Research Article

Doping in Sports: Ethical Challenges, Athlete Health, and the Effectiveness of Anti-Doping Policies – A Critical Literature Review

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Abstract

Doping remains one of the most persistent challenges facing contemporary sport. The use of prohibited substances and methods to improve athletic performance raises serious concerns about athlete health, fairness, sporting integrity, and public confidence in competitive sport. Although anti-doping organisations have introduced testing procedures, sanctions, educational programmes, and international regulations, doping continues to be influenced by individual, social, psychological, and institutional factors. This paper critically reviews published literature on doping in sports, focusing on its ethical implications, potential health consequences, the influence of coaches and athlete support personnel, and the effectiveness of existing anti-doping policies. The paper adopts a critical narrative literature review approach and draws on peer-reviewed research, systematic reviews, and official publications of the World Anti-Doping Agency (WADA). The literature indicates that doping cannot be understood solely as an individual athlete's decision. Coaching relationships, competitive pressures, sporting culture, performance expectations, and inadequate anti-doping knowledge may also influence doping-related decisions. Research further highlights potential adverse effects associated with several performance-enhancing substances, although the nature and strength of evidence vary between substances. The review argues that testing and punishment, while important, are insufficient as stand-alone prevention strategies. A more comprehensive approach should combine reliable testing, athlete-centred education, accessible medical guidance, responsible coaching, institutional accountability, and ethical development. The paper concludes that sustainable anti-doping practice requires a whole-of-sport approach that protects athlete welfare while preserving fairness and the integrity of competition.

Keywords: Anti-doping Policies, Athlete Health, Doping, Performance-enhancing Substances, Sports Ethics, World Anti-Doping Agency.

1. Introduction

Sport is widely recognised as an important social institution that promotes physical fitness, discipline, teamwork, perseverance, respect, and fair competition. Competitive sport provides athletes with opportunities to demonstrate their abilities through training, dedication, discipline, and commitment. However, the increasing professionalisation and commercialisation of sport have intensified the pressure to achieve superior results. Athletes may face expectations from coaches, teams, sponsors, sporting organisations, spectators, and national institutions. Within this competitive environment, the use of prohibited performance-enhancing substances and methods, commonly referred to as doping, has become a major concern.

Doping challenges the fundamental principles on which organised sport is based. It creates questions about fairness, equality, athlete safety, personal responsibility, and the credibility of sporting achievements. An athlete who uses prohibited substances may obtain an unfair advantage over competitors who follow the rules. At the same time, doping can expose athletes to health risks, particularly when substances are used without appropriate medical supervision or in doses and combinations that have not been established as safe.

The problem is not limited to elite or professional athletes. Research has also identified concerns about performance-enhancing drug use among amateur, collegiate, and recreational sporting populations. Warrier et al. (2023), in an umbrella review of systematic reviews and meta-analyses, examined evidence concerning several pharmacological interventions used for performance enhancement. Their review identified potential performance effects and important adverse health outcomes associated with some substances. The authors also emphasised that evidence differs considerably across substances and that claims about performance benefits should be interpreted carefully.

Doping is also a complex social and institutional issue. Athletes do not make decisions in isolation. Coaches, medical professionals, trainers, teammates, family members, sports administrators, and other support

personnel may influence their understanding of performance enhancement and acceptable sporting behaviour. Naughton et al. (2025) examined doping through a systems-thinking perspective and found that support personnel, coaches, and coach-athlete relationships are important influences on doping-related decisions. Their findings suggest that doping prevention must extend beyond the individual athlete.

Internationally, the World Anti-Doping Agency (WADA) provides a common regulatory framework for anti-doping activities. Its World Anti-Doping Code establishes rules and responsibilities for organisations and participants within the anti-doping system. The Prohibited List identifies substances and methods that are prohibited in sport. The 2026 Prohibited List came into effect on 1 January 2026 and includes substances prohibited at all times, substances prohibited during competition, and substances prohibited in particular sports (World Anti-Doping Agency [WADA], 2025).

