

Why Fear Fails: Limitations of Alarmist Tactics and Humanized Approaches in the Prevention and Treatment of Anabolic-Androgenic Steroid Abuse

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Abstract

The non-therapeutic use of anabolic-androgenic steroids (AAS) has increased across various population groups, particularly among young men and gym attendees, constituting a growing public health challenge. Despite the widespread adoption of fear-based and punitive campaigns, evidence demonstrates that such strategies are ineffective in reducing use and may produce adverse effects. Alarmist messages frequently increase stigma, reinforce user isolation, and reduce the likelihood of seeking medical follow-up. This article critically analyzes the limitations of fear-based tactics by reviewing experimental studies, qualitative research, and systematic reviews on the topic. The findings indicate that fear, by failing to strengthen perceived self-efficacy or promote a sense of personal control, does not effectively modify beliefs or behaviors. In contrast, balanced educational interventions that integrate

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information about risks and benefits, decision-making skills, and harm reduction strategies show better outcomes in prevention and therapeutic engagement. Programs such as ATLAS and ATHENA have demonstrated sustained effectiveness by promoting critical thinking and individual responsibility. Medical training represents another fundamental element: the lack of specific education in pharmacology and human behavior, combined with institutional censorship, hinders empathetic and evidence-based approaches. It is concluded that addressing AAS use requires abandoning the moralizing paradigm and adopting policies grounded in science, education, empathy, and continuous care.

Keywords: Anabolic agents, health education, health behavior, harm reduction, physician–patient relationships.

Introduction

The non-therapeutic use of anabolic-androgenic steroids (AAS) is an expanding global phenomenon, extending beyond professional sports and reaching gyms and recreational settings, where the estimated prevalence ranges from 1% to 5% among adult men, with even higher rates observed among resistance training practitioners (1). The pursuit of aesthetic improvement, physical performance enhancement, and a subjective sense of well-being are the primary motivations reported (2,3). Although cardiovascular, endocrine, and neuropsychiatric adverse effects are widely recognized (4), traditional prevention and educational strategies on the topic show limited effectiveness (5).

Since the 1980s, prevention policies have predominantly adopted fear-based approaches, known as “scare tactics,” emphasizing severe risks such as infertility, hepatotoxicity, or sudden death. However, Rogol and Yesalis (1992) had already warned that such campaigns lacked scientific grounding and were incapable of altering behavior because they exaggerated risks and disregarded users’ actual motivations (4). The classic study by Goldberg et al. (1991) confirmed this limitation by comparing an intervention focused solely on risks with a more balanced approach that discussed both adverse effects and the motivations leading to use. Only the latter achieved significant gains in knowledge and critical awareness (6). In the following decades, structured programs such as Adolescents Training and Learning to Avoid Steroids (ATLAS) and Athletes Targeting Healthy Exercise and Nutrition Alternatives (ATHENA) demonstrated greater effectiveness by integrating scientific education, promotion of healthy behaviors, and strengthening of self-efficacy (the individual’s belief in their own ability to organize and execute the actions necessary to achieve specific outcomes; that is, it refers to the individual’s confidence in attaining their physical or aesthetic goals without resorting to drug use) (7,8).

Literature reviews reinforce that messages based solely on fear fail to modify attitudes and may generate psychological reactance, that is, resistance and distrust toward institutional sources (5). Petróczi et al. (2014) demonstrated that the perception of severity and vulnerability is insufficient to reduce the intention to use when the message lacks credibility or does not engage with the social context of the target audience (5). Effective prevention therefore requires multifactorial approaches that consider health beliefs, self-efficacy, and peer influence (the pursuit of belonging and social approval) (9). Moreover, stigma and the criminalization of AAS use distance users from healthcare services and reduce access to harm reduction strategies (2,3,10). In contrast, clinical interventions centered on welcoming attitudes, pragmatic education, and laboratory monitoring show greater adherence and enable gradual and safe reduction of use (1).

Recent qualitative research indicates that most users obtain information through peer networks or online forums, where empirical and, at times, risky recommendations predominate (2,3,10). Vinther (2022) summarizes the contemporary challenge by stating that “AAS are so effective” that simple warnings cannot compete with users’ empirical experience (11). Thus, modern prevention must abandon alarmism and adopt communication grounded in evidence, recognizing both the physiological effects and the psychosocial factors that sustain use. Reassessing the topic in light of evidence-based medicine is essential to restoring the credibility of the scientific message and developing more effective and humanized health policies.

