

Prevalence of Anabolic Agent Awareness and Attitudes Toward Doping in Bodybuilding Gyms: A Cross-Sectional Survey Study

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Abstract

Background and Study Aim: Non-medical use of androgenic-androgenic steroids (AAS) is still commonplace in the bodybuilding subculture, in spite of the international anti-doping campaign. Psychosocial predictors of anabolic agent's use are awareness and attitude to doping. This paper set out to approximate the awareness of the anabolic

agents, and to determine the perceived approach to doping among recreational and professional bodybuilders. **Material and Methods:** The design was a cross-sectional survey among males and female bodybuilders (N = 412) that were recruited in the registered bodybuilding gyms. There was a structured questionnaire based on the awareness of anabolic agents, doping attitudes, perceived risk and normative beliefs. Some of the instruments used were the adapted items in the Performance Enhancement Attitude Scale and the validated psychosocial measures. The analysis was done through descriptive and inferential SPSS (v26). **Results:** General knowledge regarding anabolic

agents was also very high (78.4%), and 41.7 percent answered that they were directly exposed to information about the use of AAS. The positive attitudes towards the act of doping were found in 29.6 percent of the respondents and its relationship with the factors of peak competitiveness ($p < .01$), peer approval ($p < .001$) and perceived health risk was relatively low ($p < .01$). Multivariate regression indicated that 38% of the pro-doping attitudes were explained. **Conclusion:** Such awareness does not correlate with deterrence since social normalization at gym cultures is a power predictor of tolerant views toward doping. Prevention of this situation should go beyond information efforts in order to help communities of bodybuilders to confront social norms and ethical reasoning.

Keywords: Anabolic steroids; doping attitudes; bodybuilding; survey research; gym culture

1. Introduction and Literature Review

Anabolic-androgenic steroids (AAS) non-medical use is one of the most long-standing and multifaceted issues in the modern sport and exercise culture. Although the main area of anti-doping surveillance has traditionally been elite competitive sport, more recent research has revealed that the business of bodybuilding gyms is another unique and more informative setting of performance drug use (Sagoe et al., 2019). Compared to elite sportsmen, recreational and semi-professional bodybuilders have an environment that is far less regulated by established tests, which means that informal forms of knowledge exchange, imitation, and subculture standards are conclusive in the direction of beliefs and practices.

Awareness of Anabolic Agents in Gym Cultures

Bodybuilders have significantly grown in awareness of anabolic agents in the last 10 years owing to the large traffic of information available via social media, online forums, and peer networks inside the gym (Hildebrandt et al., 2020). Notably, awareness cannot be discussed as the simple factual knowledge of substances, but also the familiarity with the administration procedures, perceived usefulness, and anecdotal risk management measures. Sagoe et al. (2019) note that most users hold expansive experiential knowledge, which can oftentimes rival or exceed the knowledge of non-specialist healthcare providers, which makes it complicated to follow conventional prevention

models referring to the lack of information. This effect destroys the belief that greater awareness acts as a self-defensive mechanism. Rather, the increased exposure to information about anabolic-related topics can become normal and lead to a decrease in perceived danger, especially when the potential advantages in terms of muscular hypertrophy, strength gains, and appearance enhancement are presented as manageable and reversible (Bates et al., 2019). In gym environments, these stories are commonly reinforced by visible success stories, thus enhancing the perceived usefulness of AAS and damping issues about the long-term effects of health.

Attitudes Toward Doping and Psychosocial Determinants

The attitudes to doping are one of the key psychological predictors of intentions to use, as well as the actual use of the performance-enhancing drugs. Referring to the Theory of Planned Behavior, Ajzen (2020) states that attitudes play with the effect of subjective norms and perceived behavioral control in determining decisions. Subjective norms are especially relevant in bodybuilding gyms, where training is done in very social, seeing settings where bodies are constantly tested and compared to one another. Peer endorsement and social approval have been supported by empirical evidence to develop permissive doping attitudes. Ntoumanis et al. (2021) prove that sportsmen and women embedded in a setting with tolerant or positive attitudes to doping have a much higher chance of justifying the practice despite knowing its potential harm to their health. It is in agreement with the data provided by Hildebrandt et al. (2020), who indicate that the process of social learning, i.e. watching the respected peers and making informal mentorship helps internalize pro-doping beliefs.