Despite these developments, the persistence of doping indicates that regulation and testing alone cannot resolve the problem. Anti-doping strategies must also address the motivations, social environments, ethical beliefs, and institutional conditions that influence athletes. The present paper therefore examines doping as a multidimensional issue involving health, ethics, individual decision-making, sporting culture, and policy implementation.

2. Objectives of the Study

The main objective of this paper is to critically examine doping in sports through a review of published literature and existing anti-doping policies.

The specific objectives are:

1. To examine the major ethical challenges associated with doping in competitive sports.
2. To analyse the potential health consequences of performance-enhancing substances and methods.
3. To explore the influence of coaches, teammates, and athlete support personnel on doping-related decisions.
4. To evaluate the role and limitations of existing international anti-doping policies.
5. To identify strategies for strengthening doping prevention through education, institutional responsibility, and athlete welfare.

3. Review Methodology

3.1 Research Design

The paper adopts a **critical narrative literature review** approach. This method is appropriate for examining a broad research issue through the interpretation and synthesis of existing academic literature, policy documents, and published evidence. Unlike primary empirical research, the present paper does not involve the recruitment of participants, questionnaires, interviews, experiments, or the collection of new field data.

The review focuses on four interconnected themes: ethical issues in doping, health consequences, social and institutional influences, and the effectiveness of anti-doping policies.

3.2 Sources of Literature

The review draws on published academic literature and official anti-doping documents. Relevant sources include:

- Peer-reviewed journal articles and review papers.
- Systematic reviews and meta-analyses concerning performance-enhancing substances.
- Research examining psychosocial factors associated with doping intentions and behaviour.
- Publications concerning coaches and athlete support personnel.
- The World Anti-Doping Code and the WADA Prohibited List.

Relevant literature was identified through scholarly search resources, including PubMed and publicly accessible academic journal platforms. Search concepts included doping in sports, performance-enhancing substances, athlete health, sports ethics, anti-doping policy, doping intentions, coach influence, and doping prevention.

3.3 Selection and Analysis of Literature

Priority was given to peer-reviewed review articles, systematic reviews, meta-analyses, and authoritative policy documents relevant to the objectives of the paper. The selected literature was examined thematically to identify recurring arguments, areas of agreement, limitations, and gaps in existing anti-doping approaches.

The review is narrative rather than systematic. It does not claim to have searched every relevant database, screened all available publications, or followed a fully reproducible PRISMA selection procedure. Consequently, the findings should be understood as a critical synthesis of selected literature rather than a statistical estimate of the prevalence or effects of doping.

4. Understanding Doping in Sports

Doping generally refers to the occurrence of one or more anti-doping rule violations defined under the World Anti-Doping Code. These violations may involve the presence or use of prohibited substances, the use or attempted use of prohibited methods, evasion of testing, tampering with samples, possession or trafficking of prohibited substances, and other conduct specified in the Code.

Performance-enhancing substances and methods may be used with the intention of increasing muscle mass, strength, endurance, recovery, alertness, or other aspects of athletic performance. However, not every substance commonly described as a performance-enhancing product is prohibited in every sporting context. The legal and regulatory status of a substance must be checked against the applicable WADA Prohibited List and relevant sport rules.

The 2026 WADA Prohibited List classifies substances and methods into different categories. These include anabolic agents; peptide hormones, growth factors and related substances; beta-2 agonists; hormone and metabolic modulators; diuretics and masking agents; stimulants; narcotics; cannabinoids; glucocorticoids; and beta-blockers in particular sports. Some categories are prohibited at all times, while others are prohibited only during competition or in specified sports (WADA, 2025).

It is important to distinguish between prohibited doping and legitimate medical treatment. Some substances appearing on the Prohibited List may also have recognised therapeutic uses. Athletes with legitimate medical needs may require a Therapeutic Use Exemption, subject to the applicable anti-doping requirements. Therefore, anti-doping education must help athletes understand both prohibited substances and the procedures for obtaining appropriate medical authorisation.