Effectiveness of Fear-Based Tactics

Since the 1980s, educational campaigns and public policies aimed at preventing AAS use have predominantly adopted fear-based approaches, focusing on severe consequences such as hepatotoxicity, infertility, and sudden death (4,6). These interventions are based on the assumption that repeated exposure to alarmist information would be sufficient to discourage risk behavior. However, evidence accumulated over more than three decades demonstrates that fear-based tactics do not produce sustained changes in knowledge, attitudes, or behavior among adolescents and young athletes (5–8).

The controlled trial conducted by Goldberg et al. (1991) was the first to empirically test the effectiveness of this type of approach. The authors compared an educational intervention focused exclusively on risks with another that presented, in a balanced manner, risks, perceived benefits, and ethical aspects of sports performance (6). The results showed that only the balanced intervention promoted a significant increase in knowledge and critical understanding of adverse effects, whereas isolated exposure to

negative messages had no statistically significant impact on intentions to use. These findings initiated a body of evidence that began to question the validity of alarmist campaigns.

Rogol and Yesalis (1992) reinforced that preventive discourse based on threats and extreme descriptions lacks credibility among young audiences and may undermine trust in the scientific message (4). According to the authors, when individuals witness physical and functional benefits in AAS users, they tend to perceive institutional warnings as exaggerated, thereby reducing the effectiveness of communication. This discrepancy between personal experience and the official narrative contributes to distancing from medical sources and increases the search for information through informal channels. Petróczy et al. (2014) reviewed the available literature and concluded that campaigns focused solely on risks fail because they do not address mediating psychological variables, such as perceived vulnerability, self-efficacy, and social norms, which are determinants of use behavior (5). Furthermore, continuous exposure to alarmist messages tends to generate psychological reactance, that is, active resistance to persuasion, making the audience less receptive to health guidance (5).

More recent research has expanded this analysis, demonstrating that the failure of fear-based tactics is not limited to the absence of positive results but also involves adverse effects (9,10). Halliburton and Fritz (2018) showed that health beliefs and perceived self-efficacy function as consistent mediators of intention to use, and purely negative campaigns do not strengthen these factors and, therefore, do not prevent the behavior (9). Convergenly, Vinther (2022) observed that, in the contemporary context, the impact of fear is even more limited, as “AAS are so effective” in producing desired outcomes that the risk-based argument loses persuasive power when confronted with users’ empirical experience (11). Thus, the more institutional discourse ignores the actual motivations and social context of use, the less capable it is of influencing individual decisions (11).

Accordingly, the available evidence indicates that fear-based communication has low psychological validity and reduces public trust in medical and sports institutions (4–6,9,11). The repeated use of threats and sensationalist descriptions contributes to the discrediting of scientific authority and may facilitate the dissemination of alternative information, often obtained through social media, coaches, or online forums. The accumulated findings support the need to replace coercive strategies with educational approaches grounded in credibility, realism, and dialogue, capable of promoting critical understanding and genuine engagement in the prevention of AAS use (4–6,9,11).

Limitations and Consequences of Fear-Based Approaches

Preventive strategies centered on fear, in addition to demonstrating limited effectiveness in modifying behavior, may generate significant adverse effects in the context of AAS use (7,8,10). Several studies indicate that the emphasis on alarmist messages is associated with increased stigma, criminalization, and the consequent distancing of users from healthcare services (7,8,10). The social construction of the AAS user as morally reprehensible, impulsive, or uninformed contributes to isolation and reduces trust in medical and sports institutions (7,8). This perception is reinforced by public campaigns that associate AAS use with cheating or dependence, ignoring the diversity of profiles and motivations involved. The result is a communication approach lacking empathy, which hinders adherence to prevention strategies and clinical follow-up (7,8,10).