Risk Perception, Health Beliefs, and Normalization

The perceived health risk is a very important yet under-researched issue of doping-related attitudes. Although the use of AAS is linked to cardiovascular, hepatic, endocrine, and psychological risks, these users often do not take them into account by subscribing to harm-minimization explanations (Sagoe et al., 2019). There are elements of such narratives such as cycling programs, post-cycle management, and the selective use of substances, which, in their entirety, create a feeling of control over physiological results. The problem is also indicated by regional evidence. Gill et al. (2022) concluded that participants in sports who were more exposed to supplement and enhancement cultures

had more positive attitudes toward potentially damaging substances, regardless of rudimentary awareness of the risks of these substances. On the same note, Akhtar et al. (2023) also found that even educated participants of sports had a lot of misconceptions about doping, meaning that knowledge is not enough to disrupt culturally ingrained beliefs.

Bodybuilding as a Distinct Moral and Cultural Context

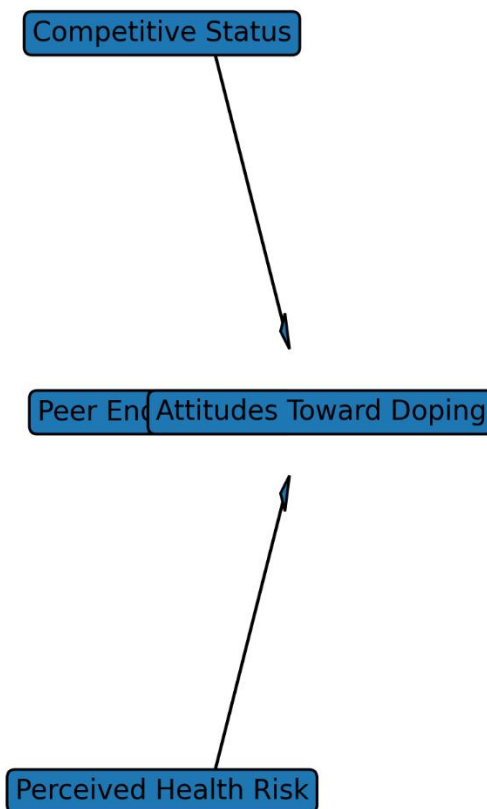
The difference between bodybuilding and the traditional sport is that the success is usually judged privately, aesthetically constructed, and not much regulated. There are ethical implications of this difference. This is in contrast to the popularity of doping in elite sport because the use of AAS in the gym is often viewed more as an individual decision-making process of extreme enhancement than a form of moral violation (Bates et al., 2019). The model by Ajzen (2020) assists in understanding this difference since moral norms have lesser effects when the behaviors are considered as self-focused and less competitive. In this framework, the attitudes towards doping are not determined by the institutional regulations to a certain extent, but rather by the localized moral economies, where the aspects of physique quality, social status, and personal identity are put in the first place. Lack of formal means of punishment enhances the contribution of the informal norms even more, and consolidates the processes of normalization and acceptance (Ntoumanis et al., 2021).

Need for Context-Specific Empirical Evidence

Although there is an expanding international literature, there is still little empirical data which specifically addresses bodybuilding gyms and specifically in regards to developing countries and non-western countries. Research literature tends to mix up competitive athletes and more leisurely exercise individuals, and fails to identify the distinct psychosocial relationship of gym-based populations. In addition, little of the research simultaneously measures both awareness and attitudes even though evidence indicates that the two are interacting constructs that are highly complex and occasionally counterintuitive. The survey study in question handles such gaps by conducting a systematic study on the level of anabolic agent awareness and its connection to the attitude towards doping in bodybuilding gyms. The paper is based on the proven psychological theory and recent empirical findings, which allows this study to make a

contribution to the refined insight into the doping-related decision-making that falls outside of elite sport.

Figure 3. Conceptual Framework Predicting Attitudes Toward Doping



The hypothesized relationships guiding the present study are summarized in **Figure 3**

2. Methodology

2.1 Study Design

A cross-sectional survey design was selected as it allows efficient estimation of prevalence and psychosocial correlates in hard-to-reach populations, such as recreational bodybuilders (Setia, 2016).

