Tesis Doctoral Internacional / International Doctoral Thesis

Prevención del Dopaje en Deportistas de Élite

Doping Prevention in Elite Athletes

Universidad de Granada

Jaime Morente Sánchez

2014

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A mi familia:

a mi padre, a mi madre y a mi hermano

To my family:

to my father, my mother and my brother

Prof. Dr. Mikel Zabala Díaz

Profesor de Universidad

Departamento de Educación Física y Deportiva

Facultad de Ciencias del Deporte

Universidad de Granada

MIKEL ZABALA DÍAZ, profesor de la Facultad de Ciencias del Deporte de la Universidad de Granada

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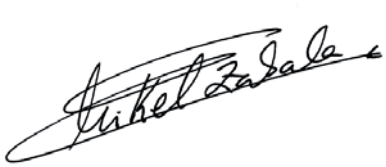

Fdo. Mikel Zabala Díaz

Granada, 20 de Febrero de 2014

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Director/es de la Tesis	Doctorando
MIKEL ZABALA DÍAZ	JAIME MORENTE SÁNCHEZ
Fdo.:	Fdo.:

Departamento de Educación Física y Deportiva
Facultad de Ciencias del Deporte
Universidad de Granada

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Jaime Morente Sánchez

Director de Tesis [Thesis supervisor]

Dr. Mikel Zabala Díaz
Profesor de Universidad
Universidad de Granada

Miembros del Tribunal [Members of the jury]

Dr. Luis Fradua Uriondo
Profesor de Universidad
Universidad de Granada

Dra. Raquel Escobar
Profesora de Universidad
Universidad de Granada

Dra. Vanessa Lentillon-Kaestner
Profesora de Universidad
Universidad de Lausanne (Suiza)

Dr. José Naranjo Orellana
Profesor de Universidad
Universidad Pablo Olavide
Sevilla

Dra. Ana Belén Peinado
Profesora de Universidad
Universidad Politécnica de Madrid

CONTENIDOS [Contents]

RESUMEN

El dopaje en el deporte, el uso de sustancias y métodos prohibidos, ha sido estudiado desde diferentes perspectivas tales como las Ciencias Sociales, la Fisiología o la Medicina. Factores psicosociales como las actitudes hacia el dopaje son considerados como un importante predictor de comportamiento dopante ante la ausencia de información más objetiva. El principal objetivo de la presente Tesis Doctoral Internacional fue analizar las actitudes hacia el dopaje en deportistas y demás partes implicadas en el deporte de élite con el fin de crear una base sólida para una mejor comprensión de la situación actual de este fenómeno en el deporte y, por consiguiente, poder colaborar en el desarrollo de programas de prevención que permitan combatir el dopaje de forma eficiente.

Esta Tesis Doctoral está compuesta por una compilación de estudios que tratan de conseguir abordar el mencionado objetivo desde distintas perspectivas. En primer lugar, la literatura científica de este campo fue revisada y analizada críticamente para crear un marco teórico desde el cual establecer diferentes líneas de investigación. En segundo lugar, la única herramienta validada para medir actitudes hacia el dopaje fue adaptada culturalmente y validada al español. El siguiente paso fue analizar la situación actual del deporte de élite, deportistas y demás partes implicadas tanto a nivel de deporte individual (ciclismo) como a nivel de deporte colectivo (fútbol). Además, se evaluó el efecto sobre el rendimiento del deportista de una sustancia (Snus-nicotina) en observación de cara a su inclusión en la Lista de sustancias prohibidas por la Agencia Mundial Antidopaje en 2013. Finalmente, se presentó una propuesta de estrategia preventiva para combatir el dopaje en el deporte de forma eficiente.

Los principales resultados de esta Tesis Doctoral Internacional ponen de manifiesto que: a) existía poca información acerca de actitudes, conocimientos y creencias sobre el dopaje en deportistas de élite; b) en general, los deportistas de élite evaluados fueron quienes mostraron unas actitudes hacia el dopaje menos permisivas en comparación con los deportistas que no eran de élite; c) los jóvenes deportistas evaluados constituyen un grupo de riesgo; d) una importante falta de conocimiento en relación a materia de dopaje fue detectada en las muestras analizadas.

Sugerimos que, aparte de mantener los controles antidopaje y hacerlos más eficientes, el establecimiento de programas de prevención, basados en estrategias educativas durante una etapa temprana de la carrera del deportista con el objetivo de establecer y reforzar actitudes no tolerantes hacia el dopaje, podrían constituir un útil complemento para erradicar la cultura del dopaje de forma eficiente a medio-largo plazo

SUMMARY

Doping, the use of banned substances and methods, in sport has been investigated from different perspectives such as social science, physiology, and medical research. Psychosocial factors, such as attitudes, are often considered as a predictor of doping behaviour in the absence of more objective information. The main aim of this International Doctoral Thesis was to analyse attitudes towards doping in elite athletes and stakeholders, in order to create a foundation to better understand the current situation of this phenomenon in sport and to improve the development of practical preventive strategies to effectively fight against it.

This Thesis is composed of a compilation of manuscripts that try to achieve that objective from different perspectives. In the first place, scientific literature on this field was revised and critically analysed in order to create a theoretical framework from which different lines of investigation could be established. Secondly, the only validated instrument to measure attitudes towards doping was cross-culturally adapted and validated into Spanish language. The next step was to analyse the current situation in elite athletes and implied stakeholders from both individual (cycling) and team sports (football). In addition, a substance (Snus-nicotine) placed on Wold Anti-Doping Agency's 2013 monitoring program was assesses related to its effect on athlete's performance. Finally, a proposal of practical preventive strategy to effectively fight against doping in sport was offered.