Qualitative studies conducted in the United Kingdom and Australia indicate that fear of judgment and legal repercussions is among the primary barriers to accessing healthcare among AAS users (7,10). Many avoid seeking medical care due to concerns about exposure, loss of confidentiality, or potential legal liability, choosing instead to obtain information through forums, gyms, and peer groups (7,10). This substitution of formal sources of care with informal support networks keeps users distant from evidence-based interventions and exposes them to empirical guidance without clinical supervision, thereby increasing the risk of adverse events and complicating the management of side effects (8,10). Harvey et al. (2019) observed that, even in contexts with harm reduction policies, stigma and fear of social disapproval limit adherence to counseling programs and reduce the reach of preventive interventions (7).

Beyond individual barriers, alarmist discourse has institutional and structural implications (8). Vázquez-Mourelle et al. (2018) highlight that many healthcare professionals feel unprepared to treat active AAS users, in part because public policies prioritize abstinence based approaches rather than the clinical management of use-related complications (20). This training gap contributes to the persistence of moralistic attitudes and reduces patient engagement in follow-up strategies and laboratory monitoring (7,8,10). The result is the loss of opportunities for early intervention and the perpetuation of a relationship of mistrust between users and healthcare professionals (7,8,10).

The body of evidence indicates that fear-based campaigns not only fail to reduce AAS use but also produce counterproductive effects, such as distancing from medical care, reinforcement of stigma, and the strengthening of informal information and support networks (7,8,10). Overcoming these limitations depends on replacing punitive and moralizing approaches with educational models grounded in empathy, confidentiality, and trust, capable of restoring the therapeutic relationship and the credibility of public health interventions (7,8,10).

The main conclusions of the reviewed studies are summarized below in Table 1, highlighting the predominant type of evidence and the reasoning supported by the authors. This organization aims to facilitate comparative visualization among the different preventive approaches, their underlying foundations, and the level of empirical support available.

Table 1. Synthesis of the main assertions, theoretical rationale, and empirical evidence regarding strategies for the prevention of AAS use.

	Main Claim	Rationale / Theoretical Basis	Predominant Type of Evidence	Key Studies and References
Fear-based tactics alone do not reduce steroid use		show no meaningful effect on knowledge acquisition or behavioral change.	Controlled trials; narrative and systematic reviews	1992; Vinther, 2022; Halliburton & Fritz, 2017
Balanced educational approaches are more effective		Programs such as ATLAS demonstrate sustained reductions in intention to use and improvements in protective factors.	Randomized controlled trials; multidimensional intervention studies	Goldberg et al., 1991; Halliburton & Fritz, 2017; Goldberg et al., 1996
Stigma and criminalization distance users from healthcare services		Qualitative evidence and reviews indicate increased social isolation and reduced help-seeking behavior. Qualitative studies show preference for informal sources, which may either increase or mitigate risk depending on context.	Qualitative studies; integrative reviews	Piatkowski et al., 2023; Bonneau et al., 2021; Harvey et al., 2019
Users seek information from peers and coaches			Ethnographic studies; in-depth interviews	Kimergård & McVeigh, 2014; Harvey et al., 2019
There is no consensus on isolated effective behavioral strategies		Systematic reviews indicate a lack of robust evaluations of specific standalone interventions.	Systematic reviews; scoping reviews	Vinther, 2022; Bates et al., 2019; McVeigh et al., 2021
Fear-based campaigns may generate resistance and distrust		Expert reports and qualitative studies suggest backlash effects and reduced credibility of medical sources.	Expert reports; qualitative studies	Vinther, 2022; Hoffman & Ratamess, 2006; Harvey et al., 2019
Controlled studies and reviews			Goldberg et al., 1991; Petróczy et al., 2014; Rogol & Yesalis,	

More Effective Alternatives

In light of the limitations of fear-based campaigns, empirical studies and systematic reviews indicate that balanced educational approaches (presenting positive effects and potential risks) and multidimensional programs are more effective in preventing AAS use (5,6,7,9,11). These strategies recognize that mere exposure to risks is insufficient to modify behavior and that education must consider psychological, social, and contextual factors that influence individual decision-making (5,6,7,9,11). Unlike punitive tactics, contemporary educational programs emphasize the development of cognitive and behavioral skills, the correction of distorted perceptions, and the strengthening of personal resources, such as self-efficacy and a sense of autonomy (9,11).