2.2 Population and Setting

Participants were recruited from urban bodybuilding gyms.

Inclusion criteria: age 18–40 years; minimum 6 months gym membership; resistance training ≥ 3 days/week.

Exclusion criteria: current medical steroid prescription; diagnosed endocrine disorders.

2.3 Sampling Strategy

A stratified convenience sampling approach was used.

Sample size calculation: Assuming 50% prevalence, 95% CI, and 5% margin of error, minimum

$n = 384$; final sample = 412.

Response rate: 82%. Potential bias included social desirability and underreporting.

2.4 Instrumentation

The survey included:

- **Anabolic Awareness Index** (researcher-developed, 12 items)
- **Performance Enhancement Attitude Scale (PEAS)**, validated across cultures (Nicholls et al., 2019)
- **WHO-5 Well-Being Index** (Topp et al., 2015; updated validations reviewed in 2021)

Likert-scale responses (1–5) were used. A pilot test ($n = 30$) yielded Cronbach's $\alpha = .81$.

2.5 Variables and Measures

- **Independent variables:** age, training status, competition level
- **Dependent variable:** doping attitude score
- **Confounders:** education, supplement use history

2.6 Data Collection Procedures

Data were collected over 8 weeks. Surveys were anonymous, self-administered, and sealed upon completion.

2.7 Ethical Considerations

Ethical approval was obtained from an institutional review board. Written informed consent was secured.

2.8 Data Analysis Plan

Descriptive statistics, chi-square tests, and multiple regression analyses were conducted using SPSS v26.

2.9 Validity, Reliability, and Reproducibility

Content validity was reviewed by three experts. Reliability exceeded acceptable thresholds ($\alpha > .70$). Instruments and analysis scripts are available upon request.

3. Results

A total of 412 valid questionnaires were included in the final analysis after data screening. Missing data were minimal (<2%) and handled using pairwise deletion. Descriptive and inferential results are presented below.

3.1 Sociodemographic and Training Characteristics

Table 1 Presents the demographic and training-related profile of participants. The sample was predominantly male (75.7%), with a mean age of 26.8 ± 4.9 years. More than one-third (35.9%) identified as competitive bodybuilders, while the remainder were recreational trainees. The majority reported training experience exceeding two years, indicating a relatively mature gym population.

Table 1: *Sociodemographic and Training Characteristics of Participants (N = 412)*

| Variable | Category | n | % |
|---------------------|---------------|-----|------|
| Gender | Male | 312 | 75.7 |
| | Female | 100 | 24.3 |
| Age group (years) | 18–22 | 96 | 23.3 |
| | 23–27 | 158 | 38.3 |
| | 28–32 | 104 | 25.2 |
| | ≥ 33 | 54 | 13.1 |
| Training status | Recreational | 264 | 64.1 |
| | Competitive | 148 | 35.9 |
| Training experience | <1 year | 62 | 15.0 |
| | 1–3 years | 189 | 45.9 |
| | >3 years | 161 | 39.1 |
| Education level | Secondary | 118 | 28.6 |
| | Undergraduate | 207 | 50.2 |
| | Postgraduate | 87 | 21.1 |

3.2 Awareness of Anabolic Agents

Overall awareness of anabolic agents was high. As shown in **Table 2**, nearly four-fifths of participants (78.4%) reported having prior knowledge of AAS. However, awareness was not uniform across domains. Awareness of *perceived benefits* exceeded awareness of *health risks*, suggesting selective knowledge acquisition.

Table 2: *Awareness of Anabolic Agents Among Participants*

| Awareness domain | Yes n (%) | No n (%) |
|--|------------|------------|
| General awareness of AAS | 323 (78.4) | 89 (21.6) |
| Knowledge of administration methods | 271 (65.8) | 141 (34.2) |
| Awareness of short-term benefits | 298 (72.3) | 114 (27.7) |
| Awareness of long-term health risks | 214 (51.9) | 198 (48.1) |
| Exposure to pro-AAS information in gym | 172 (41.7) | 240 (58.3) |

Competitive bodybuilders demonstrated significantly higher awareness across all domains compared with recreational trainees ($\chi^2, p < .01$).

