FINAL REPORT: PERSPECTIVES OF ATHLETES AND ATHLETE SUPPORT PERSONNEL ABOUT ANTI-DOPING SYSTEMS FROM CHILE AND COLOMBIA: PERCEIVED EFFECTIVENESS, DETERMINANTS AND IMPLEMENTATION STRATEGIES

Abstract

This research project aimed to explore and compare the perspectives of athletes and athlete support personnel (ASP) on anti-doping systems in Chile and Colombia. The study focused on understanding how these key actors perceive the effectiveness of current anti-doping measures, what factors influence their opinions, and what strategies they believe could improve implementation. Our research employed a multi-method approach, combining a survey, documentary analysis of anti-doping regulations in both countries with in-depth interviews of athletes and ASP. We also conducted a meta-analysis of existing studies on anti-doping prevention programs to contextualize our findings.

Importance of taking measures against doping

Doping in sport is a global problem that affects the integrity of competitions and the health of athletes. Anti-doping measures not only seek to prevent unfair practices, but also protect the physical and mental health of athletes. In this sense, anti-doping policies have become an urgent necessity to maintain fairness and ethics in sport.

Countries that are part of the World Anti-Doping Code, established by the World Anti-Doping Agency (WADA), are obliged to create and maintain National Anti-Doping Systems (NAS). These systems are responsible for implementing WADA code regulations and ensuring that all actors in sport comply with anti-doping rules. However, although they share a common framework, NAS vary in their structure and execution depending on the local reality of each country.

Although National Anti-Doping Systems are guided by the same international code, there is notable heterogeneity in their implementation. Differences include the autonomy of agencies, the way sanctions are handled, prevention methods, and educational actions. In Chile, for example, the anti-doping agency operates independently, while in Colombia it depends directly on the Ministry of Sports. These differences impact how regulations are applied and the effectiveness of the system.

In our region, Latin America, there are few studies that explore in detail how anti-doping systems work, especially in countries like Chile and Colombia. It is crucial to understand which components of these systems are yielding positive results and which need improvements. The lack of previous research made a comprehensive analysis of both countries necessary to identify the successes and challenges in their NAS.

Research methodology

This study is one of the first to be conducted in Chile and Colombia on anti-doping systems. To collect information effectively, we combined several techniques. First, we analyzed the current regulations of both countries. Then, we met with sports authorities to learn about their perceptions of the application of the code. We also interviewed professionals and high-performance technical teams to obtain their opinions and experiences. Finally, we conducted surveys with athletes with both open and closed questions to capture their views on the subject. The research was carried out over a period of 24 months, involving more than 300 participants, including representatives from various sports institutions and authorities related to sport in both countries.

Key findings

Informative interventions, which vary in duration and focus, center on educating athletes and their support teams about prohibited substances, associated risks, the doping control system, and governance. On the other hand, educational interventions based on values and ethics demonstrated greater effectiveness, helping to change attitudes towards doping through the discussion of ethical dilemmas and narratives about athletes. These interventions were more effective when directed at young athletes, involved support staff, and used virtual tools.

Regarding anti-doping regulations, both Chile and Colombia follow the WADA Code framework, but differ in their implementation. In Chile, the National Doping Control Commission operates independently, while in Colombia it depends on the Ministry of Sports, which generates differences in decision-making and application of sanctions. The qualitative results revealed that, although both countries share a similar anti-doping structure, perceptions about the effectiveness of sanctions, education, and the experience of control samples vary considerably among the actors interviewed in Chile and Colombia, suggesting key areas for improvement in both systems.

In the interviews, sports professionals agreed that educational and prevention programs are not effectively reaching young athletes, and pointed out the need to involve families more in this process. In Colombia, the need for stricter sanctions was highlighted, while in Chile an approach of restorative justice was advocated.

The surveys yielded interesting data on athletes' perceptions. Most respondents considered that sanctions are necessary, but that they should be accompanied by effective educational programs. In addition, many athletes pointed out that current anti-doping controls could be more rigorous and transparent.

The main findings include:

1. Both Chile and Colombia have largely adopted the World Anti-Doping Agency (WADA) guidelines, but there are some differences in implementation due to local contexts.

2. Athletes and ASP in both countries generally support anti-doping efforts, but express concerns about the effectiveness of current detection methods and the fairness of some procedures.

3. There is a need for more comprehensive and consistent educational programs, especially targeting younger athletes.

4. ASP, particularly coaches and medical staff, play a crucial role in shaping athletes' attitudes towards doping, but often feel underprepared to fulfill this responsibility.

5. Both countries face challenges in balancing the need for strict enforcement with athletes' rights to privacy and fair treatment.

6. Prevention programs show promising results, especially when focused on ethical decisionmaking and adapted to specific sports contexts.

Conclusions and suggestions

From this research process, we were able to conclude that the National Anti-Doping Systems in Chile and Colombia have important areas for improvement, particularly in doping education and prevention. Our study suggests that awareness campaigns targeting young athletes and their families should be increased, training of technical teams should be improved, and international collaboration should be fostered to share best practices.

Recommendations based on our findings include:

1. Improving anti-doping education programs, with a focus on value-based approaches and starting from an earlier age.

2. Enhancing communication and transparency about anti-doping procedures and their rationale.

3. Providing more support and training to ASP to effectively guide athletes on anti-doping matters.

4. Considering more restorative approaches for first-time offenders, especially in cases of unintentional doping.

5. Strengthening coordination between national anti-doping organizations and other sports institutions to ensure consistent messaging and enforcement.

In conclusion, this research contributes to the growing body of knowledge on anti-doping efforts in South America and provides valuable insights for policymakers and sports organizations seeking to improve the effectiveness and acceptability of anti-doping measures.

We hope that this report will be read and considered by all actors involved in the fight against doping in sport, and that it will serve as a basis for future research and policies in the region.

Academic Summary

Introduction

Foundations of the anti-doping system

According to the World Anti-Doping Agency (WADA, 2021b), the use of prohibited substances and methods (PSM) is considered a form of cheating and violates the spirit of healthy and clean sport, which seeks to protect the right of athletes to participate in fair, equitable, and doping-free sport.

However, it is a fact that athletes continue to use PSM in different parts of the world and in various sports (Gleaves et al., 2021). In this sense, doping has been a persistent problem that has affected the integrity and fairness of sports competitions, as well as the health of athletes, from the first instances it was considered in the early 19th century to the present (Houlihan et al., 2019; Müller, 2010).