Goldberg et al. (1991) demonstrated that interventions presenting both the risks and perceived benefits of AAS use in a balanced manner produce superior outcomes compared to purely negative strategies (6). This pioneering study showed that increases in knowledge and critical understanding occur only when preventive messages are perceived as realistic and consistent with participants' experiences. Subsequently, structured programs such as

Adolescents Training and Learning to Avoid Steroids (ATLAS) and Athletes Targeting Healthy Exercise and Nutrition Alternatives (ATHENA) confirmed these findings, demonstrating sustained reductions in intention to use and improvements in behavioral and social protective factors (7,8,9). These programs integrate scientific education, encouragement of natural nutrition and training, promotion of health and drug-free performance, and the reinforcement of positive social norms within the sports environment (7,8,9).

The review conducted by Petróczi et al. (2014) reinforces that effective prevention programs combine multiple components, including evidence-based information, ethical discussion, behavior modeling, and the promotion of self-efficacy (5). This educational model, by addressing users' actual motivations and offering plausible alternatives, generates greater engagement and reduces the resistance effect typical of moralistic campaigns. Halliburton and Fritz (2018) demonstrated that health beliefs and perceived personal competence mediate the intention to use AAS, suggesting that interventions should cultivate the individual's sense of capacity to achieve goals without resorting to substances (9). This approach is consistent with Bandura's social cognitive theory, according to which preventive behavior depends not only on information but also on the individual's confidence in their ability to act effectively (9).

Beyond educational strategies, the incorporation of harm reduction principles has proven fundamental in reengaging users with healthcare services and reducing associated risks (8). Recent reviews emphasize that clinical management should prioritize active listening, a welcoming approach, and laboratory monitoring, even when the patient decides to continue use (8,10). This approach does not imply endorsement of the behavior, but rather recognition of individual autonomy and a commitment to reducing medical complications. By replacing moral judgment with pragmatic and empathetic clinical practice, a more conducive environment is created for adherence, open communication, and the eventual decision to discontinue use.

The convergence of balanced education and harm reduction represents a new paradigm in addressing AAS use. Rather than reinforcing fear and stigma, this combination provides realistic information, promotes a sense of control, and establishes trust between professionals and users. The available evidence suggests that integrated educational programs and clinical approaches centered on autonomy and dialogue are the most effective alternatives for reducing AAS use and minimizing its impact on individual and public health (5–11).

Peer Influence and Sources of Information

Peer influence and access to different sources of information play a decisive role in the

initiation and maintenance of AAS use (2,3,7). Qualitative studies and systematic reviews show that most users obtain knowledge about use protocols, dosages, and safety measures through coaches, gym peers, and online forums, rather than seeking professional guidance (2,3,7). This trend reflects the construction of informal networks of trust established in sports and virtual environments, in which empirical experience is valued over scientific information (2,3). The preference for peer advice is explained by accessibility, shared language, and the perception that these sources better understand the aesthetic and performance-related demands typical of the population involved (2,7).

Kimergård and McVeigh (2014) reported that the primary channel of communication among AAS users is peer-to-peer information exchange, often based on personal accounts and informal observations without scientific validation (2). Although this exchange may reduce some immediate risks by disseminating basic monitoring practices, it also tends to reinforce unsafe behaviors, such as the concurrent use of multiple substances and self-medication without medical supervision (2,3,10). Harvey et al. (2019) observed that, in the absence of clinical support and amid the predominance of moralistic discourse, many users came to regard these alternative networks as more trustworthy than healthcare institutions (7). This perception of credibility among peers stems, in part, from the mistrust generated by alarmist campaigns and the fear of judgment or punishment, which distance the target population from formal channels of care (3,7,10).

The role of peers is not limited to the transmission of information but also influences collective norms and perceptions (9). Studies on behavior in gyms and sports environments show that the belief that “most people use AAS” increases the likelihood of experimentation by creating a sense of social acceptance and normality (9). This dynamic, known as the false consensus effect, has been described in various young populations and recreational athletes (9). Educational intervention in this context should correct inaccurate normative perceptions and promote new group references based on values of health and natural performance (7,9). Programs such as Adolescents Training and Learning to Avoid Steroids (ATLAS) and Athletes Targeting Healthy Exercise and Nutrition Alternatives (ATHENA) have shown that involving athletes and team leaders as mediators of preventive messages increases the effectiveness of educational actions and reduces intention to use AAS (6–9). These results indicate that when communication occurs within a familiar and trusted social context, the preventive impact is greater than that achieved through external and impersonal campaigns (7,9).