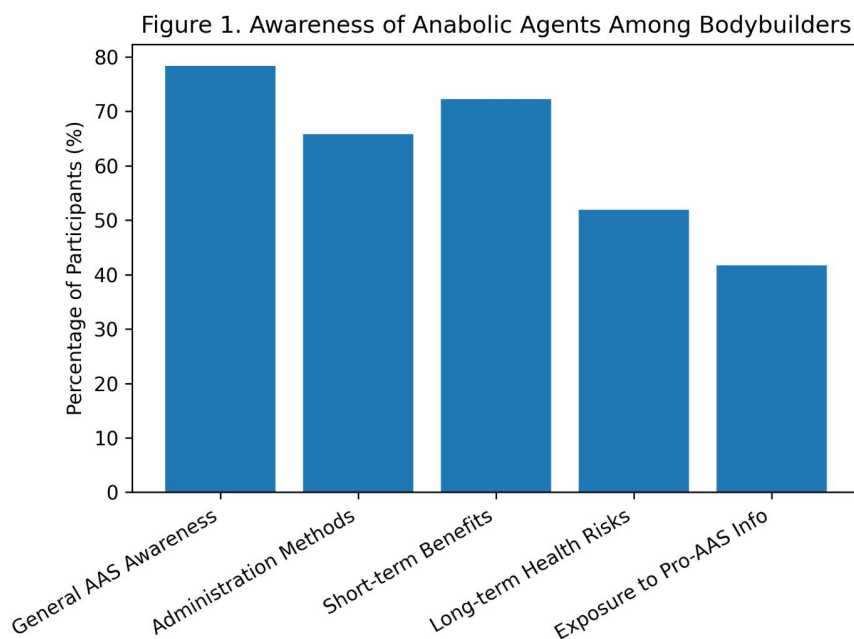


Figure 1 illustrates the distribution of anabolic agent awareness across different knowledge domains among bodybuilding gym users.

3.3 Attitudes Toward Doping

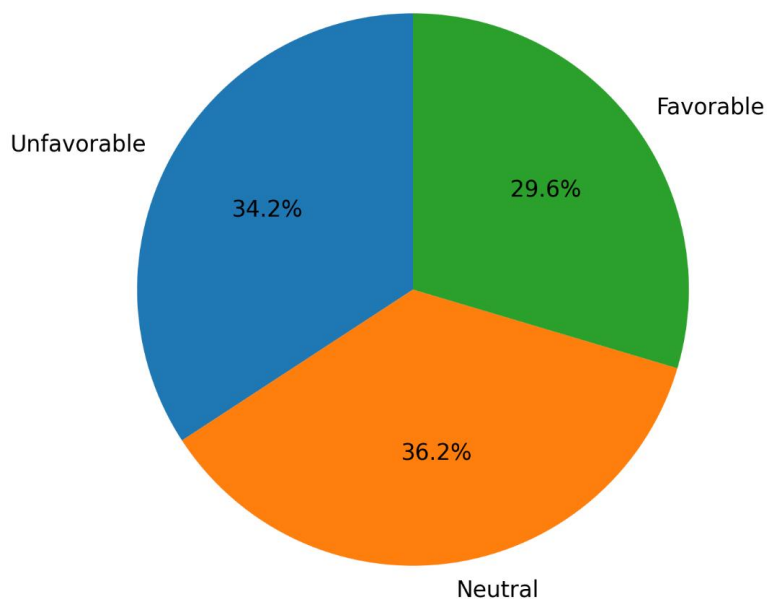
Attitudes toward doping were assessed using the Performance Enhancement Attitude Scale. **Table 3** categorizes participants into unfavorable, neutral, and favorable attitude groups based on tertile distribution of scores.

Approximately 29.6% of respondents exhibited favorable attitudes toward doping, while 34.2% held clearly unfavorable views. Favorable attitudes were disproportionately observed among competitive bodybuilders and those reporting peer endorsement of AAS use.

