieving an optimally muscular body requires AAS. This agreement was significantly lower among non-users with no intentions to use (19%) compared to AAS users and non-users with intentions to use ($p < 0.0001$). Non-users with undetermined intentions showed mixed attitudes toward the benefits of AAS on muscular definition (Table 2).

Regarding the perceived harmfulness of AAS, 6.8% of AAS users considered them very harmful, 29.5% believed they were not very harmful, and 56.8% thought they were not harmful if used correctly. Non-users with intentions to use exhibited a similar distribution in their attitudes toward AAS harmfulness ($X2 = 1.507$, $df = 3$, $p = 0.68$). However, non-users with no intentions to use had a significantly different distribution, with 50% considering AAS very harmful ($p < 0.000001$).

**Peer Influence:**

Nearly all AAS users (97.8%) and a majority of non-users with intentions to use (90.5%) personally knew someone using AAS. This percentage was significantly lower among non-users with undetermined intentions (80%) and even lower among non-users with no intentions to use (64.3%) ($p < 0.0001$).

**Reported Reasons for Not Using AAS:**

The primary reason for not using AAS among non-users with no intentions to use was concerns about their harmfulness (58.3%), followed by not feeling the need to use AAS (27.4%). Among all non-users, only 34.1% cited concerns about AAS harmfulness as their primary reason for non-use.

**Motivation to Exercise:**

The primary motivation for attending fitness centers was achieving a muscular body appearance, reported by 81.8% of AAS users, 71.4% of non-users with intentions to use, and 39.3% of non-users with no intentions to use ($p < 0.0001$).

**Practice of AAS Use:**

Both oral and injectable forms of AAS were used at similar frequencies, with a combination of both being the most common practice (42.6%). Additionally, 53.2% of users administered multiple AAS courses consisting of two or more substances.

**Usage of Other Substances:**

AAS users reported the highest frequency of using multiple (≥3) ergogenic aids and supplements (80%), significantly higher than non-users with intentions to use (28.6%) and all non-users (17.3%) ($p < 0.0001$). The frequency of smoking was also higher among AAS users (70.5%) compared to non-users (48.7%) ($p < 0.05$).

**Source of AAS:**

AAS were obtained from various sources, including gym coaches (62.1%), individual suppliers (58.8%), traveling abroad (34.6%), pharmacies or physicians (30.8%), internet orders (25.9%), and friends (24%).

**Knowledge:**

While 59% of AAS users believed they had adequate information about AAS, only 24.7% of non-users shared this belief. Regarding knowledge of AAS side effects, 50% of users had inadequate knowledge, and only 18.2% had appropriate knowledge. There was no significant difference in knowledge between users and non-users ($X2 = 0.561$, $df = 2$, $p = 0.75$).

**Table 1 Age distribution of users and non-users of Anabolic Androgenic Steroids**

| Age (years) | 14 – 19 | 20 – 29 | 30 – 40 | >40 | Total (number) |
|---|---|---|---|---|---|
| AAS users | 9% (4) | 56.8% (25) | 25% (11) | 9% (4) | 44 |
| Non-users | 22% (33) | 59.3% (89) | 16% (24) | 2.6% (4) | 150 |

| | | | | | |
|---|---|---|---|---|---|
| Total | 19% (37) | 58.8% (114) | 18% (35) | 4% (8) | 194 |

**Table 2 Differences amongst participants based on history and intention of using Anabolic Androgenic Steroids**

| **Variable** | **AAS users** | **Non-user With intentions to use** | **With undetermined intentions** | **With no intentions to use** |
|---|---|---|---|---|
| Having an optimally muscular body can only be achieved by using AAS | | | | |
| True | 70.5% | 67% | 34% | 19% |
| False | 25% | 24% | 36% | 51% |
| I don't know | 4.5% | 9% | 30% | 30% |
| Do you personally know an AAS user? | | | | |
| Yes | 99.78% | 90.5% | 80% | 64.3% |
| Is AAS harmful? | | | | |
| Yes, very harmful | 6.8% | 9.5% | 20% | 50% |
| Not very harmful | 29.5% | 42.9% | 33.3% | 14.3% |
| No, not if it was used correctly | 56.8% | 42.9% | 24.4% | 19% |
| I don't know | 6.8% | 4.8% | 22.2% | 16.7% |
| Use many (>3) supplements and aids to achieve his goals in the gym (other than AAS) | | | | |
| Does | 80% | 28.6% | 24.4% | 10.7% |

## DISCUSSION

This study delved into the prevalence, knowledge levels, attitudes, and behaviors concerning Anabolic Androgenic Steroid (AAS) use among male attendees of fitness centers . The observed frequency of AAS users at 22.7% was higher than previously reported in studies but somewhat lower than findings from other regions. The most common age range for initial AAS usage was 19–25 years, aligning with trends seen elsewhere in the Middle East and North Africa (MENA) region. (Mohammad, 2014)

Interestingly, educational levels did not significantly influence AAS use, indicating that education alone may not deter individuals from using AAS. Beliefs about AAS necessity for optimal muscle gain and personal acquaintance with AAS users were linked to actual AAS use or intentions to use. Users and those intending to use AAS were more inclined to perceive the benefits of AAS as outweighing the risks, consistent with broader patterns seen among gym-goers and athletes. (Nilsson et al., 2004)

Among non-users, the primary reason for avoiding AAS was not primarily due to concerns about health risks; rather, many felt they didn't need AAS to achieve their fitness goals. This insight is crucial for strategies aimed at curbing AAS misuse, suggesting that addressing misconceptions about AAS dangers may not be the most effective approach. (Nojoomi & Behravan, 2005)

The study also highlighted a strong association between AAS use and the use of other substances, including supplements and smoking, indicative of a broader pattern of risk-taking behavior among AAS users. (Parkinson & Evans, 2006)

Notably, despite significant legal restrictions on AAS, a considerable percentage of users sourced AAS from gym coaches and even pharmacies or physicians, indicating potential gaps in regulatory control and healthcare provider awareness of AAS risks. This poses challenges for healthcare systems, especially given the high rates of combined substance use among AAS users. (Santos et al., 2011)

The study's limitations included self-selection bias among participants due to the length of the questionnaire, limiting the generalizability of the findings. However, the analysis incorporating participants' intentions regarding future AAS use provided valuable insights into the interplay of attitudes, beliefs, and behaviors surrounding AAS use in fitness center attendees. (Singhammer, 2013)

## CONCLUSION

In conclusion, while attitudes and beliefs regarding AAS effects and risks differed significantly between users and non-users, intentions to use AAS were closely aligned with actual AAS users' attitudes. This suggests that addressing misconceptions and peer influences may be key to interventions aimed at reducing AAS misuse.

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