Main results from this International Doctoral thesis highlighted that: a) little was known about attitudes, beliefs, and knowledge related to doping in elite athletes; b) in general, assessed elite athletes showed less permissive attitudes towards doping in comparison with non-elite athletes; c) young elite athletes constitutes a risk group; d) an worrying lack of knowledge regarding doping issues was detected in analysed samples.

We suggest that, apart from maintaining doping controls and improving their efficiency, prevention programmes based on education strategies at an early stage of an athlete's career to reinforce non-tolerant attitudes towards doping could be a useful aid to effectively eradicate the doping culture in sport in the middle to long term.

INTRODUCCIÓN

"¿Dopaje en el deporte? Eso es un torbellino sin fin" declaró Callaway (2011) en la prestigiosa revista *Nature* mostrando un punto de vista pesimista sobre el fenómeno del dopaje en el deporte. El uso de sustancias prohibidas ha marcado el mundo del deporte competitivo en los últimos años. El caso Armstrong en 2012 o la Operación Puerto (2006-2013) son ejemplos evidentes. Previamente, otros casos famosos como los positivos del velocista Ben Johnson en los Juegos olímpicos de Seúl en 1988 o del futbolista Diego Armando Maradona en la Copa del Mundo de Estados Unidos en 1992, también sacudieron el mundo del deporte. Por tanto, el dopaje es un tema tabú en el mundo del deporte profesional pero, desafortunadamente, ha estado presente siempre. En 1999, después del escándalo del Tour de Francia de 1998 (caso Festina), se creó la Agencia Mundial Antidopaje (AMA). Desde 2004, la AMA actualiza anualmente el Código que regula los estándares en materia antidopaje a nivel internacional. Actualmente, dos de los siguientes tres criterios deben cumplirse para que una sustancia o método sea incluida en la lista prohibida: a) que mejore o tenga el potencial de mejorar el rendimiento **(estudio XIII)**; b) que represente un riesgo inmediato o potencial sobre la salud del deportista; y c) que atente contra el espíritu del deporte el cual queda definido en la introducción del código. Por tanto, el principal objetivo del código, y por ende, de la AMA, es preservar los derechos de todo deportista de participar en un deporte libre y limpio, promocionando la salud, la deportividad y la igualdad entre los deportistas de todo el mundo, así como garantizar programas antidopaje coordinados y efectivos tanto a nivel nacional como internacional para la detección, disuasión y prevención del dopaje (WADA, 2009).

De acuerdo con Gucciardi, Jalleh and Donovan (2011), mientras los investigadores del ámbito médico y de la fisiología se centran en mejorar métodos biomédicos para detectar el uso de sustancias prohibidas (Bahrke & Yesalis, 2002), los investigadores de la rama de Ciencias Sociales buscan una explicación para ciertos comportamientos específicos evaluando factores psicocociales tales como actitudes, valores y creencias a partir de los cuales definir contextos sobre los que poder actuar a nivel preventivo a través de programas educativos antidopaje (Backhouse, McKenna, Robinson, & Atkin, 2007). La *Teoría del Comportamiento Planeado* (Azjen, 1991)

sugiere que un comportamiento específico esta definido por una idea individual de acciones, que a su vez está regulada por la capacidad de autocontrol, normas subjetivas, y por las actitudes. En este sentido, las "*actitudes hacia el dopaje*" son consideradas como un fuerte predictor de comportamiento dopante (Lucidi, Grano, Leone, Lombardo, & Pesce, 2004; Lucidi et al., 2008).

Sin embargo, aunque los factores psicosociales podrían influir sobre la conducta dopante (Alaranta et al., 2006), poco se sabe acerca de las creencias, conocimiento y actitudes hacia el dopaje **(estudio I y II)** en deportistas de élite en comparación con otras áreas (Backhouse et al., 2007; Bloodworth & McNamee, 2010). Por otro lado, en relación al tipo de intrumento usado para medir y/o evaluar las actitudes hacia el consumo de sustancias prohibidas en la literatura científica, sólo unos pocos estudios (Morente-Sánchez & Zabala, 2013) usaron herramientas validadas (Petròczi and Aidman, 2009; Uvacsek et al., 2011), las cuales no han sido validadas ni adaptadas a nuestro idioma **(estudio III)**. A pesar de que las herramientas no validadas basadas en teorías correctamente establecidas permiten obtener información útil e interesante, un instrumento de medida debidamente validado, aparte de ser más fiable, permite realizar inferencias y comparaciones entre las diferentes muestras que lo usaron. Con el objetivo de tapar estos huecos existentes en la literatura científica, algunos de los estudios que componen esta Tesis Doctoral Internacional se centran en el análisis comparativo de las actitudes hacia el dopaje en muestras de muy alta calidad y difícil acceso tanto a nivel de deportes individuales (ciclistas de élite) **(estudios IV, V, VII)**, como a nivel de deportes colectivos (futbolistas profesionales) **(estudios X)**, usando para ello tanto herramientas ad-hoc como herramientas validadas.