Over time, the understanding and regulation of doping have evolved significantly (Houlihan et al., 2019; Kambhampati & Star, 2021). WADA has played a fundamental role in unifying criteria and establishing international standards to fight against doping (McLean et al., 2023). Its code, adopted by many countries, establishes the rules and sanctions to prevent and penalize doping in the sports field (WADA, 2021b).

The Code defines the obligations that various sports bodies must comply with (Waddington & Møller, 2019). According to WADA, national Olympic and Paralympic committees must align their policies with the Code, and national federations are obliged to comply with its provisions to be recognized and funded by the State. Likewise, all sports organizations are expected to collaborate with National Anti-Doping Organizations (NADOs) and promote anti-doping policies among their members (WADA, 2021b). NADOs, in turn, must implement national regulations that adapt to the Code, cooperate with national and international anti-doping agencies, as well as promote the collection and management of information between different countries (Wagner & Hanstad 2011).

Although the established obligations are clear, the implementation and rigor with which States apply these norms vary considerably, due in part to the hybrid nature of WADA between private law and its objective of incorporating the Code into public law, which represents a complication in itself, and may even come into conflict with local laws (Henne, 2010; Henning & Andreasson, 2022).

In this sense, although the Code and its defense of clean sport values were endorsed by a large number of countries and international organizations (Kambhampati & Star, 2021; WADA, 2021b), criticisms have emerged that point to aspects such as its legal definitions,

disciplinary ambiguities, or even the freedom with which each State and institution is responsible for its implementation, noting that this type of regulation tends to disadvantage developing countries that have a less solid structure and fewer resources for its implementation (Star, 2023; Star & Kelly, 2022).

For this reason, numerous studies have explored how each government implements the Code. Idiosyncratic differences can generate significant disparities in the experience of athletes from different countries (Star & Kelly, 2022). Furthermore, in the legal field, although most of the investigations found are prior to the publication of the latest Code, they indicate a lack of harmonization that impacts the magnitude and quality of actions that arise from the regulations of each nation (Brissonneau & Ohl, 2010; Kornbeck, 2017; Van Der Sloot et al., 2020).

For these reasons, research is relevant first, on how the legal application of anti-doping regulations is in developing countries such as Colombia or Chile, and, secondly, how it is perceived by athletes or athlete support personnel (ASP) of these countries.

Perception of the anti-doping system for users

The phenomenon of doping in sport is dynamic and multi-level, which has given rise to a complex system that has different strategies and approaches for doping reduction (McLean et al., 2023). Analyzing this system involves understanding the participation of various stakeholders, such as athletes, athlete support personnel (ASP), administrative staff, managers, government institutions around the world, sports scientists, health professionals, social scientists, and others (Boardley et al., 2021).

WADA and the Code signatories have articulated multiple strategies to address the problem of doping in elite sport, which can be classified into detection-deterrence and prevention (Backhouse et al., 2014; Boardley et al., 2021).

The detection-deterrence strategy is based on the ability of controls and punishments to discourage the use of doping, assuming that athletes weigh the probability of being subjected to controls and discovered consuming or carrying PSM, the severity of the punishment to which they will be subjected and the consequences of these punishments against the expected benefits of doping (Gleaves et al., 2021; Overbye, 2017).

The prevention strategy, on the other hand, seeks to dissuade athletes from consuming PSM through training in decision-making and alternatives that seek health care as a method to improve sports performance. This is done through educational programs, information campaigns, and literacy workshops (Pöppel, 2021; Woolf, 2020).

Although both strategies are designed to complement each other through a holistic approach against doping (WADA, 2021b), anti-doping systems have historically placed a greater

amount of temporal, human, and economic resources in the development and implementation of actions associated with the detection-deterrence strategy (Boardley et al., 2021).

However, WADA has sought to give greater relevance to prevention in recent years, which can be evidenced in the publication of the International Standard for Education (WADA, 2021a), which urges all signatories of the code to develop and deliver anti-doping education based on values, awareness, information provision, and anti-doping education.

This context of transition towards a holistic perspective of Anti-Doping Systems is complex (Gleaves et al., 2021) and requires the incorporation of the perspectives of the different parties that participate in sport, especially actors that are not usually considered in decision-making, such as ASP or the athletes themselves (Allen et al., 2017; Engelberg et al., 2019; Juma et al., 2022; Mazanov et al., 2015; Weber et al., 2022).

In this sense, previous studies have found that both ASP and athletes, although they have a general understanding of the rules, tend to have significant knowledge gaps about the functioning of the anti-doping system (Daher et al., 2021; Listiani et al., 2024; Weber et al., 2022). In relation to this, there is some consensus on the need for a greater frequency in training (Allen et al., 2017; Ozkan et al., 2020; Zhumabayeva et al., 2022).

On the other hand, it has been found that in general there is widespread support for efforts to make sport a clean and doping-free competitive environment (Allen et al., 2017; Patterson & Backhouse, 2018), however, it is a topic little discussed in the sports environment and only mentioned when a relevant media case or a nearby case is found (Barkoukis et al., 2019; Engelberg & Moston, 2016; Mazanov et al., 2015; Weber et al., 2022; Woolway et al., 2020).

Regarding sanctions, it has been found that both ASP and elite athletes have positive perceptions about them, considering that they are an adequate punishment for cheaters, are consistent with the values of fair play, and useful for deterring substance use (Blank et al., 2021; Mazanov et al., 2015; Weber et al., 2022).

However, as with the analysis of the legal regulations on which the fight against doping is based, most research is carried out in high-income countries, with few exceptions that include other populations (Gatterer et al., 2020; Juma et al., 2022; Ozkan et al., 2020; Zhumabayeva et al., 2022). Specifically, there is a scarcity in the scientific literature regarding the doping situation in South America, so the present study was dedicated to gathering the perception of both ASP and elite athletes in Colombia and Chile regarding the anti-doping system implemented in their countries.

Preventive interventions to combat doping

It is intended that this research serve as a basis for planning future interventions in doping prevention in South American countries, specifically in Colombia and Chile. For this reason, having a recent look at practices whose effectiveness is empirically supported in the world is crucial.

As mentioned earlier, with the publication of the International Standard for Education (WADA, 2021a), international institutions are making a greater effort to include preventive and educational programs to combat doping within their policies.

However, it is relevant to mention that this effort is not recent and that it comes to enhance the advances that the area has had during the last two decades in which numerous anti-doping education programs have been developed: for example, those promoted by WADA: ATLAS and ATHENA (Goldberg & Elliot, 2005); the Hercules program (Sagoe et al., 2016); Clean Sports Programme (Hurst et al., 2020); High Five Program (Elbe & Brand, 2016); Cool and Clean (Wicki et al., 2018), among others.