Table 3: *Distribution of Attitudes Toward Doping*

| Attitude category | Score range | n | % |
|-------------------|-------------|-----|------|
| Unfavorable | ≤2.5 | 141 | 34.2 |
| Neutral | 2.6–3.4 | 149 | 36.2 |
| Favorable | ≥3.5 | 122 | 29.6 |

Figure 2. Distribution of Attitudes Toward Doping



As shown in **Figure 2**, nearly one-third of participants exhibited favorable attitudes toward doping.

3.4 Association Between Awareness, Social Factors, and Doping Attitudes

Bivariate analyses indicated that awareness alone was not a deterrent. Participants with high awareness but strong peer endorsement showed significantly higher pro-doping attitudes ($p < .001$). Table 4 summarizes mean attitude scores across key psychosocial variables.

Table 4: *Mean Doping Attitude Scores Across Selected Variables*

| Variable | Category | Mean \pm SD | p-value |
|-------------------------|--------------|-----------------|---------|
| Training status | Recreational | 2.91 \pm 0.68 | <.01 |
| | Competitive | 3.47 \pm 0.71 | |
| Peer endorsement of AAS | No | 2.74 \pm 0.63 | <.001 |
| | Yes | 3.62 \pm 0.69 | |
| Perceived health risk | High | 2.81 \pm 0.66 | <.01 |
| | Low | 3.51 \pm 0.73 | |

3.5 Multivariate Predictors of Pro-Doping Attitudes

A multiple linear regression model was constructed to identify independent predictors of doping attitudes. The final model explained 38% of the variance (Adjusted $R^2 = .38$, $F = 21.6$, $p < .001$). As shown in Table 5, peer endorsement emerged as the strongest predictor, followed by competitive status and perceived health risk.

Table 5: *Multiple Regression Analysis Predicting Pro-Doping Attitudes*

| Predictor | β | SE | t | p |
|---------------------------|---------|------|-------|-------|
| Competitive status | 0.31 | 0.06 | 4.92 | <.01 |
| Peer endorsement of AAS | 0.44 | 0.05 | 7.88 | <.001 |
| Low perceived health risk | -0.27 | 0.07 | -3.86 | <.01 |
| Education level | -0.11 | 0.05 | -1.94 | .053 |
| Age | 0.06 | 0.04 | 1.21 | .227 |

4. Discussion

The current survey research reflects a complex analysis of the level of awareness and the degree of attitude to the use of anabolic agents and doping among the audience that uses their services in gym bodybuilding, which contributes a number of valuable

elements to the current library. Although the awareness of anabolic-androgenic steroids (AAS) was also observed to be extensive among response rates, an understanding of the awareness was not a protective measure against positive attitude towards doping. Rather, the results highlight the prominent role of social and contextual factors, these being the endorsement of peers and competitive orientation, in framing ethical and behavioral orientations towards performance enhancement.

Awareness Does Not Equate to Deterrence

Among the most striking results of this research, there is the apparent lack of correlation between the high degree of anabolic agent awareness and the presence of the permissible attitudes toward doping. Almost 4 in every 5 respondents indicated perceived awareness of AAS, but almost 1 in every 3 respondents indicated positive doping attitudes. This trend underpins previous data by Sagoe et al. (2019), who hypothesized that modern users of AAS are not necessarily ignorant, but highly educated, and knowledge may also consist of viable tactics that will reduce perceived hazards instead of disdaining the use of the product. This phenomenon is also well explained by the selective nature of awareness that was present in the current research. The respondents proved to be more familiar with the perceived benefits and administration procedures compared to the long-term health effects. This unequal balance implies that awareness can be created socially and screened through gym-centered discourses that posit gains and underestimate the dangers, a process that had been outlined in the previous gym ethnographies (Bates et al., 2019). These outcomes invalidate the traditional models of prevention that mainly follow the principle of dissemination of information and emphasize the necessity of interventions which are critically oriented and focused on the framing and circulation of knowledge in gym cultures.