5. Ethical Challenges Associated with Doping

5.1 Fairness and Equality in Competition

Fairness is one of the central principles of organised sport. Sporting competitions are designed to assess athletic ability under agreed rules. Athletes are expected to compete according to common standards, allowing performance to reflect training, preparation, skill, discipline, and talent.

Doping undermines this principle because the use of prohibited substances or methods may provide an unfair advantage. Athletes who refuse to dope may feel disadvantaged when they compete against individuals who use prohibited methods. This situation can create an environment in which athletes perceive doping as necessary to remain competitive.

Bloodworth and McNamee (2017) explain that anti-doping rules are connected to broader ethical questions concerning the nature and purpose of sport. Their discussion highlights fairness, health, and the spirit of sport as important considerations in determining why particular forms of performance enhancement are restricted.

Nevertheless, fairness should not be understood only as the prevention of prohibited substance use. Differences in access to training facilities, coaching, nutrition, medical support, and financial resources also influence sporting opportunities. Anti-doping policies must therefore operate alongside wider efforts to promote fair access and responsible sporting development.

5.2 Integrity and the Spirit of Sport

Sporting integrity depends on trust in the rules, officials, institutions, and athletes involved in competition. When doping violations occur, the credibility of individual results and sporting events may be questioned. The consequences may extend beyond the athlete concerned, affecting teams, coaches, sporting organisations, and the reputation of a sport.

The concept of the spirit of sport is central to anti-doping philosophy. It represents values such as respect, excellence, dedication, honesty, health, and fair play. Doping raises ethical concerns because it can place winning above these values and encourage the belief that success justifies the use of prohibited methods.

However, ethical discussions should also recognise that athletes may experience significant pressure from their sporting environment. A meaningful ethical approach should combine personal responsibility with institutional responsibility and should not treat every doping-related situation as identical.

5.3 Athlete Autonomy and Informed Decision-Making

Athlete autonomy concerns the ability of individuals to make informed decisions about their bodies, health, and sporting careers. Some arguments in debates about doping focus on an athlete's freedom to choose performance-enhancing substances. However, this position must be considered alongside potential health risks, unequal competitive conditions, coercion, and the wider consequences for sport.

An athlete's decision may not always be completely independent. Pressure from coaches, teammates, sponsors, or the desire to retain a professional position may influence choices. Younger athletes may also lack sufficient knowledge to evaluate the risks associated with prohibited substances.

Consequently, ethical anti-doping practice should protect athletes' ability to make informed decisions. Education should explain the rules, potential health consequences, medical responsibilities, and available sources of reliable guidance.

5.4 Responsibility of Sporting Institutions

The responsibility for maintaining clean sport cannot be placed exclusively on athletes. Sports federations, universities, clubs, coaches, medical professionals, and administrators also have responsibilities.

Institutions should establish clear policies, provide reliable information, protect athletes who raise concerns, and ensure that performance expectations do not encourage prohibited conduct. Coaches and support personnel should be trained to recognise risks and guide athletes towards appropriate medical and nutritional advice.

A system that punishes athletes while ignoring the environment in which doping decisions occur may fail to address the underlying causes of the problem.

6. Health Consequences of Performance-Enhancing Substances

The health implications of doping are a major reason for anti-doping regulation. However, the risks differ according to the substance, dosage, duration of use, individual health status, and whether substances are combined. It is therefore inappropriate to assume that all performance-enhancing substances have identical effects.

6.1 Anabolic-Androgenic Steroids

Anabolic-androgenic steroids are associated with increases in muscle mass and strength. They may be misused by athletes seeking improvements in physical power, muscular development, and recovery.

However, their use can be associated with adverse effects involving cardiovascular health, liver function, hormonal regulation, reproductive health, and psychological well-being. The severity of these outcomes may vary according to patterns of use and individual circumstances.