These programs typically use, to a greater or lesser extent, activities such as informational workshops, discussion groups, role-playing, case debates, and presentations by veteran athletes (Elbe & Brand, 2016; Goldberg & Elliot, 2005; Hurst et al., 2020; Wicki et al., 2018). Furthermore, according to Gatterer et al., (2020) all programs can be classified as informative and educational depending on the approach they adopt.

Informative programs focus on raising awareness and imparting knowledge about the doping problem and providing basic information about their functions and responsibilities to athletes and their ASP; while educational programs seek the development of values, ethical behaviors, decision-making, communication skills, and/or socio-affective skills as a strategy to prevent doping (Backhouse et al., 2014; Gatterer et al., 2021).

According to Gatterer & Blank (2023), despite WADA mobilizing to demonstrate the need to develop greater comprehensive education and evidence that providing information as a strategy to prevent doping is not sufficient, the predominant paradigm in anti-doping education seems to remain informative.

More importantly, in line with the perception of athletes and ASP, there is evidence that antidoping education coverage barely exceeds 60% of athletes (Gatterer et al., 2021), anti-doping knowledge remains low among athletes (Woolf, 2020) and research in the field increases regularly, but remains a niche to which few material and human resources are allocated globally (Pöppel, 2021).

Within the framework of the push towards more effective anti-doping interventions, empirical research has identified various challenges faced by these initiatives. Among the

highlighted obstacles are language barriers, the lack of human and financial resources, contextual and institutional differences between countries, the limited anti-doping training of many ASP, and the low attractiveness of anti-doping education for some athletes (Barkoukis et al., 2022; Hallward & Duncan, 2019; Hoff, 2021; Juma et al., 2022).

On the other hand, certain factors have been identified as facilitators of the success of educational interventions in anti-doping. These include sports environments with attitudes mostly against the use of PSM, the implementation of regular anti-doping workshops instead of occasional ones, the use of interactive activities, and the participation of figures such as veteran athletes who can act as role models for young people (Allen et al., 2017; Hallward & Duncan, 2019; Juma et al., 2022; Lentillon-Kaestner, 2013; Patterson et al., 2022).

Despite these findings, the literature review revealed the existence of only one meta-analysis that specifically addresses the effect of anti-doping interventions (Ntoumanis et al., 2014). These authors identified only four experimental studies that evaluated the effectiveness of informative programs. This suggests that, by the mid-2010s, anti-doping interventions were rarely subjected to rigorous evaluations through experimental trials. Furthermore, a significant but small effect was found on doping intention and no effect on doping behavior.

The present study

For the reasons previously described and with the intention that this study serves as a basis for the subsequent development of the pilot of preventive interventions to combat doping in Chile and Colombia, this being an analysis of the current state of the issue in both countries.

In this sense, the present study aimed to understand the perception of elite athletes and athlete support personnel regarding the anti-doping system implemented in these countries and was divided into three phases: (1) a comparative analysis of the legal regulations that regulate the issue of doping in both countries; (2) a qualitative analysis of the perspectives of ASP from both countries regarding the anti-doping system; and, (3) a quantitative analysis of the attitudes and knowledge of elite athletes from both countries regarding their anti-doping systems. Additionally, a systematic review was carried out that included a meta-analysis of anti-doping preventive interventions that have been experimentally tested in the world.

Methods and methodology

This study employed a multi-method approach:

Documentary Analysis

We did an exhaustive search of official regulatory databases in both Chile and Colombia. In the case of Chile, the search included the National Congress Library, the repositories of the Ministry of Sports, the archives of the National Sports Institute, and the records of the Sports Subsecretary. Similarly, for Colombia, the research involved consulting the General Secretariat of the State, the archives of the Ministry of Sports, and the records of both the General Secretariat and the Vice Ministry of Sports.

The study established specific inclusion criteria for selecting regulatory documents. To be included, the regulations needed to be at least partially in force, directly reference high-performance athletes or participants in national or international competitions, and explicitly address doping, anti-doping, or prohibited substances. As a result of this selection process, the final corpus comprised 16 documents: six from Chile and ten from Colombia. Regulations that focused exclusively on physical exercise, community sports, or general health without specific reference to high-performance athletics and doping were deliberately excluded.

The analytical framework was based on Braun and Clarke's (2012) thematic content analysis methodology for qualitative documentary material, following a multi-stage analytical process:

- 1. The first stage consisted of the initial processing of documents. We used the Atlas.ti platform (version 7.5.7), with separate analytical units created for Colombia and Chile, and individual primary documents generated for each of the regulations.
- 2. The second stage was the coding process. We used automatic search and coding tools to identify paragraphs that talk about anti-doping measures, healthy behavior, and prohibited substances. These automatic identifications served as markers for further detailed analysis.
- 3. The third stage was based on Hantrais and Mangen's (2013) recommendations and proceeded through four key steps: generating comparisons that highlighted both differences and similarities, establishing a priori and a posteriori categories, adapting these categories to local language uses, and developing resources to facilitate comparison.

Finally, we made a thematic analysis. This involved an initial inductive analysis of selected sections, the development of preliminary categories, and a thorough re-reading of the regulations through a categorical lens. Emergent subcategories were established, and the categories and subcategories were organized into a thematic framework. Representative quotes were then selected for each analytical node to illustrate the findings

We acknowledge several limitations in the methodological approach used. The first one was the restricted focus to sports regulations, excluding health, judicial or criminal regulations. The second limitation was the potential underestimation of health ministries' and law enforcement agencies' roles and the last one was the possible oversight of informal or administrative procedures not captured in formal regulations

This methodology enabled a systematic comparison while maintaining sensitivity to national contexts, allowing for identification of both standardized elements and local variations in anti-doping systems (Wagner & Hanstad, 2011).

Qualitative Interviews

The study employed a qualitative research design with a comparative methodology to examine perspectives across two national contexts. As outlined by Hantrais (2009), this approach facilitated the identification of common elements and country-specific variations in the implementation of anti-doping programs. The research formed part of a broader project that initially analyzed doping laws and regulations in both countries to identify key system components. These findings then informed the structure of the interviews and the framework for analysis.