Además, se debe considerar que los deportistas de élite no son seres humanos aisladas, sino que pertenecen a un contexto que incluye a su familia, entrenadores, demás miembros del cuerpo técnico, así como a otros compañeros deportistas, y que por lo tanto, esas relaciones pueden influir sobre sus actitudes hacia el dopaje y sus comportamientos específicos (Dunn & Thomas, 2012). En relación a la prevención del dopaje desde la perspectiva de las demás partes implicadas adyacentes al deportista **(estudios VI, VIII, IX, XI)**, consideramos que, de acuerdo con Vangrunderbeek y Tolleneer (2011), aparte de la educación que reciben en el entorno familiar por sus padres, un preparador físico, un profesor de Educación Física **(estudio XVII)** o un entrenador, los cuales siguen principios pedagógicos paralelos, deben transmitir a los

deportistas que el dopaje no es una alternativa (Lentillon-Kaestner, Hagger, & Hardcastle, 2012). Por tanto, a pesar de que la mayoría de las inversiones en materia antidopaje están destinadas a la optimización de los imperfectos controles antidopaje (Berry, 2008), sugerimos que un programa educativo de carácter preventivo en edades tempranas **(estudio XIV)** constituye un paso crucial para establecer y fortalecer actitudes hacia el dopaje en el deporte de élite promocionando una cultura antidopaje sólida.

INTRODUCTION

"Doping in sport? This is an endless whirl" stated Callaway (2011) in the prestigious journal Nature, showing his pessimistic point of view about the phenomenon of doping in sport. Banned substances use has marked the world of competitive sport in the last years. Lance Armstrong case in 2012 or Puerto case (2006-213) are evident examples. Previously, other famous doping cases also existed, such as Ben Johnson's in Seoul 1988 Olympic Games or Diego Armando Maradona in USA 1994 Football World Cup. Furthermore, doping in professional sport is a taboo subject but, unfortunately, it has been always present. In 1999, after the scandal of the 1998 Tour de France (Festina case), the World Anti-Doping Agency (WADA) was born. Since 2004, the WADA has annually updated their Code and related documents that outline the official international anti-doping standards. Nowadays, two of the next three criteria must be met for a substance or method to be included on the prohibited list: (a) it enhances or has the potential to enhance performance **(paper XIII)**; (b) it represents an actual or potential health risk to the athlete; and (c) it violates the spirit of sport described in the introduction to the code. Therefore, the main objectives of the World Anti-Doping Programme and the Code are to care for the athlete's fundamental right to participate in doping-free sport and, therefore, promote health, fairness, and equality for athletes worldwide, and also to guarantee harmonised, coordinated, and effective local and worldwide anti-doping programmes regarding the detection, deterrence, and prevention of doping (WADA, 2009).

According to Gucciardi, Jalleh and Donovan (2011), whereas medical and physiology researchers focus on improving biomedical methods for detecting banned substances use (Bahrke & Yesalis, 2002), social science researchers look for an explanation for that specific behaviour assessing the psycho-social factors, such as attitudes, values and beliefs, that may offer targets for preventive educational anti-doping programmes (Backhouse, McKenna, Robinson, & Atkin, 2007). The *Theory of planned behaviour* (Ajzen, 1991) suggests that a specific behaviour is a consequence on the individual's idea of actions, which is regulated by the individual's perceived behavioural control, subjective norms, and attitudes. In this sense, "attitudes" were

considered the strongest predictors for doping behaviour (Lucidi, Grano, Leone, Lombardo, & Pesce, 2004; Lucidi et al., 2008).

Nevertheless, although psycho-social factors could influence on doping behaviour (Alaranta et al., 2006), little is known about beliefs, knowledge or attitudes towards doping **(Papers I, II)** in elite athletes in contrast with other areas (Backhouse et al., 2007; Bloodworth & McNamee, 2010). On the other hand, regarding the type of tools employed to measure attitudes towards banned substances in sport in the scientific literature, just a few studies (Morente-Sánchez & Zabala, 2013) used validated tools (Petròczi and Aidman, 2009; Uvacsek et al., 2011), which have not been cross-culturally adapted to Spanish **(paper III)**. Although bespoke instruments based on well-established theories would provide very useful information, the benefit of using a standard validated measurement tool is that, apart from obtaining a higher level of reliability, inferences and comparisons could be made among different samples. In order to cover theses gaps in the scientific literature, some of the papers that compose this International Doctoral Thesis are focused on studying attitudes towards doping in high quality and difficult access samples from both individual sports, such as elite cyclists **(papers IV, V, VII)**, and team sports, such as professional football players (**paper X)**, using both ad-hoc and validated tools.

In addition, elite athletes are members of a group that includes family, coaches, support staff, and other athletes, and these relationships may influence on their doping attitudes and specific behaviours (Dunn & Thomas, 2012). Regarding doping prevention from the perspective of other stakeholders who are close to the athletes **(papers VI, VIII, IX, XI)**, we consider, according to Vangrunderbeek and Tolleneer (2011), that, apart from the upbringing received by their parents, a fitness trainer, a physical education teacher **(paper XII)**, or a coach, which follow parallel pedagogic codes, it should be made clear to athletes that doping is not an alternative (Lentillon-Kaestner, Hagger, & Hardcastle, 2012). Therefore, despite of the fact that most anti-doping funds are invested in the optimization of imperfect drug testing (Berry, 2008), we suggest that an educational prevention programme at an early stage of an athlete's career **(paper XIV)** is a crucial step to establish and reinforce non-tolerant attitudes towards doping in elite sport, promoting a solid anti-doping culture. For this reason, we have decided to share this last work as a digital publication easily accessible and

frequently visited, which is also available not only to the scientific community, but also to anyone in the world of sport, specially the Spanish speaking community.