Warrier et al. (2023) reviewed evidence concerning anabolic-androgenic steroids and reported improvements in strength and lean body mass in the studies they examined. They also identified adverse effects, including changes in lipid profiles. Their review reinforces the importance of evaluating both the potential performance effects and the health consequences of these substances.

6.2 Growth Hormone

Growth hormone is sometimes misused with the expectation that it will increase muscle development, improve body composition, or accelerate recovery. However, improvements in body composition do not necessarily translate into better athletic performance.

Warrier et al. (2023) reported that growth hormone may alter body composition but did not demonstrate a corresponding strength or performance benefit in the evidence reviewed. Potential adverse effects included soft-tissue swelling, fatigue, joint pain, and carpal tunnel syndrome.

These findings demonstrate why athletes should not rely on assumptions or promotional claims when evaluating performance-enhancing substances.

6.3 Erythropoietin and Blood Manipulation

Erythropoietin (EPO) and related methods can affect the production of red blood cells and the oxygen-carrying capacity of blood. Such methods may be misused in endurance sports because oxygen delivery is important for sustained physical activity.

However, manipulating red blood cell production can increase blood viscosity and create serious cardiovascular risks. Warrier et al. (2023) noted that evidence concerning performance benefits was limited, despite changes in physiological measures, and highlighted severe cardiovascular risks.

6.4 Stimulants and Other Substances

Stimulants may influence alertness, perceived fatigue, and nervous system activity. Their misuse can be associated with cardiovascular strain, sleep disturbance, anxiety, and other adverse effects. The risks depend on the specific substance and circumstances of use.

Other prohibited substances and methods may also affect hormonal, metabolic, cardiovascular, or neurological functioning. Since the WADA Prohibited List is updated annually, athletes and support personnel must consult the current list rather than rely on outdated information.

6.5 Limitations of the Health Evidence

Health research on performance-enhancing substances presents several methodological challenges. Studies may differ in the substances examined, dosage, duration, participant characteristics, and outcome measures. Some evidence comes from clinical settings rather than real-world athletic populations. In addition, illegal or concealed use makes it difficult to obtain reliable information about long-term exposure.

Warrier et al. (2023) provide an important synthesis of existing reviews, but their findings should not be generalised to every prohibited substance or every athlete. Further research is needed to understand long-term outcomes and the combined effects of multiple substances.

7. Social and Psychological Factors Influencing Doping

7.1 Competitive Pressure and the Desire for Success

Competitive pressure is an important factor in understanding doping-related decisions. Athletes may invest substantial time, effort, and financial resources in their sporting careers. Selection, scholarships, professional contracts, medals, and recognition can create strong incentives to achieve superior performance.

When athletes believe that natural training is insufficient to meet expectations, they may become more receptive to prohibited performance-enhancing methods. The pressure to win may also influence their ethical judgement, particularly when doping is perceived as common within a sporting environment.

However, competitive pressure alone does not explain doping behaviour. Individual beliefs, moral values, knowledge, self-efficacy, and the surrounding sporting culture also influence decisions.

7.2 Influence of Coaches and Athlete Support Personnel

Coaches have a significant role in shaping athletes' training environments, expectations, and attitudes towards competition. They may act as protective influences by promoting fair play and healthy training practices. Conversely, inadequate knowledge, excessive performance pressure, or encouragement of prohibited practices may increase athletes' vulnerability.

Naughton et al. (2025) conducted a systematic review using a systems-thinking perspective. Their findings identified coaches, support personnel, and coach-athlete relationships as important influences on doping-related decisions. The authors argued that doping should be understood as an issue emerging from a broader sporting system rather than solely from individual athlete behaviour.

The role of athlete support personnel extends to medical practitioners, physiotherapists, nutritionists, sport psychologists, trainers, and family members. These individuals may influence athletes' decisions about medication, supplements, recovery, and performance enhancement. Their anti-doping knowledge and professional responsibilities are therefore important components of prevention.

7.3 Peer Influence and Sporting Culture

Teammates and training partners can influence perceptions of what is acceptable within a sport. If prohibited substance use is normalised within a team or training environment, athletes may begin to view it as a routine part of competitive preparation.