The participant pool consisted of 32 Athlete Support Personnel (ASPs), evenly distributed with 16 participants from each country and a gender balance of 44% female and 56% male. Participants were strategically divided into three professional categories: twelve technical team members (including coaches, physical trainers, and methodologists), eleven healthcare professionals (specialists in sports medicine, physiotherapy, physiology, and nutrition), and lastly, nine psychosocial professionals (psychologists and social workers). Sampling followed what Patton (2014) describes as the "comparative logic of matched critical cases" ensuring equitable representation across professions and countries. These participants worked in diverse sporting contexts, including team sports (such as football, handball, and basketball), individual sports (like cycling, karate, and swimming), and within various institutional settings, such as professional clubs, regional teams, national teams, and government institutions serving elite athletes.

Data collection involved semi-structured interviews with each participant, lasting between 30 and 60 minutes. As described by Taylor, Bogdan, and DeVault (2016), this interview format allowed systematic data collection while maintaining the flexibility to explore emerging topics. Participants were recruited through sports federations, professional clubs, and government institutions responsible for sports development in both countries.

The data analysis process was displayed in multiple stages. Initially, all interviews were conducted and analyzed by the research team during group meetings, with discrepancies resolved through consensus. This process is based on Braun and Clarke's (2006, 2019) thematic analysis methodology and the data was then organized around five components of the anti-doping system: doping control samples, sanctions, information management, anti-doping education, and health actions.

Afterwards, we did a comparative analysis that followed Patton's (2014) guidelines. We coded the interviews from each country separately and the categories were then re-coded into common language to identify similarities and differences, and the analysis examined both positive and negative perspectives as well as suggestions for improvement for each system aspect.

To ensure quality control and participants anonymity, specific references to institutions, sports, athletes, or other professionals were anonymized, particularly for participants in unique relevant positions, such as national team coaches. We developed a coding system to maintain clarity while safeguarding confidentiality, so we used identifiers such as "TS" for technical teams, "HT" for health professionals, and "PT" for psychosocial team professionals, followed by numbering and country indicators ("CH" for Chile, "COL" for Colombia).

Meta-analysis

We conducted a meta-analysis of seven studies (n=2128) evaluating the effectiveness of preventive anti-doping interventions. Effect sizes were calculated for doping likelihood, moral disengagement, and attitudes towards doping.

The review process began with an exhaustive literature search spanning January 1, 2012, to December 31, 2022. This time frame was chosen specifically to capture interventions conducted before the release of the International Standard for Education in 2021, while allowing enough time for the publication of results. The searches were conducted across four major databases, yielding 1024 records from EBSCO Host, 40 records from SciELO, 5840 records from Scopus Elsevier, and 1047 records from Web of Science Clarivate and the search strategy used broad terms to maximize coverage, using keyword combinations such as "Athletes" AND "Doping" OR "Antidoping" OR "Substance" OR "Drugs." To enhance the comprehensiveness of the search, additional searches were conducted in the reference lists of identified articles, as recommended by Backhouse et al. (2014).

Strict inclusion and exclusion criteria were implemented to select the studies for analysis. Articles were included if they were published in peer-reviewed indexed journals, examined the effect of a preventive anti-doping intervention, utilized experimental or quasi-experimental designs with pretest-posttest measurements, and included participants identified as elite athletes, defined as those registered in sports federations or competing regularly at national or international levels. Articles were excluded if they were literature reviews, documentary research, or commentary pieces; non-peer-reviewed publications; non-experimental or qualitative studies; or studies focusing on substances not listed in WADA's prohibited substances list.

To extract relevant data, We developed a coding framework covering variables such as sample size, type of sport (categorized by the proportion of individual sports participants), gender distribution, mean age of participants, number of intervention sessions, intervention duration in weeks, type of intervention (informative or educative), delivery mode (online, face-to-face, or combined), and target audience (athletes, support personnel, or both).

Statistical analysis was conducted using the Metafor package in R. Restricted Maximum Likelihood estimation (REML) was chosen based on its suitability for meta-analyses with limited studies, as recommended by Seide et al. (2019). Effect sizes were calculated using

Cohen's d, enabling comparisons across populations and instruments (Lee, 2016). Heterogeneity was assessed using the I² index to measure the proportion of observed variance due to real differences and the Q index to quantify excess variation. I² values of 25%, 50%, and 75% were interpreted as low, moderate, and high heterogeneity, respectively, following Borenstein et al. (2009).

Publication bias was analyzed using multiple methods, including Egger regression for all comparisons and Rosenthal's fail-safe N index for pre-post comparisons, as these approaches are suitable for analyses with limited studies (McClain et al., 2021). When high heterogeneity was identified ($I^2 > 75\%$ or significant Q), moderator analyses were conducted using meta-regressions for continuous variables and meta-ANOVAs for categorical moderators, allowing for the examination of factors influencing intervention effectiveness (Hagger, 2022).

Throughout the review process, each researcher independently evaluated studies for eligibility, resolving disagreements through discussion. The methodology adhered to PRISMA guidelines, ensuring transparency and reproducibility. Data synthesis was conducted on seven studies meeting all criteria, representing a total sample of 2,128 participants. We documented every step of study selection and exclusion, maintaining detailed records to ensure rigor.

This methodological approach demonstrates the extensive measures taken to achieve comprehensive coverage of relevant literature while maintaining high standards for study inclusion and analysis. The multi-layered analysis and quality control measures reinforce the reliability of the findings and their implications for designing and implementing effective anti-doping interventions.

Quantitative Questionnaire

We did an empirical study using a descriptive strategy, a non-probabilistic cross-sectional selective design with an exploratory scope (Ato et al., 2013). This approach involved collecting data from elite athletes to explore a largely under-researched field in the Latin American context: their perception and knowledge of the current doping control system.

The target population consisted of elite athletes, defined as individuals registered with a sports federation in either Chile or Colombia who participate in official national or international competitions. Convenience sampling (Salkind, 2021) was employed, conducted at high-performance training centers and sporting events, where researchers asked athletes to complete the instruments. The sample comprised 322 participants, of which 41.3% were from Chile and 58.7% from Colombia.

1. **Performance Enhancement Attitude Scale (PEAS):** Attitudes toward doping were measured using the short version of the PEAS, a six-item unidimensional instrument. Statements about doping in sports were rated on a six-point Likert scale ranging from

"strongly disagree" to "strongly agree" (Elbe & Brand, 2016; Petróczi & Aidman, 2009). The Spanish version of the scale, previously adapted by Morente-Sánchez et al. (2014), was used. A reliability coefficient of $\omega = 0.647$ was obtained.