Peer influence can also be transformed into a protective tool when structurally incorporated into public health strategies (7,9,11). Recent reviews emphasize that training multipliers, such as coaches, physical education professionals, and influential athletes,

expands the dissemination of evidence-based information and increases the legitimacy of preventive messages (7,9,11). Vinther (2022) highlights that by recognizing the centrality of social relationships in the decision to use or not use AAS, educational programs become more realistic and culturally appropriate (11). This horizontal communication model, which prioritizes dialogue and cooperation between professionals and practitioners, is identified as one of the most promising approaches for rebuilding the credibility of medical messages and reducing the distance between users and institutions (2,3,7,9–11).

Thus, multiple lines of evidence suggest that understanding peer influence is fundamental to the design of effective prevention and harm reduction policies. Social interaction between users and non-users constitutes a space of symbolic negotiation regarding risks and benefits, in which technical knowledge and common sense intersect (2,3,7,9,10). Strategies that ignore this social dimension tend to fail, as they do not address the factors that sustain use behavior. Conversely, programs that value collective engagement and the shared construction of knowledge appear more appropriate for addressing a phenomenon that is, above all, relational and cultural (2,3,7,9–11).

Discussion

Repressive strategies and fear-based campaigns historically used to curb AAS use have proven ineffective across different population and cultural contexts (8,10,17,19). Studies show that criminalization, excessive enforcement, and alarmist discourse have not reduced prevalence of use but have instead driven migration to the illegal market, where there is a greater risk of product adulteration and absence of medical supervision (8,10,17,19). This displacement, combined with fear of judgment and potential legal sanctions (including professionals working in this context), contributes to distancing users from healthcare services and hinders adequate clinical and laboratory monitoring (8,10,19,22). Thus, policies centered on coercion and fear ultimately reinforce the very behaviors they intend to inhibit, perpetuating the cycle of misinformation and vulnerability (17,19,22).

Understanding this phenomenon requires behavioral analysis grounded in established psychological theories. Self-Efficacy Theory, proposed by Bandura, posits that behavior change depends on the perception of personal capability to act, which is diminished by campaigns that induce fear or shame (15,16,20). Similarly, Ajzen's Theory of Planned Behavior indicates that beliefs, subjective norms, and perceived control shape intention to use and are minimally influenced by exclusively negative messages (15,16,20). In experimental studies involving adolescents and young athletes, approaches based solely on emphasizing risks did not significantly alter behavior, whereas balanced educational programs (presenting benefits and risks in a more objective and non-biased manner) that also address aspects of identity and self-image demonstrated greater impact (3,4,15). Therefore, the failure of fear

based tactics is supported by consistent empirical and theoretical foundations. Motivations for AAS use are multiple and frequently related to self-esteem, body identity, and the pursuit of belonging (12,16,20). The moral labeling of users as transgressors or dependent individuals disregards the complexity of these motivations and deepens social stigma (8,16,20). This stigmatization limits dialogue and reduces trust in healthcare professionals (8,10,19,22). In contrast, approaches centered on active listening, scientific education, and harm reduction strategies have demonstrated greater effectiveness in promoting engagement, reducing risky practices, and facilitating adherence to medical care (17,19,20,22,23). Recent reviews indicate that the therapeutic relationship is a determinant of behavioral change, surpassing the effect of purely informational interventions (14,17,23). The ethical and institutional dimension must also be considered. Many physicians report feeling unprepared to treat active AAS users, whether due to lack of training or fear of appearing complicit in use (14,17,23). This educational gap is exacerbated by the restrictive stance of medical councils and professional societies, which, by discouraging open discussion on the topic, ultimately perpetuate misinformation (14,17,23). Such implicit censorship shifts the scientific debate to informal and poorly qualified spaces, where empirical guidance and practices lacking an evidence base proliferate (8,10,16,20). The lack of adequate training in AAS pharmacology, hormonal physiology, and risk behavior compromises physicians' ability to fulfill an educational and preventive role (14,17,23). This institutional omission reinforces the distance between medicine and a group that, paradoxically, is most in need of specialized follow-up.