In contrast, teams that promote ethical conduct, open communication, and responsible training can create protective environments. Peer support can therefore be used positively in anti-doping education.

7.4 Psychosocial Predictors of Doping Intentions

Psychological and social factors are relevant to both doping intentions and actual doping behaviour. A systematic review and meta-analysis by Ntoumanis and colleagues (2024) examined psychosocial predictors of doping intentions, doping use, and inadvertent doping. The review included experimental and observational evidence

and identified risk factors such as pro-doping norms and attitudes, supplement use, body dissatisfaction, and psychological ill-being. Protective factors included self-efficacy and positive morality.
These findings suggest that anti-doping programmes should not focus exclusively on providing lists of prohibited substances. They should also address ethical reasoning, social norms, confidence in clean performance, and the ability to resist pressure.

8. Anti-Doping Policies and Regulatory Framework

8.1 The World Anti-Doping Agency

The World Anti-Doping Agency was established to coordinate international efforts to protect clean sport. It plays a central role in developing common standards, maintaining the Prohibited List, supporting research, and promoting education and compliance across the international sporting community.
The World Anti-Doping Code provides a harmonised framework for anti-doping rules and procedures. It establishes the responsibilities of athletes and anti-doping organisations and defines anti-doping rule violations and consequences.
The Code is important because international sport involves athletes and organisations operating across different countries and sporting systems. A common framework helps reduce inconsistencies in the treatment of doping violations.

8.2 The Prohibited List

The WADA Prohibited List identifies substances and methods that are prohibited in sport. It is reviewed and updated annually. The 2026 list became effective on 1 January 2026 (WADA, 2025).
The list distinguishes between substances prohibited at all times, substances prohibited in competition, and substances prohibited in particular sports. This distinction is important because an athlete's responsibilities may depend on the substance, method, sport, and timing of use.
Athletes should not assume that a substance is permitted merely because it is available commercially or prescribed in another context. They should consult the applicable anti-doping organisation and qualified medical professionals before using medication or supplements where a prohibited-substance risk may exist.

8.3 Testing and Sanctions

Testing is an important component of anti-doping enforcement. It can involve the collection and analysis of biological samples according to established procedures. Testing programmes aim to detect prohibited substances and methods and discourage their use.
Sanctions may include periods of ineligibility, disqualification of results, and other consequences specified by the applicable rules. These measures are intended to protect fairness and maintain confidence in sport.
Nevertheless, testing has limitations. Not every prohibited substance or method is equally easy to detect, and testing alone cannot address all social and psychological influences on doping. Effective prevention therefore requires a combination of detection, education, investigation, and institutional accountability.

8.4 Education and Prevention

Education is essential because athletes must understand their responsibilities before they compete. They need accurate information about prohibited substances, supplement risks, medication procedures, testing, and the consequences of anti-doping rule violations.
Education should also be provided to coaches, medical professionals, trainers, and other support personnel. A well-informed support network can help athletes make safer decisions and avoid inadvertent violations.
Educational programmes should be continuous rather than limited to a single session before a competition. They should be adapted to athletes' ages, levels of competition, sporting contexts, and responsibilities.

9. Effectiveness and Limitations of Existing Anti-Doping Approaches

Anti-doping policies have contributed to the establishment of common rules, testing procedures, prohibited-substance classifications, and sanctions. They have also increased awareness of the responsibilities associated with participation in organised sport.
However, the continued occurrence of doping violations suggests that regulatory measures require further development and stronger implementation.

9.1 Overdependence on Testing and Punishment

Testing and sanctions are necessary for enforcement, but they are primarily concerned with detecting and responding to violations. They may not adequately address the circumstances that lead athletes to consider doping.

A prevention strategy should identify risk factors before violations occur. This requires education, ethical development, appropriate medical guidance, and supportive sporting environments.