- 2. Anti-Doping Systems Evaluation Questionnaire (ADSEQ): This custom questionnaire was developed for the study to assess athletes' perceptions of the doping control system. Based on analyses of anti-doping laws in both countries and expert input, 12 key actions were selected. Descriptive statements, such as "Collecting samples from athletes during national and international competitions is...," or "Prohibiting athletes who test positive in doping tests from competing in national and international competitions is...," were rated across four dimensions: Necessity (Unnecessary/Necessary), Utility (Useless/Useful), Goodness (Bad/Good), and Fairness (Unfair/Fair). Responses used a five-point scale, with higher scores reflecting more positive evaluations. Reliability coefficients for the 12 actions ranged from $\omega = 0.926$ to 0.977.
- 3. WADA-Play-True-Quiz: Knowledge about doping control was measured using this 10-item multiple-choice quiz (Kambhampati & Star, 2021), with each item offering 2-4 options and one correct answer. The pool of 40 items was divided into four equivalent versions to ensure all items were used. Reliability coefficients ranged from $\omega = 0.938$ to 0.970.

Results

Regulatory Analysis

The study reveals how Chile and Colombia have adopted and adapted the WADA Code within their national contexts, showcasing key differences in institutional structures and implementation strategies. Both countries have incorporated the Code into their national regulations, with Chile implementing it through Decree 41 in 2012 and Colombia through Decree 245 of 2011. However, the institutional frameworks differ significantly. In Chile, the National Anti-Doping Control Commission operates with substantial independence from the Ministry of Sports, enabling a high degree of autonomy. In contrast, Colombia's National Anti-Doping Organization (NADO) works closely with its Ministry of Sports, requiring explicit measures to safeguard administrative and legal independence.

In terms of regulatory implementation, both countries maintain WADA's legal independence and ensure the separation of sports jurisdiction from civil and legislative authorities. Their systems align with the World Anti-Doping Code by adhering to standards for sample collection, competition controls, results management, and authorization procedures.

The analysis highlights shared strategic approaches between the two countries, albeit with nuanced differences. Both nations have comprehensive testing protocols, but Chile's approach centralizes efforts within expert panels, while Colombia employs a multi-level tribunal structure. In the realm of education and prevention, Chile has made notable progress,

with detailed provisions for implementing preventive programs. Colombia, by comparison, focuses on disseminating information about doping risks and regulatory knowledge. Regarding sanctions, both systems impose economic, administrative, and disciplinary measures, but Colombia's regulations provide more detailed disciplinary procedures, whereas Chile emphasizes accountability not only for individual athletes but also for teams.

A notable distinction lies in the distribution of responsibilities. Colombia places significant emphasis on individual athlete accountability, reflecting its historical focus on sports medicine. Chile, on the other hand, adopts a broader approach by distributing responsibilities among athletes, teams, federations, and Athlete Support Personnel (ASP), thereby promoting collective accountability.

National sports federations also play crucial roles in both systems, though with differing emphases. In Chile, federations are required to maintain technical commissions dedicated to anti-doping measures, whereas in Colombia, federations primarily focus on regulatory compliance and coordination with the NADO. Both countries have established processes for therapeutic use exemptions (TUEs), but the institutional arrangements differ. In Chile, these exemptions are managed by specialized panels within the NADO, with a strong emphasis on medical oversight.

Overall, the findings demonstrate that while the WADA Code provides a standardized framework, each country has tailored its implementation to reflect local institutional priorities and historical contexts. These variations, particularly in institutional structures and responsibility distribution, influence how the anti-doping system is experienced by athletes and support personnel. The results underscore the importance of balancing international compliance with domestic needs to create effective and contextually relevant anti-doping systems.

ASP Perspectives:

The study sheds light on the varied perspectives of Athlete Support Personnel (ASPs) regarding the understanding, implementation, and effectiveness of anti-doping systems in Chile and Colombia. It reveals significant gaps in ASPs' knowledge of procedures they do not regularly encounter, echoing global findings on limited comprehension of anti-doping operations. Sports physicians were identified as the primary professionals responsible for anti-doping matters. However, perceptions differed between the two countries: Chilean ASPs viewed these responsibilities as narrowly defined, while Colombian ASPs adopted a more collaborative perspective, describing anti-doping as a shared responsibility across the biomedical team.

ASPs expressed pessimism about the effectiveness of detection and deterrence strategies, often believing that doping evolves faster than detection methods, a sentiment consistent with previous research. This skepticism was particularly pronounced regarding out-of-

competition testing, which participants perceived as exploitable by athletes during unmonitored periods. While ASPs valued the role of anti-doping education, they criticized its infrequency and focus on competition periods or regulatory updates. Both Chilean and Colombian participants emphasized the importance of targeting younger athletes for education to build long-term awareness and prevention. However, Colombian ASPs noted specific shortcomings in virtual education modalities, highlighting a disconnect with athletes' preferred learning styles.

We found that sanctions and information management were areas of concern, with ASPs supporting the deterrent role of sanctions but questioning their implementation. Chilean ASPs raised ethical issues around public disclosure of sanctioned athletes' identities, while Colombian ASPs highlighted economic disparities in the appeals process, emphasizing that financial barriers often hinder fair access to legal and technical support.

Resource allocation emerged as another critical issue, with ASPs in both countries noting inequities in distribution across regions and sports. Resources were concentrated in urban centers and high-profile sports, leaving smaller regions and disciplines underserved. In Colombia, the closure of laboratories during the COVID-19 pandemic exacerbated these disparities, increasing testing costs and logistical challenges.

A significant theme was the perceived invisibility of anti-doping organizations. ASPs suggested that these institutions were primarily visible only in cases of positive doping results, a perception that undermines trust and engagement with the system. The study also identified a gap in support for sanctioned athletes. Both Chilean and Colombian ASPs noted that athletes who faced sanctions were often left without access to resources or psychological support, leading to feelings of abandonment. This finding prompted calls for restorative justice approaches and mental health services, particularly for athletes involved in unintentional violations.

The research revealed notable country-specific differences in attitudes toward sanctions. Colombian ASPs advocated for stricter measures, including permanent bans from sports, reflecting a punitive approach. In contrast, Chilean ASPs emphasized rehabilitation and reintegration, signaling a more restorative perspective on anti-doping enforcement.

These findings underscore the complexity of implementing anti-doping systems within different national contexts while adhering to international standards. Although common challenges exist across countries, institutional, cultural, and economic factors uniquely shape the ways these challenges are perceived and addressed by ASPs. The study highlights the importance of balancing global consistency with local adaptations to foster effective and equitable anti-doping systems.