Medical ethics, guided by the principles of autonomy and beneficence, maintains that care must prevail over judgment. Denying a welcoming approach to individuals who use AAS is equivalent to denying the principle of nonmaleficence (14,17,23). Structured harm reduction programs implemented in countries such as the United Kingdom and Australia show that offering active listening, risk counseling, laboratory monitoring, and empathetic guidance reduces hepatic, cardiovascular, and psychiatric complications (17,19,21–23). These findings reinforce that the most effective approach is one that integrates technical knowledge, empathy, and continuous follow-up.

Finally, it is essential that medical and educational institutions adopt an active stance in training professionals capable of understanding AAS use in its pharmacological, psychological, and social dimensions. The promotion of continuing medical education, free from censorship and grounded in evidence, is crucial for medicine to reclaim a leading role in addressing this phenomenon (14,17,23). Initiatives such as Adolescents Training and Learning to Avoid Steroids (ATLAS) and Athletes Targeting Healthy Exercise and Nutrition Alternatives (ATHENA) demonstrate that multidimensional interventions, by balancing information, skills development, and ethical reflection, achieve lasting results in preventing

AAS use (3,4,15). The synthesis of these findings indicates that fear and punishment are fragile public health tools, whereas knowledge and dialogue constitute solid foundations for transformation. Only by replacing control with care will medicine be able to resume its central role of guiding and protecting, rather than punishing.

Conclusion

The analyzed evidence consistently indicates that fear-based campaigns and repressive policies are not effective in preventing AAS use. On the contrary, they reinforce stigma, widen the distance between users and healthcare professionals, and contribute to the displacement of use to informal and unsupported environments. Fear, when used as an educational tool, fails because it ignores the cognitive and social determinants that sustain behavior and undermines the perception of autonomy and self-efficacy necessary for change.

Addressing AAS use therefore requires a paradigm shift. Strategies centered on balanced education, empathy, and harm reduction are more consistent with clinical reality and the bioethical principles of medicine. Dialogue must replace coercion, and care must precede judgment. It is imperative that physicians receive adequate training in pharmacology, endocrinology, and behavioral sciences, enabling them to understand the phenomenon in its complexity and to provide ethical and safe follow-up.

Institutional censorship, paradoxical and commonly practiced, and the taboo still present in parts of medical and academic institutions hinder the circulation of knowledge and perpetuate educational gaps. Promoting an open, scientific, and prejudice-free debate is an essential condition for reducing harm, preventing complications, and rebuilding trust between physicians and users. Thus, combating the misuse of AAS is achieved not through fear or prohibition, but through science, education, and humanization.

References

1. Bonnacaze AK, O'Connor T, Burns CA. Harm reduction in male patients actively using anabolic androgenic steroids (AAS) and performance-enhancing drugs (PEDs): a review. *J Gen Intern Med.* 2021;36(7):2055-2064. doi:10.1007/s11606-021-06751-3
2. Kimergård A, McVeigh J. Environments, risk and health harms: a qualitative investigation into the illicit use of anabolic steroids among people using harm reduction services in the UK. *BMJ Open.* 2014;4(6):e005275. doi:10.1136/bmjopen-2014-005275
3. Harvey O, Keen S, Parrish M, van Teijlingen E. Support for people who use anabolic androgenic steroids: a systematic scoping review into what they want and what they access. *BMC Public Health.* 2019;19(1):1024. doi:10.1186/s12889-019-7288-x