9.2 Inadequate Knowledge Among Athletes and Support Personnel

Athletes may have incomplete knowledge of prohibited substances, medication rules, supplement contamination, and Therapeutic Use Exemptions. Similar gaps may exist among coaches and other support personnel.

Anti-doping organisations should therefore develop accessible and regularly updated educational resources. Information should be communicated in language that athletes can understand and apply to everyday decisions.

9.3 Supplement-Related Risks

Dietary supplements are widely used in sport, but products may differ in quality, composition, and regulatory oversight. Some products may contain undeclared ingredients or prohibited substances. Athletes who use supplements without appropriate assessment may face health risks or inadvertent anti-doping rule violations.

Education should encourage athletes to seek advice from qualified professionals, assess whether a supplement is necessary, and understand that third-party certification does not eliminate every possible risk.

9.4 Insufficient Attention to the Wider Sporting Environment

Naughton et al. (2025) argue that doping is influenced by the wider sporting system, including coaches, support personnel, governance, and other stakeholders. This challenges approaches that place almost all responsibility on individual athletes.

Anti-doping organisations should therefore encourage institutional responsibility. Sporting bodies need to review coaching practices, performance expectations, athlete welfare arrangements, and reporting mechanisms.

9.5 Need for Evidence-Based Evaluation

Anti-doping education and prevention programmes should be evaluated to determine whether they improve knowledge, ethical decision-making, and the ability to resist doping-related pressure. The success of a programme should not be measured only by the number of educational sessions conducted.

Long-term evaluation can help identify which interventions are effective for different age groups, sports, and competitive levels.

10. Recommendations for Strengthening Anti-Doping Practices

Based on the reviewed literature, the following recommendations are proposed:

10.1 Strengthen Athlete Education

Anti-doping education should be integrated into regular athlete development programmes. It should include information about prohibited substances, health consequences, medication procedures, supplement risks, and ethical responsibilities.

10.2 Provide Training for Coaches and Support Personnel

Coaches, trainers, medical professionals, nutritionists, and other support personnel should receive role-specific anti-doping education. Their responsibilities should be clearly defined, and professional development should include updates on changes to anti-doping regulations.

10.3 Promote Ethical Sporting Culture

Sports institutions should promote fairness, respect, honesty, and responsible performance development. Coaches and administrators should recognise athletes for discipline, commitment, and improvement rather than focusing exclusively on winning.

10.4 Improve Medical and Nutritional Guidance

Athletes should have access to qualified medical and nutritional advice. They should be encouraged to consult appropriate professionals before using medication or supplements and to check relevant anti-doping requirements.

10.5 Adopt a Whole-of-Sport Approach

Anti-doping strategies should involve athletes, coaches, sports federations, universities, medical professionals, administrators, and families. Shared responsibility can help address the social and institutional conditions that contribute to doping.

10.6 Develop Supportive Reporting Mechanisms

Athletes and support personnel should have access to confidential and appropriate mechanisms for reporting suspected doping practices or seeking advice. Such systems should protect individuals from intimidation and retaliation.

10.7 Evaluate Prevention Programmes

Educational interventions should be evaluated through appropriate research methods. Future studies can examine changes in knowledge, ethical reasoning, perceived social norms, and confidence in clean sporting performance.

11. Discussion

The literature reviewed in this paper demonstrates that doping is a multidimensional challenge that cannot be explained exclusively through individual motivation or rule-breaking. It involves ethical, medical, psychological, social, and institutional dimensions.

The ethical literature highlights the importance of fairness, sporting integrity, and the spirit of sport. Bloodworth and McNamee (2017) demonstrate that anti-doping policies are connected to fundamental questions about what sporting competition is intended to represent. These principles provide an ethical foundation for restricting practices that threaten the credibility of competition or expose athletes to unacceptable risks.

The health literature also provides important reasons for preventing the misuse of performance-enhancing substances. Warrier et al. (2023) show that the effects of substances differ and that potential performance changes must be considered alongside adverse health outcomes. This supports the need for accurate, evidence-based education rather than generalised claims about all performance-enhancing products.