The results of the qualitative and quantitative phases of the project were organized around the components and actions distilled from the analysis of the regulations. Regarding the perspective of ASP in Chile and Colombia on the Antidoping System, Table 1 summarizes the general results found in the present study.

Summary of Chilean a	na Colombian I BA perspec	lives on Mill-Doping Sys	iems
	Positive perspectives	Negative perspectives	Suggested improvements
Anti-doping system	WADA and NADOs are the institutions responsible for making the Anti-Doping System work. Sports physicians are the ASPresponsible for doping within the sports institutions. The rest of the athlete's ASP can contribute in the detection, referral and transmission of the values of clean sport.	The war against doping is lost: The development of strategies and substances for doping or masking doping is faster than the development of detection measures. No attention is paid to all categories of professional sport.	Coordination with other public or private institutions that can contribute to the control and prevention of doping. Focus efforts on the most prevalent sports.
Anti-doping education	Psychoeducation is good.	It is infrequent.	Education for athletes should focus on youth, ethics, morals,
	The professional competence of the facilitators affects the quality of education is high	The virtual modality is not very effective.	teaching about prohibited substances and methods, and protocols to follow.
	quarty of concurrent is ingri-	There is no anti-doping education for other social referents that athletes have (parents, friends, partner, etc).	Education for ASP should focus on teaching about prohibited substances and methods and protocols to follow.
Sanctions	Some sanctions are dissuasive.	Its effectiveness is limited.	Penalties differentiated according to intentionality.
		The appeal process depends on the athlete's income.	Differentiated sanctions according to substance and sport.
			Include sanctions based on Restorative Justice.
			Toughening of sanctions.
Doping control samples	Doping control samples are effective in detecting doping use.	ASP are uninformed about doping control samples.	Seek mechanisms to reduce the athletes' unpleasant experience.
	The doping control samples process is reliable.	doping control samples are unpleasant for athletes.	Strengthen the work of the laboratories.
	-	They are infrequent.	
		Sometimes it seems that they are not entirely random, always showing up in the first few places in the competition.	
Communication and Information Dissemination		There is little visibility of the organizations in charge of doping control.	Strengthen channels of communication and dissemination of information on doping.
			More interactive communication and dissemination channels.

 Table 1.

 Summary of Chilean and Colombian PSA perspectives on Anti-Doping Systems

Disclosure of positive cases	It has a deterrent function.	It is ethically complex.			
	This is fine, as it is part of the sport's regulations.	It creates a social stigma for athletes who are sanctioned for doping and for their environment.			
Measures for athletes already sanctioned		Athletes sanctioned for doping are removed from the system.	Psychoeducation for athletes who are going to reintegrate to sport after serving a doping		
		Possible actions for sanctioned athletes should take into	sanction.		
		account the intentionality of the substance use and the type of sanction of the athlete.	Psychosocial care for athletes who are serving a doping sanction.		

Own elaboration.

Meta-analysis of Prevention Programs:

The systematic review and meta-analysis provided a thorough examination of anti-doping interventions across seven studies involving 2,128 participants, yielding insights into their effectiveness and the factors moderating their outcomes.

The meta-analysis demonstrated that anti-doping interventions significantly influenced key variables. For pre-post comparisons, a small but meaningful effect size was observed for Doping Likelihood (d = .329, p < .001), with Moral Disengagement also showing a small but significant impact (d = .293, p < .001). The most pronounced effects were seen in Doping Attitudes, which displayed a medium effect size (d = .522, p < .001). These findings suggest that the interventions were effective, and their impact was somewhat stronger than previously reported in earlier meta-analyses, such as those by Ntoumanis et al. (2014).

The analysis of long-term effects revealed that while the magnitude of the impact diminished over time, the interventions still maintained significant positive outcomes. Doping Likelihood and Moral Disengagement continued to show small but sustained effects in follow-up evaluations, particularly in team sports settings, underscoring the potential for these programs to have lasting benefits on athletes' decision-making and moral reasoning (Barkoukis et al., 2022).

Several moderating factors emerged as critical determinants of intervention success. Age proved significant, with younger athletes showing greater improvements in Doping Attitudes and Moral Disengagement, reinforcing the importance of early intervention (Patterson et al., 2022). The characteristics of the interventions themselves also played a pivotal role. Shorter, more intensive interventions showed stronger immediate effects, while a greater number of sessions improved outcomes at follow-up, highlighting the importance of tailored intervention design. Delivery methods significantly influenced outcomes, with online programs outperforming face-to-face formats for Doping Attitudes, a finding that aligns with recent shifts toward digital learning methods (Gatterer & Blank, 2023).

The type of sport was another significant moderator. Interventions in team sports demonstrated superior long-term effects on Moral Disengagement compared to individual sports, suggesting that the social and collaborative aspects of team environments may enhance the sustainability of positive behavioral changes (Shelley et al., 2021). Additionally, intervention approaches varied in effectiveness. Contrary to expectations, informative interventions proved more impactful than educational approaches, particularly for Doping Attitudes and Moral Disengagement, challenging traditional assumptions about anti-doping education.

Target audience also played a crucial role in moderating intervention effectiveness. Programs targeting both athletes and support personnel had the most significant effects on Doping Attitudes, far surpassing interventions aimed at athletes or support personnel alone. This finding highlights the importance of engaging the broader athletic ecosystem in anti-doping efforts.

Despite these promising results, the analysis revealed some variability in intervention effectiveness, with moderate to high heterogeneity across studies. This suggests that differences in study designs, contexts, or populations likely influenced the observed outcomes. While publication bias was minimal for most measures, some concerns were noted in follow-up evaluations of Moral Disengagement.

Overall, the findings provide compelling evidence for the effectiveness of anti-doping interventions while highlighting the complex interplay of factors that influence their success. The superior outcomes associated with informative approaches, online delivery methods, and programs targeting both athletes and support personnel suggest the need for continued innovation in intervention design. These results offer valuable guidance for the development of future anti-doping strategies, emphasizing the importance of tailoring programs to participant characteristics and leveraging modern delivery methods to maximize impact.