4. Rogol AD, Yesalis CE 3rd. Anabolic-androgenic steroids and the adolescent. *Pediatr Ann.* 1992;21(3):175-188. doi:10.3928/0090-4481-19920301-09
5. Petróczi A, Dodge T, Backhouse S, Adesanwo C. Review of the literature on negative health risk-based interventions to guide anabolic steroid misuse prevention. *Perform Enhanc Health.* 2014;3(4):100-114. doi:10.1016/j.peh.2014.08.001
6. Goldberg L, Bents R, Bosworth E, Trevisan L, Elliot DL. Anabolic steroid education and adolescents: do scare tactics work? *Pediatrics.* 1991;87(3):283-286
7. Goldberg L, Elliot D, Clarke GN, et al. Effects of a multidimensional anabolic steroid prevention intervention. The Adolescents Training and Learning to Avoid Steroids (ATLAS) Program. *JAMA.* 1996;276(19):1555-1562. doi:10.1001/jama.1996.03540190027025
8. Ranby KW, Aiken LS, Mackinnon DP, et al. A mediation analysis of the ATHENA intervention for female athletes: prevention of athletic-enhancing substance use and unhealthy weight loss behaviors. *J Pediatr Psychol.* 2009;34(10):1069-1083. doi:10.1093/jpepsy/jsp025
9. Halliburton AE, Fritz MS. Health beliefs as a key determinant of intent to use anabolic androgenic steroids (AAS) among high-school football players: implications for prevention. *Int J Adolesc Youth.* 2018;23(3):269-280. doi:10.1080/02673843.2017.1344928
10. Piatkowski T, Gibbs N, Dunn M. Beyond the law: exploring the impact of criminalising anabolic–androgenic steroid use on help-seeking and health outcomes in Australia. *J Criminol.* 2024;57(1):62-82. doi:10.1177/26338076231209044
11. Vinther AS. “The challenge is that steroids are so effective”: a qualitative study of experts’ views on strategies to prevent men’s use of anabolic steroids. *Contemp Drug Probl.* 2023;50(1):85-104. doi:10.1177/00914509221129300
12. Izzat N, Abu-Farha R, Harahsheh MM, Thiab S. A qualitative assessment of anabolic androgenic steroid use among gym users in Jordan: motives, perception, and safety. *Int J Legal Med.* 2023;137(5):1421-1430. doi:10.1007/s00414-023-03046-6
13. Khalili S, Khoshravesh S, Barati M, Mahjoub H, Faradmal J. Androgenic-anabolic steroids use among bodybuilders in western Iran: application of ridge logistic regression model. *BMC Sports Sci Med Rehabil.* 2023;15(1):7. doi:10.1186/s13102-023-00616-4
14. Anawalt BD. Diagnosis and management of anabolic androgenic steroid use. *J Clin Endocrinol Metab.* 2019;104(7):2490-2500. doi:10.1210/jc.2018-01882
15. Jalilian F, Allahverdipour H, Moeini B, Moghimbeigi A. Effectiveness of anabolic steroid preventative intervention among gym users: applying theory of planned behavior. *Health Promot Perspect.* 2011;1(1):32-40. doi:10.5681/hpp.2011.002
16. Kutscher E, Arshed A, Greene RE, Kladney M. Exploring anabolic androgenic steroid use among cisgender gay, bisexual, and queer men. *JAMA Netw Open.* 2024;7(5):e2411088. doi:10.1001/jamanetworkopen.2024.11088
17. McVeigh J, Hearne E, Boardley I, et al. Generating evidence on the use of image and performance enhancing drugs in the UK: results from a scoping review and expert

consultation by the Anabolic Steroid UK network. *Harm Reduct J.* 2021;18(1):107. doi:10.1186/s12954-021-00550-z

18. Hoffman JR, Ratamess NA. Medical issues associated with anabolic steroid use: are they exaggerated? *J Sports Sci Med.* 2006;5(2):182-193

19. Kutscher E, Arshed A, Greene RE, Kladney M. Harm reduction techniques among cisgender gay, bisexual, and queer men using anabolic androgenic steroids: a qualitative study. *Harm Reduct J.* 2024;21(1):196. doi:10.1186/s12954-024-01121-8

20. Vázquez-Mourelle R, Carracedo-Martinez E, Figueiras A. Impact of health authority control measures aimed at reducing the illicit use of anabolic-androgenic steroids. *Eur Addict Res.* 2018;24(1):28-36. doi:10.1159/000486852

21. Stojko M, Nocoń J, Piłat P, et al. Innovative reports on the effects of anabolic androgenic steroid abuse-how to lose your mind for the love of sport. *Medicina (Kaunas).* 2023;59(8):1439. doi:10.3390/medicina59081439

22. Piatkowski T, Dunn M. Navigating risks and reducing harm: a gendered analysis of anabolic-androgenic steroid users within the risk environment framework. *Contemp Drug Probl.* 2024;51(2):111-128. doi:10.1177/00914509241249292

23. Bates G, Van Hout MC, Teck JTW, McVeigh J. Treatments for people who use anabolic androgenic steroids: a scoping review. *Harm Reduct J.* 2019;16(1):75. doi:10.1186/s12954-019-0343-1