An important contribution of recent research is the recognition that doping decisions are influenced by the wider sporting environment. Naughton et al. (2025) identify coaches, support personnel, and coach-athlete relationships as important factors. This finding challenges the assumption that doping prevention can be achieved only by educating and testing athletes. It suggests that sports organisations should also examine their coaching cultures, support systems, and performance expectations.

The psychosocial evidence reviewed by Ntoumanis and colleagues (2024) further indicates that risk and protective factors are associated with doping intentions and use. Pro-doping attitudes and norms may increase vulnerability, whereas positive morality and self-efficacy may offer protection. These findings support the inclusion of ethical reasoning and psychological skills in anti-doping programmes.

Taken together, the literature suggests that anti-doping policy should combine enforcement with prevention. Testing and sanctions remain necessary, but they should be supported by accessible education, responsible coaching, medical guidance, and institutional accountability. A whole-of-sport approach is more likely to address the conditions that contribute to doping than a strategy that focuses primarily on punishment after a violation has occurred.

12. Research Gaps and Future Directions

Although the existing literature provides important insights, several areas require further investigation.

First, more research is needed on the knowledge and anti-doping responsibilities of athlete support personnel, particularly in university and developing sporting systems. Coaches and medical professionals may have substantial influence over athletes, but their knowledge and educational needs may differ across sports and institutions.

Second, further research should examine how anti-doping education influences actual decision-making over time. Many educational programmes assess immediate knowledge or attitudes, but long-term behavioural outcomes are more difficult to establish.

Third, additional research is required on supplement-related risks and inadvertent anti-doping violations. Athletes may not always have sufficient information to assess product composition, labelling, or contamination risks.

Fourth, research should consider the influence of sporting culture, financial pressure, selection systems, and institutional expectations. These factors may differ between elite, professional, university, and recreational sport.

Finally, future research should examine how anti-doping programmes can be adapted to local sporting contexts while remaining consistent with international standards. Such work may be particularly valuable for universities and sports institutions seeking to strengthen athlete welfare and clean-sport education.

13. Limitations of the Review

This paper has several limitations. First, it adopts a critical narrative review approach rather than a systematic review with a fully reproducible search and screening protocol. Therefore, it does not claim to include every relevant publication on doping in sports.

Second, the reviewed literature covers different substances, sporting populations, research designs, and outcome measures. Direct comparisons between findings may therefore be inappropriate.

Third, evidence about the health effects of performance-enhancing substances is not equally developed for every substance or method. Some conclusions are based on limited evidence or research that may not directly represent all athletic populations.

Finally, anti-doping rules and the Prohibited List are subject to change. Readers and practitioners should consult the current WADA documents and the relevant national or international anti-doping organisation for operational decisions.

14. Conclusion

Doping remains a significant challenge to athlete health, sporting ethics, and the integrity of competitive sport. The use of prohibited substances and methods raises concerns about fairness, equality, informed decision-making, and the credibility of sporting achievements. Although anti-doping organisations have developed international rules, testing systems, and sanctions, these measures cannot independently address the complex factors that influence doping-related decisions.

The reviewed literature indicates that doping is shaped by more than individual choices. Coaches, teammates, support personnel, sporting institutions, competitive pressures, and social norms may influence athletes' attitudes and behaviour. At the same time, the health consequences associated with some performance-enhancing substances reinforce the importance of prevention and reliable medical guidance.

The paper concludes that an effective anti-doping framework must combine regulation with education, ethical development, athlete welfare, and institutional responsibility. Coaches and support personnel should be actively involved in prevention, while athletes should have access to accurate information and appropriate professional guidance. Sports institutions must promote environments in which success is achieved through legitimate training, dedication, and fair competition.

Ultimately, the protection of clean sport requires a collective commitment. Anti-doping should not be viewed merely as a system of testing and punishment, but as an ongoing effort to protect athletes, uphold sporting values, and maintain public confidence in sport.

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