			Colombia	Chile	
System actions	М	SD	M(SD)	M(SD)	ω
PEAS	1.796	.956	1.662 (0.759)	2.108 (1.151)	.647
In-competition doping control samples	4.475	.901	4.489 (0.849)	4.442 (1.019)	.926
Out-of-competition doping control samples	4.214	1.088	4.167 (1.101)	4.321 (1.059)	.950
Communication campaigns	4.558	.847	4.604 (0.777)	4.45 (0.99)	.946
Educational programs for athletes	4.525	.908	4.545 (0.891)	4.479 (0.954)	.954

Table 2.Preliminary results of the quantitative phase of the study

Educational programs for ASP	4.535	.893	4.567 (0.87)	4.463 (0.946)	.941
Public statement of sanctioned cases	3.097	1.404	3.104 (1.475)	3.079 (1.237)	.947
Prohibition to compete	4.329	1.036	4.376 (0.97)	4.221 (1.178)	.967
Prohibition of training	2.829	1.576	3.068 (1.594)	2.275 (1.397)	.972
Prohibition of administrative positions	3.251	1.371	3.344 (1.406)	3.038 (1.275)	.970
Financial penalties	3.351	1.357	3.362 (1.393)	3.325 (1.281)	.957
Stronger penalties for repeat offenses	4.219	1.151	4.092 (1.209)	4.513 (0.952)	.975
Stronger penalties for recurrence	4.313	1.053	4.216 (1.075)	4.537 (0.974)	.977
WADA QUIZ	6.905	1.763	6.683 (1.624)	7.417 (1.968)	.938970

Note:Significance "p>.001; p>.05

Regarding the PEAS, which measures attitudes toward doping, athletes in Colombia have a significantly higher mean than athletes in Chile (p = 0.001). A similar trend is observed in attitudes toward the prohibition of training (p < 0.001). Colombian athletes also demonstrate more positive attitudes toward in-competition doping controls, communication campaigns, educational programs for athletes, educational programs for support personnel (ASP), public declarations of sanctioned cases, prohibition from competing, prohibition from training, and economic sanctions. However, these differences are not statistically significant.

Chilean athletes, on the other hand, exhibit significantly more favorable attitudes toward harsher sanctions for relapses (p = 0.018), sanctions for recurrence (p = 0.048), and knowledge about the anti-doping system (p = 0.007). In this context, both groups show generally similar attitudes, with specific variations. Notably, Chilean athletes place greater importance on punishing repeat offenders, which may reflect a stronger concern for addressing those who resort to doping for the first time and on a single occasion, while advocating for stricter penalties for individuals who reoffend after being given a second chance.

Additionally, correlations between the PEAS, the WADA Quiz, and attitudes toward the antidoping system were calculated. The results are presented in Table 3.

Table 3.

Correlations with attitudes towards the anti-doping system

Attitude towards the anti-doning system	PE.	AS	WADA Quiz		
Thirde to wards the anti-doping system	r	р	r	р	
In-competition doping control samples	-0.379	<.001	0.243	<.001	
Out-of-competition doping control samples	-0.217	0.002	0.206	0.004	
Communication campaigns	-0.117	0.101	0.209	0.003	
Educational programs for athletes	-0.162	0.022	0.180	0.011	

Educational programs for ASP	-0.127	0.074	0.217	0.002
Public statement of sanctioned cases	-0.120	0.092	0.129	0.070
Prohibition to compete	-0.173	0.014	0.220	0.002
Prohibition of training	-0.227	0.001	0.050	0.479
Prohibition of administrative positions	-0.218	0.002	0.167	0.019
Financial penalties	-0.210	0.003	0.053	0.461
Stronger penalties for repeat offenses	-0.231	0.001	0.203	0.004
Stronger penalties for recurrence	-0.186	0.008	0.193	0.006

As expected, the correlations between the PEAS and the actions of the anti-doping system are predominantly negative, indicating that a more favorable attitude toward doping is associated with lower acceptance of the anti-doping system's measures. The strongest and statistically significant correlations include in-competition testing (r = -0.379, p < .001), out-of-competition testing (r = -0.217, p = .002), banning from training (r = -0.227, p = .001), and banning from administrative positions (r = -0.218, p = .002). These findings suggest that individuals with more favorable attitudes toward doping view both in-competition and out-of-competition controls, as well as associated penalties, unfavorably.

In contrast, the correlations between knowledge about the anti-doping system and the actions of the system are mostly positive, indicating that greater knowledge of the anti-doping system is associated with higher acceptance of its measures. The strongest and most statistically significant correlations include in-competition testing (r = 0.243, p < .001), out-of-competition testing (r = 0.206, p = 0.004), banning from competition (r = 0.220, p = 0.002), banning from administrative positions (r = 0.167, p = 0.019), communication campaigns (r = 0.209, p = 0.003), and ASP educational programs (r = 0.217, p = 0.002). These results suggest that greater knowledge of the anti-doping system is linked to a stronger desire to compete cleanly, to penalize rule violations, and to support the development of an anti-doping system that fosters a culture of clean sport.

Discussion of findings

The pessimism expressed by ASP regarding the effectiveness of current detection methods aligns with previous research highlighting the challenges of the deterrence-based approach (Overbye, 2017). The emphasis on education and prevention programs in both countries reflects a growing recognition of the importance of a more holistic approach in anti-doping efforts (WADA, 2021).

The meta-analysis results suggest that preventive interventions can be effective, particularly in shaping attitudes towards doping. The identified moderating effects (e.g., age, type of intervention) provide valuable insights for tailoring future prevention programs.

The limited knowledge of ASP about certain aspects of the anti-doping system underscores the need for more comprehensive training and education, not only for athletes but for all actors in the sports environment.

The quantitative results complement the qualitative findings, showing that athletes generally highly value educational programs and communication campaigns. The lower evaluations of certain sanctions (e.g., prohibition of training with the team, financial sanctions) suggest the need to reconsider or better communicate the rationale behind these measures. The correlation between knowledge and perception of certain anti-doping actions highlights the importance of comprehensive educational programs.

Main findings

Regulatory Implementation: the adoption of the WADA Code shows significant variations between Chile and Colombia. While Chile has opted for a model with greater institutional autonomy, Colombia maintains a more integrated structure with the Ministry of Sports. This difference does not imply a less effective implementation, but rather different approaches to the independence and management of the anti-doping system.

Perspectives of Athlete Support Professionals (ASP): the qualitative results reveal contrasted perceptions about the effectiveness of anti-doping systems. There is widespread pessimism regarding detection capability, with the perception that doping strategies are evolving faster than detection methods. However, important differences were also identified:

- In Chile, there is an emphasis on rehabilitation and reintegration of sanctioned athletes.
- In Colombia, there is a more punitive tendency, with greater support for more severe sanctions.

Effectiveness of Interventions: Meta-analysis of prevention programs showed promising results in the significant impact on reducing the likelihood of doping, it also showed the more pronounced effects on attitudes toward doping, greater effectiveness in shorter but intensive interventions and better outcomes in team sports and with younger populations.