OBJETIVOS

Objetivo general: el principal objetivo de la presente Tesis Doctoral fue analizar las actitudes hacia el dopaje en deportistas y demás partes implicadas en el deporte de élite, con el fin de crear una base sólida para una mejor comprensión de la situación actual de este fenómeno en el deporte y, por consiguiente, poder colaborar en el desarrollo de programas de prevención que permitan combatir el dopaje de forma eficiente.

Objetivos específicos:

Objetivo 1: recopilar y analizar de forma crítica los estudios de la literatura científica más reciente que describan a) actitudes, creencias y conocimientos hacia el dopaje en deportistas de élite y b) prevalencia de uso de suplementos y sustancias prohibidas en el deporte. **Estudios I y II.**

Objetivo 2: proceder a la validación y adaptación cultural de la version española de la *Escala de Actitudes hacia la Mejora del Rendimiento*, la única herramienta validada para medir actitudes hacia el dopaje. **Estudio III.**

Objetivo 3: conocer y comparar las actitudes hacia el dopaje, así como obtener información complementaria que permita comprender el contexto, en los distintos grupos que componen el ciclismo español (ciclistas de élite, directores de equipo y jóvenes ciclistas de élite). **Estudio IV, V, VI, VII, VIII y IX.**

Objetivo 4: conocer y comparar las actitudes, creencias y conocimientos en relación al dopaje, en los distintos grupos que componen el fútbol español: futbolistas (desde elite hasta élite sub-18) y miembros de los cuerpos técnicos (entrenadores, prepradores físicos y entorno/resto de personal del staff). **Estudio X y XI.**

Objetivo 5: conocer las actitudes hacia el dopaje en alumnos universitarios de Ciencias del Deporte (profesionales del deporte a corto plazo) y observar si existen diferencias en función del tipo de deporte practicado (individual, colectivo y ambos). **Estudio XII.**

Objetivo 6: evaluar la influencia del Snus (nicotina), sustancia en observación por la Agencia Mundial Antidopaje en 2013, sobre el rendimiento físico y la carga cognitiva percibida en futbolistas amateur. **Estudio XIII.**

Objetivo 7: desarrollar una propuesta de aplicación práctica para combatir eficientemente el dopaje en el deporte. **Estudio XIV.**

AIMS

General Objective: The main aim of this International Doctoral Thesis was to analyse attitudes towards doping in elite athletes and stakeholders in order to create a foundation to better understand the current situation of this phenomenon in sport, and to improve the development of practical preventive strategies to effectively fight against it.

Specific Objectives:

Objective 1: To gather and critically analyse recent publications that describe a) elite athletes' attitudes, beliefs and knowledge of doping in sport, and b) athletes' prevalence rates of supplements and banned substances**. Papers I and II.**

Objective 2: To cross-culturally adapt and validate the Spanish version of the original *Performance Enhancement Attitude Scale* (PEAS), the only validated tool to measure attitudes towards doping. **Paper III.**

Objective 3: To know and compare the attitudes towards doping, and also to get some additional information that could better explain the context in different groups involved in Spanish cycling (elite cyclists, coaches and talented young cyclists). **Papers IV, V, VI, VII, VIII and IX.**

Objective 4: To know and compare the attitudes, beliefs and knowledge related to doping in different groups involved in Spanish football: footballers (from elite to U18), and members of technical staff (coaches, fitness trainers and environment). **Papers X and XI.**

Objective 5: To understand the attitude towards doping in Spanish Sport Sciences university students (sport professionals in a short-term) and whether it varied according to the kind of sport practised (individual, team, and both). **Paper XII.**

Objective 6: To assess the influence of Snus (nicotine), a substance placed on WADA's 2013 Monitoring Programme, on amateur footballers' physical performance and perceived cognitive load. **Paper XIII.**

Objective 7: To develop a proposal of practical strategies to effectively fight against doping in sport. **Paper XIV.**

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MATERIAL, MÉTODOS, RESULTADOS Y DISCUSIÓN

Las secciones “Material y métodos”, “Resultados” y “Discusión” se presentan a continuación en cada uno de los capítulos que componen la memoria de la presente Tesis Doctoral Internacional.

MATERIALS, METHODS, RESULTS AND DISCUSSION

Sections “Material and methods”, “Results” and “Discussion” are presented below for each chapter that constitutes the mayor research of this International Doctoral Thesis.

I

DOPING IN SPORT: A REVIEW OF ELITE ATHLETES' ATTITUDES, BELIEFS AND KNOWLEDGE.

Morente-Sánchez, J., & Zabala, M.

Department of Physical Education and Sport.

Faculty of Sport Sciences (University of Granada)

Sports Medicine

2013, 43(6): 395-411

(JCR: 5.237)

Sports Med (2013) 43:395–411
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REVIEW ARTICLE