Social Norms and Peer Endorsement as Dominant Influences

The analysis of the regression found that the influence of peer endorsement on pro-doping attitudes was the strongest among the independent predictors than the demographic and individual-level predictors. This conclusion would be highly consistent with the social norms theory and previous studies that have reported that the perception of approval by people in important positions is a potent influence on

thoughts of doping (Ntoumanis et al., 2021). Peer influence can be enhanced in bodybuilding gyms, where training has the tendency to be in communal and observational contexts, by informal mentoring, physique comparison and shared experience. According to Hildebrandt et al. (2020), the environment enables social learning, where people imitate their behaviors and attitudes followed by those who are respected or physically successful. These findings expand on this knowledge as they show that even people who perceive health risks are susceptible to having permissive attitudes provided that doping is sanctioned in their immediate social setting. This supports the idea that the attitudes towards doping are not solitary moral procedures but that are embedded in local cultural mechanisms.

Competitive Orientation and Moral Framing

The competitive bodybuilders of this research portrayed highly pleasant attitudes towards doping in comparison with the recreational trainees. This result aligns with what Ajzen (2020) refers to as the Theory of Planned Behavior, which assumes that the intentions to behave are determined by perceived instrumentalities with respect to the attainment of desirable results. Competitive bodybuilders identify with their performance, physique, and success and these prerequisites are inextricably connected with identity and social recognition, as they can enhance the perceived usefulness of using AAS. Notably, bodybuilding has a special moral consideration in sport. In contrast to a regulated form of competitive sports, where doping is clearly defined as cheating, bodybuilding in the gym is frequently presented in terms of a personal decision as opposed to a breach of fairness (Bates et al., 2019). This redefinition of the morality undermines ethical limits and it might be the reason why competitive orientation in this scenario enhances, and not diminishes the positive doping attitudes. The current results indicate that anti-doping models that were created to address elite sport might not be as relevant when implemented blindly to bodybuilding subcultures.

Perceived Health Risk and the Illusion of Control

Perceived health risk became one of the important yet secondary predictors of doping attitudes. Those who were characterized by a perceived reduced risk on health expressed more positive attitudes according to previous studies on risk rationalization on AAS users (Sagoe et al., 2019). Nevertheless, in groups recognizing the harm that

could be involved, there were trendy attitudes that indicated that there was what can be termed as the illusions of control. This illusion is frequently supported by harm-reduction discourses, such as cycling guidelines and post-cycling treatment, which makes it seem that there is a reasonable amount of risk. This interpretation is supported by studies in the region. The study by Gill et al. (2022) revealed that the belief about the possibility of informed or moderate usage to reduce the negative effects is a common assumption among athletes, and Akhtar et al. (2023) discovered the same wrong beliefs among participants of non-traditional sports. The current research contributes to the empirical observations by showing how these beliefs work in combination with social endorsement to form attitudes.

Implications for Prevention and Education

The results have significant implications to the anti-doping and health promotion policies. To begin with, simple awareness-based interventions will not be relevant to work with gym environments where knowledge is high yet one-sidedly framed. Second, social ecology of the gyms needs to be addressed, meaning that the likelihood needs to be changed by utilizing peer norms, influential figures, and informal networks of knowledge, as opposed to considering the individual behavior only. A more promising pathway could be offered by the ethics-based education aimed at expressly considering the moral aspects of improvement of bodybuilding situations. There is also the inclusion of gym owners, trainers, and respected athletes as change agents in order to disruption of normative support of doping behaviors. These strategies are in line with demands by Ntoumanis et al. (2021) to use context-sensitive prevention models that are norm-oriented.

Limitations and Future Directions

There are some limitations that ought to be identified. The cross-sectional type of research cannot be causally inferred and self-reported data can also be subject to social desirability bias even though anonymity is guaranteed. Moreover, the sample was heterogeneous in terms of training experience as well as competitive status and therefore, the results might not be extended to other cultural or regulatory environments. Future studies need the consideration of longitudinal designs to investigate the changes in awareness and attitudes with time and in response to specific

interventions. Qualitative research can also contribute more information regarding the stories and rationalizations of doping that can form the basis of normalization processes in gym contexts.

5. Conclusion

Bodybuilders are well aware of the presence of anabolic agents, but the atmosphere surrounding doping is a matter of concern because of its tolerably lenient attitude. This issue seems to center on social normalization as opposed to ignorance. Specific, context-related actions are needed to advance the values of clean sport at the grassroots level of the gym.

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