Recommendations and Implications

Improve anti-doping education programs

We think there is a necessity to design programs focused on values such as honesty, respect, and fair play, rather than exclusively highlighting the negative consequences of doping, and incorporate testimonials from athletes who have remained drug-free, emphasizing their ethical and sporting achievements.

We also think there is a need to introduce doping awareness modules in physical education for children and adolescents before they begin competing at higher levels. This would allow the development of educational content tailored to the cognitive and emotional development levels of young athletes. This also could find benefit in consulting coaches and athletes to customize content according to the specific needs and challenges of each sport.

Enhance communication and transparency

As a research team, we think publishing detailed guides that clearly explain the anti-doping control process, from sample collection to laboratory analysis and sanctioning procedures can be beneficial. Offering these guides in accessible formats, including videos and visual resources can be also useful for easier understanding.

Launching public campaigns to showcase the work of anti-doping organizations, demonstrating their impact on promoting clean sport and using social media and digital platforms to engage with athletes, coaches, and the general public, addressing questions and building trust in anti-doping systems, could be more effective to connect athletes with sports regulations.

Strengthen support for ASP

We think that implementing continuous training programs for Athlete Support Professionals (ASP), including regular updates on regulations and doping trends is a need, and to offer interactive workshops and case studies to help ASP apply their knowledge in real-world situations could help strengthen this support.

The sports scene could benefit from clearly defining the expectations for coaches, medical staff, and other ASPs in the prevention and detection of doping and establish protocols that ASPs can follow to identify and report suspicious behaviors without jeopardizing their relationship with athletes.

Consider more restorative approaches

We suggest that there is a need to design mandatory educational programs for first-time offenders that encourage reflection on the ethical and sporting implications of their actions and use restorative justice models to promote repentance and reintegration rather than focusing solely on punishment.

This could be made by creating programs allowing sanctioned athletes to participate in activities such as mentoring, training, or educational roles while serving their sanctions. Provide psychological support to prevent social isolation and its negative impact on mental health.

Improve coordination between organizations

One of the critical areas for improvement lies in fostering stronger collaboration between national anti-doping organizations and sports federations. We recommend establishing formal agreements to facilitate the exchange of information, resources, and strategies. This would not only streamline efforts but also promote a unified approach to combating doping.

In addition, we emphasize the importance of organizing regular meetings between these entities to align objectives and ensure consistency in policy implementation. These meetings should serve as platforms to discuss challenges, share best practices, and evaluate progress.

To reinforce these efforts, it is essential to deliver consistent messaging across all levels of sports organizations. Awareness campaigns should communicate a uniform message that emphasizes fair play and ethical behavior. Clubs and federations should also invest in training spokespersons to actively promote these values and principles within their communities.

Develop more comprehensive communication campaigns

Anti-doping communication campaigns must evolve from sporadic initiatives to sustained efforts that continuously reinforce the anti-doping message. Our team recommends implementing permanent campaigns with annual milestones, such as workshops, talks, and substance-free sporting events, to maintain engagement over time.

Leveraging both traditional and digital media is vital in this process. Social media platforms like Instagram, TikTok, and YouTube can be utilized to create engaging, youth-focused content, while traditional media outlets such as television and radio remain essential for reaching broader audiences. A combination of these channels ensures a wider impact and facilitates long-term awareness.

Address disparities in anti-doping knowledge

The disparity in anti-doping knowledge among different groups of athletes is a pressing concern. Amateur and non-professional athletes, for instance, often lack access to crucial information about doping prevention. To address this, we recommend designing targeted educational programs specifically tailored to these groups. Community sports clubs and school-based programs should be included in these initiatives to ensure broader outreach.

Furthermore, educational content should be customized to meet the needs of athletes at varying levels of performance, from developing athletes to seasoned professionals. Periodic evaluations should be conducted to identify gaps in knowledge and to refine these programs accordingly, ensuring that they remain relevant and impactful.

Directions for future research

Our findings also highlight the need for further research to better understand and address the complexities of anti-doping systems. One area of interest is the practical consequences of differences in anti-doping implementation across countries. Investigating how these variations impact athletes' perceptions and compliance could provide valuable insights for refining international frameworks.

Additionally, longitudinal studies are necessary to evaluate the long-term effectiveness of prevention programs. This type of research can help determine which approaches produce the most sustainable results and offer guidance for future interventions.

Finally, incorporating athletes' perspectives is crucial for a more comprehensive understanding of anti-doping systems. Conducting surveys and interviews with athletes at various levels can complement existing data from Athlete Support Professionals (ASP), providing a more balanced and holistic view. By comparing these perspectives, we can design strategies that are both practical and athlete-centered.

The study demonstrates that there is no single model for an anti-doping programs. Effectiveness lies in the ability to balance international standards with local adaptations, prioritizing an ethical and preventive sports culture based on principles of justice and integral development of the athlete.

Closing of the process

Description of completed work:

1. Comprehensive review of anti-doping regulations in Chile and Colombia.

2. Conduct and analysis of 32 in-depth interviews with ASP from both countries.

3. Conduct of a meta-analysis of seven studies on anti-doping prevention programs.

4. Conduct of a quantitative survey with 313 elite athletes from Chile and Colombia.

5. Development and validation of a new instrument (ADSEQ) to measure athletes' perceptions of anti-doping system actions.

6. Synthesis of findings to provide a comparative analysis of anti-doping systems in Chile and Colombia.

7. Development of recommendations to improve anti-doping efforts based on research findings.

Budget summary:

- Total project budget: USD 19,000
- Spent to date (08/07/2024): USD 16,643
- Balance: USD 2,357

Breakdown of expenses:

- Research assistance: USD 13,310 (planned: USD 14,000).
- Travel expenses: USD 3,333 (planned: USD 3,480).
- General expenses: USD 0 (planned: USD 1,520).

Additional in-kind resources: USD 2,350.

Intended use of results

The findings of this research will be disseminated through:

- 1. Academic publications in peer-reviewed journals.
- 2. Presentations at international sports science and policy conferences.
- 3. Reports to national anti-doping organizations in Chile and Colombia.
- 4. Educational materials for ASP and sports organizations.
- 5. Targeted educational materials based on identified knowledge gaps.
- 6. Recommendations to NADOs to improve communication strategies and educational programs.

7. Inform policy discussions on the structure and implementation of sanctions in anti-doping systems.

The results will inform policy recommendations to improve anti-doping efforts in Latin America and other middle-income regions. We do not anticipate patentable results or commercial use of the results.

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