Doping in Sport: A Review of Elite Athletes' Attitudes, Beliefs, and Knowledge

Jaime Morente-Sánchez · Mikel Zabala

Published online: 27 March 2013

Abstract Doping in sport is a well-known phenomenon that has been studied mainly from a biomedical point of view, even though psychosocial approaches are also key factors in the fight against doping. This phenomenon has evolved greatly in recent years, and greater understanding of it is essential for developing efficient prevention programmes. In the psychosocial approach, attitudes are considered an index of doping behaviour, relating the use of banned substances to greater leniency towards doping. The aim of this review is to gather and critically analyse the most recent publications describing elite athletes' attitudes, beliefs and knowledge of doping in sport, to better understand the foundations provided by the previous work, and to help develop practical strategies to efficiently combat doping. For this purpose, we performed a literature search using combinations of the terms "doping", "sport", "elite athletes", "attitudes", "beliefs", "knowledge", "drugs", and "performance-enhancing substances" (PES). A total of 33 studies were subjected to comprehensive assessment using articles published between 2000 and 2011. All of the reports focused on elite athletes and described their attitudes, beliefs and knowledge of doping in sport. The initial reasons given for using banned substances included achievement of athletic success by improving performance, financial gain, improving recovery and prevention of nutritional deficiencies, as well as the idea that others use them, or the "false consensus effect". Although most athletes acknowledge that doping is cheating, unhealthy and risky because of sanctions, its effectiveness is also widely recognized. There is a general belief about the inefficacy of anti-doping programmes, and athletes criticise the way tests are carried out. Most athletes consider the severity of punishment is appropriate or not severe enough. There are some differences between sports, as team-based sports and sports requiring motor skills could be less influenced by doping practices than individual self-paced sports. However, anti-doping controls are less exhaustive in team sports. The use of banned substance also differs according to the demand of the specific sport. Coaches appear to be the main influence and source of information for athletes, whereas doctors and other specialists do not seem to act as principal advisors. Athletes are becoming increasingly familiar with anti-doping rules, but there is still a lack of knowledge that should be remedied using appropriate educational programmes. There is also a lack of information on dietary supplements and the side effects of PES. Therefore, information and prevention are necessary, and should cater to the athletes and associated stakeholders. This will allow us to establish and maintain correct attitudes towards doping. Psychosocial programmes must be carefully planned and developed, and should include middle- to long-term objectives (e.g. changing attitudes towards doping and the doping culture). Some institutions have developed or started prevention or educational programmes without the necessary resources, while the majority of the budget is spent on anti-doping testing. Controls are obviously needed, as well as more efficient educational strategies. Therefore, we encourage sporting institutions to invest in educational programmes aimed at discouraging the use of banned substances. Event organizers and sport federations should work together to

J. Morente-Sánchez · M. Zabala (✉)
Department of Physical Education and Sport, Faculty of Sport Sciences, University of Granada, c/ Carretera Alfacar s/n, 18011 Granada, Spain
e-mail: mikelz@ugr.es

J. Morente-Sánchez · M. Zabala
Doping Prevention Area, Spanish Cycling Federation, Madrid, Spain

adapt the rules of each competition to disincentivize dopers. Current research methods are weak, especially questionnaires. A combination of qualitative and quantitative measurements are recommended, using interviews, questionnaires and, ideally, biomedical tests. Studies should also examine possible geographical and cultural differences in attitudes towards doping.

1 Introduction

The use of performance-enhancing substances (PES) is not a new sporting phenomenon [1]. Since 2004, the World Anti-Doping Agency (WADA) has annually updated their Code and related documents that outline the official international anti-doping standards. Currently, two of the following three criteria must be met for a substance or method to be included on the prohibited list: (1) it enhances or has the potential to enhance performance; (2) it represents an actual or potential health risk to the athlete; and (3) it violates the spirit of sport described in the introduction to the code [2]. The aims of the World Anti-Doping Programme and the Code are to care for the athlete's fundamental right to participate in doping-free sport and thus promote health, fairness and equality for athletes worldwide, and to guarantee harmonized, coordinated and effective anti-doping programmes at the international and national level relating to the detection, deterrence and prevention of doping [3, 4].

Doping in sport has been a focus of medical, physiology and social science research in recent years. According to Gucciardi et al. [5], whereas medical and physiology researchers focus on improving methods (e.g. blood, urine and gene tests) for detecting the use of prohibited substances and to deter athletes from their use [6], social science researchers strive to better understand the psychosocial factors (e.g. attitudes, environment and beliefs) that may offer targets for educational programmes aimed at preventing this behaviour [7].

According to Petroczi and Aidman [8], in the absence of objective information on the use of performance-enhancing drugs (PED), attitudes are often used as a proxy for doping behaviour, assuming that those who use banned substances show greater leniency towards doping than those who stay clear of doping. Attitudes were also clear foci in behavioural models of doping [9–12] that were developed to identify possible risk factors for this behaviour. Consequently, researchers have identified the need to develop more sophisticated and bespoke interventions to support the athletes with attitudes that increase their likelihood of using banned substances, and the need to develop empirically tested models [7]. Based on these previous studies, it is reasonable to agree with the statement by the WADA that, in addition to medical, analytical and physiological investigation, anti-doping research should also include sociological, behavioural and ethical studies of athletes' attitudes and beliefs towards the use of banned substances in sport.

Unlike other areas [7], very few studies have focused on the attitudes, beliefs or knowledge of elite athletes towards PED [1]. One reason for this is that access to the population is not easy. In addition, athletes may be unwilling to discuss this topic with researchers, even if anonymity and confidentiality are guaranteed by the investigators [1]. Consequently, obtaining reliable information on doping behaviour is hindered by the fact that athletes are asked to admit to a behaviour that could jeopardize their sporting career [8].

While testing and research play a central and high-profile role in WADA's anti-doping strategy, their education programme is deemed central to fostering a lasting anti-doping culture in elite sports [13]. In the absence of more objective information on the use of PED among elite athletes, a greater understanding of the athletes' attitudes and their origins should allow us to develop more effective anti-doping educational programmes [1]. According to Vangrunderbeek and Tolleneer [14], if a physical education teacher's task is to educate children in a certain way, the school will be the primary source of education that children receive, apart from their upbringing by their parents. Therefore, a sports teacher or a coach that follows similar pedagogical principles must make it clear to athletes at an early age that doping is not an option.

Although the athletes' beliefs and values may influence whether or not an athlete will use banned substances in sport [8, 15], little is known about the elite athlete's attitudes. Therefore, the aim of this review is to gather and critically analyse recent publications (from 2000 to 2011) that described elite athletes' attitudes, beliefs and knowledge of doping in sport, to better understand the foundation provided by previous work and to help develop practical strategies to effectively combat doping in sport.

2 Methods

A systematic literature search was performed using a set of relevant criteria that were established a priori: (1) the study subjects consisted of "elite athletes"; and (2) the article reported on the attitudes, beliefs, and/or knowledge of doping in sport. For this study, we defined "elite athletes" as the best athletes in each sport at a national and/or international level, as suggested by Dunn et al. [16].

We searched PubMed, MEDLINE, Web of Knowledge, Scopus, and SPORTDiscus™ using a set of doping-related keywords to identify potentially relevant articles. Since

each database has unique indexing terms, bespoke search strategies were developed. The first search terms included combinations of "doping", "sport", "elite athletes", "attitudes", "beliefs", and "knowledge". To complete the search, and because of the nature of terms like "doping", in the scientific literature, we repeated the search by replacing "doping" with "performance-enhancing substance" and "drugs". In the first search that was carried out through to December 2011, we used the keyword "athletes" rather than "elite athletes" to later compare how many articles would be eliminated. The electronic search identified 99 potentially valid articles, after combining the articles retrieved from each database. When we added the term "elite athletes" to the search terms, the number of articles was reduced to 29, of which 20 met our established criteria.

We next performed a manual search of the references cited in the studies retrieved in the electronic search. This search retrieved 13 studies that met our criteria but were not identified in the original electronic search. Therefore, a total of 33 articles published between 2000 and 2011 were retrieved and evaluated. Although studies that focused on nutritional supplements were not the intended target of our review, those that met our criteria were reviewed and analysed. Articles that only reported the prevalence rates or that did not specifically refer to doping in sport were excluded. Only full papers published in peer-reviewed journals in English were included in this review (see Fig. 1).

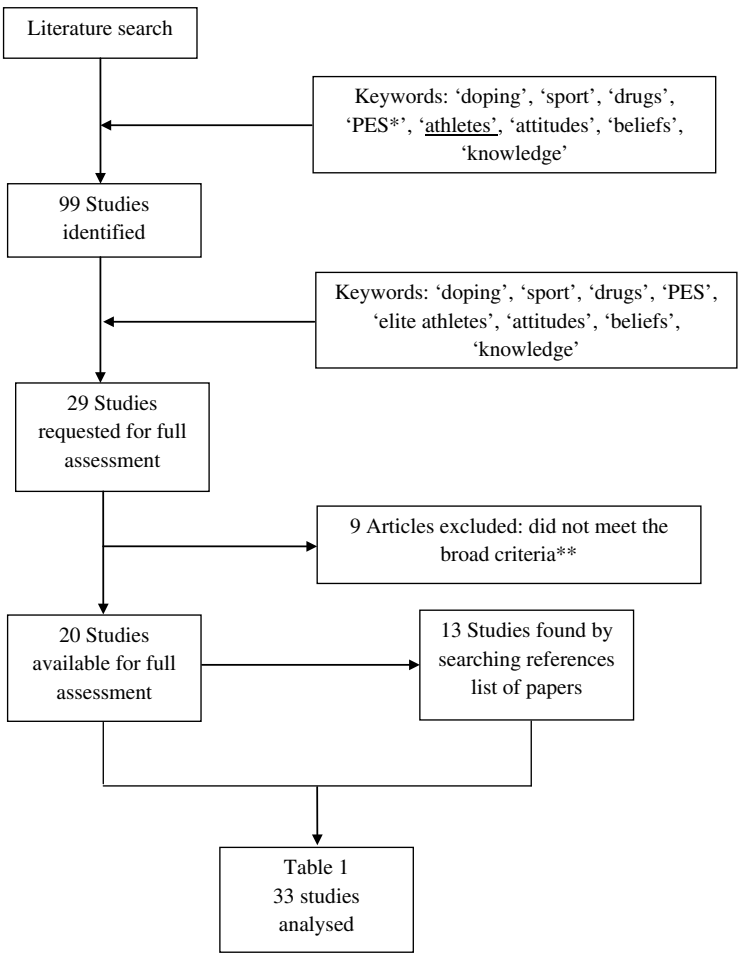

Fig. 1 Search procedure. Thirty-three studies accepted for analysis

3 Findings

3.1 Reasons for Use and Attitudes Towards Doping

To help introduce this section, we should consider that there are different approaches to explain doping behaviour. One is "realistic evaluation", which considers that outcomes (behaviours) are the sum of the mechanisms and the context [17]. This could consist of an influential approach to assess social promotion programmes, such as those promoting health. The MINDSPACE (Messenger, Incentives, Norms, Defaults, Salience, Priming, Affect, Commitment and Ego) framework [18] identified nine factors that could influence behaviours in mostly automatic, rather than deliberate, ways. This theory should be evaluated in the context of pro- or anti-doping decisions because these decisions seem to be more deliberate than automatic.

According to Lucidi et al. [11], the "theory of planned behaviour" [19] suggests that behaviours depend on the individual's plan of actions towards a specific behaviour (i.e. intentions), which is regulated by the individual's perceived behavioural control, subjective norms and attitudes. In this regard, Lucidi et al. [20] reported that "attitudes" were the strongest predictors for the intention to use doping substances.

3.1.1 Reasons for Use

Striegel et al. [21] described that the most frequently reported reasons for drug use were to achieve athletic success (86 %) and for financial gain (74 %). The responders ($n = 101$) also described that their motives included increasing self-confidence (30 %) and social recognition (24 %). Similar results were reported by Backhouse et al. [7] in their exhaustive review submitted to WADA in 2007. Pitsch et al. [22] reported that 5.1 % of the participants in their study were encouraged to engage in doping practices by their coaches and 6.5 % were encouraged by their family members and friends. However, in another study ($n = 40$), the athletes perceived no external pressure to encourage their use of PED, although the respondents did cite several reasons for their use, including to aid recovery from injury and the economic pressures of elite sport [1]. Although PES are not necessarily defined as PED (the latter are PES, but they are also substances specifically banned by WADA), we should take into account the reasons given by athletes for their use, particularly because of the close definitions of PES and PED, and the classification of some compounds, which could change each year (as with caffeine). From this context, Nieper [23] described, in a small study of 34 elite junior athletes, several different reasons for using PES as follows: to protect health (45 %), to enhance the immune system (40 %) and to improve performance (25 %). Similar results were observed in the study by Kim et al. [24], in which PES were reported to improve recovery ability (66 %) and muscle performance (22 %). Erdman et al. [25] stated that the three most popular reasons given for considering supplementation in a study of 582 athletes were to increase energy (54.3 %), to maintain health or prevent nutritional deficiency (53.8 %), and to improve exercise recovery (52.2 %). In other study, 15 % of the responders ($n = 403$) reported that supplement use is necessary to be successful in sport [26].

Meanwhile, all of the young elite cyclists ($n = 8$) interviewed by Lentillon-Kaestner and Carstairs [27] took nutritional supplements in the belief that they improved their performance. Hence, they were attracted to doping and admitted that they were open to using doping substances themselves if they considered it was essential to continue their cycling career, but only after they became professional. In another study of the same sample, Lentillon-Kaestner et al. [28] reported that the pressure exerted by team staff and doctors on the use of banned substances by cyclists has become less important and less direct after various doping scandals.

Dunn et al. [29] considered the so-called concept of the "false consensus effect", which has been discussed elsewhere [30, 31]. This term suggests that athletes with a history of illicit drug use overestimate the prevalence of drug use among other athletes. These results warrant much attention because the participants tended to report a higher prevalence of drug use among athletes in general compared with athletes in their own sport. Although overestimation of drug use was not common, it appeared to be influenced by the participants' history of drug use. In this context, Tangen and Breivik [32] showed that an individual's decision to take banned substances is influenced by the assumption that his or her competitors are also taking drugs [13]. Similarly, in the study by Uvacsek et al. [31], 14.6 % of 82 athletes acknowledged using banned substances and 31.7 % reported using recreational drugs. Moreover, those who admitted to using PED significantly overestimated the prevalence of doping in their sport (Mann–Whitney $U = 299.00$; $p = 0.098$) compared with those who abstained from doping. Therefore, it seems athletes who believe that others are taking PED are more likely to start using them as well, which could establish a vicious cycle that propagates the pro-doping culture. This is why people around athletes (i.e. physicians, coaches, family, and friends) must be very careful about the "false consensus effect" when talking about doping. It is important that these stakeholders stress the importance of avoiding doping and do not exaggerate the supposed use of PED or the assumption that those who achieve success are taking PED.

3.1.2 Attitudes Towards Doping

According to earlier studies [1, 7], the general lack of scientific literature describing elite athletes' attitudes towards doping could be due to the difficulty in convincing athletes to discuss this topic with researchers.

Peretti-Watel et al. [33] conducted a cross-sectional study of elite student athletes ($n = 458$) in France. Almost all responders (90 %) reported that doping was dishonest, unhealthy and/or risky because of sanctions. In another study, 74.0 % of the athletes stated that the use of banned substances is dangerous or very dangerous to health [15]. De Hon et al. [34] assessed the attitudes of Dutch elite athletes ($n = 433$) towards various anti-doping matters. In that study, 91 % of the respondents reported that they would feel guilty if they used banned substances themselves. Similar results were reported by Bloodworth and McNamee [1], who interviewed 40 English elite young athletes organized into 12 focus groups. Their respondents, generally, viewed doping as "unnatural" and considered the shame associated with doping was a significant deterrent. Mottram et al. [35] reported that the majority of responders ($n = 507$) were of the opinion that stimulants enhance performance, pose a risk to health and their use is against the ethical spirit of sport.

In a cross-sectional study of 458 elite student athletes in France, three groups of subjects were identified according to their attitudes towards doping, health and performance: (1) those who considered doping as both dangerous and useless (Cluster 1; $n = 242$; 52.8 %), (2) those who viewed doping as dangerous but helped improve performance (Cluster 2; $n = 103$; 22.5 %); and (3) those who regarded doping as a dangerous but an essential adjunct to sporting and nonsporting achievement (Cluster 3; $n = 113$; 24.7 %) [33]. In a complementary study, Bloodworth et al. [26] conducted a survey of 403 talented athletes on their attitudes towards doping. In response to the question "How much do you agree or disagree with the following statement: You have to take supplements to be successful in sport", 45.4 % of young athletes disagreed and 33.0 % strongly disagreed. The responders, in general, also expressed a strong belief that no substance should be allowed for performance-enhancing purposes.

Alaranta et al. [15] assessed the self-reported attitudes of 446 Finnish elite athletes and 90 % believed that banned substances had performance-enhancing effects. In addition, 7.3 % of the athletes reported that they would use PES if their use was allowed (9.2 % men vs. 7.3 % women; $p = 0.05$). Notably, 96.9 % of the athletes considered that it is possible to reach the highest international level in sport without using banned substances or methods. Dascombe and Karunaratna [36] reported similar results, as 87 % (63/72) of athletes in their study had used nutritional supplements, while 63 % (45/72) recognized that their use could violate doping regulations.

Breivik et al. [37] compared the attitudes of Norwegian elite athletes ($n = 234$) with those of the general public ($n = 428$) and reported that elite athletes were more reluctant to use PES. Although the use of non-banned nutritional supplements was considered acceptable by more than 65 % of both groups (athletes and general population), both groups rejected the use of erythropoietin, anabolic steroids and amphetamines. In this context, Connor and Mazanov [38] considered that elite athletes constitute a discrete group with a set of norms, values and beliefs that are quite different from those of the wider population. This could be directly related to the different motivations, objectives, necessities, pressures, knowledge and other external influences placed on elite athletes, which could result in different behaviours. Therefore, comparisons between general populations and elite athletes, or even between athletes in different types of sports, should be made with caution.

Lentillon-Kaestner and Carstairs [27] interviewed eight Swiss elite young cyclists who reported that doping was acceptable at the professional level in cycling but not at the amateur level. Another study [39] stated that among Polish athletes ($n = 830$) who showed moderately positive attitudes, their attitudes towards anti-doping controls were much stronger than they were towards sanctions (multivariate analysis of variance [MANOVA]: Wilk's $\lambda = 0.74$, $F_{(3,782)} = 89.34$; $p < 0.001$), Furthermore, females were significantly less permissive than males (MANOVA: Wilk's $\lambda = 0.96$, $F_{(4,780)} = 8.55$; $p < 0.001$).

Bloodworth et al. [26] reported that the use of any substance to improve concentration was the most acceptable, while gene manipulation was the least acceptable in a survey of 403 athletes. In their study, 10 % responded that they would take a "magic" drug. Meanwhile, 72.6 % reported that at least some other athletes would take the drug if it had no harmful effects, while more than 40 % reported that some athletes would take the drug, even if it shortened the lifespan. Similar results were obtained in the study by Bloodworth and McNamee [1], in which a minority of athletes would consider using a banned hypothetical PES if it guaranteed success and was undetectable. Similarly, 5 % of English footballers ($n = 706$) reported that they would take banned PES if it could guarantee them selection for the national team in the next World Cup [40].

Barkoukis et al. [41] studied the motivational, achievement goals and sportspersonship profiles of 1,075 elite athletes in terms of their doping behaviour. A cluster analysis revealed three important segments with respect to self-determination (intrinsically motivated, extrinsically motivated and amotivated athletes). Amotivated athletes ($n = 129$) had significantly higher scores for past use of

prohibited substances and intentions for future use compared with intrinsically motivated ($n = 449$) and extrinsically motivated athletes ($n = 457$). On the other hand, no significant difference ($p > 0.05$) in the past use of banned substances and intentions for future use was found between athletes with high- and low-levels of sportspersonship. Peretti-Watel et al. [42] also used cluster analysis to summarize the attitudes towards doping among 996 elite student athletes ($F_{(2,1016)} = 0.221$; $p > 0.05$; $F_{(2,1014)} = 1.27$; $p > 0.05$). It was stated that 52.8 % of participants were prone to agree with a variety of statements dealing with sport- or non-sport-related benefits of banned PES.

Lazuras et al. [43] examined the predictors of doping intentions in Greek elite athletes because they expected that their attitudes, social norms (descriptive and injunctive) and behavioural control beliefs (reflecting both internal and external control processes) would significantly predict doping intentions. Pearson's correlation coefficients revealed that social desirability was negatively but significantly correlated with doping intentions ($r = -0.16$; $p < 0.001$) and situational temptation ($r = -0.27$; $p < 0.001$), which suggests that past and current doping behaviour strongly predicts doping intentions. According to these authors, behavioural control and attitudinal beliefs can be changed to reduce the future risk of doping. Therefore, according to Peretti-Watel et al. [33], other factors associated with a positive attitude towards doping include (1) a low personal and parental academic achievement; and (2) extensive involvement in sports, as assessed by the number of hours per week spent engaging in sporting activities.

On the other hand, a study of 830 Polish elite athletes showed an association between goal orientations and attitudes towards doping [39]. Using multiple regression analyses, it was shown that ego or achievement orientation was significantly negatively associated (i.e. more permissive) whereas task orientation was significantly positively associated to (less permissive) to attitudes towards doping.

Based on these studies, it could be argued that athletes are aware of the fact that the use of PED constitutes cheating, and that the athletes generally show anti-doping attitudes. However, it seems that there is a significant difference between what some athletes say and what they really think, which is a major limitation of these surveys.

3.1.3 Attitudes Towards Doping Controls

Dunn et al. [16] stated that 75.9 % (738/974) of Australian elite athletes considered testing an effective deterrent to drug use. In addition, 59 % (575) of the athletes agreed/strongly agreed that there should be separate punishments for being caught using an illicit drug and being caught using a banned PES in their sport.

On the other hand, Chester et al. [44] reported that this anti-doping system is only reaching elite athletes, not those who have the potential to become elite. According to Striegel et al. [21], who surveyed 74 sports athletes, measures should be taken, such as improved doping controls, to eradicate doping in sport. Overall, 79 % of the respondents did not regard current dope testing to be sufficient. A similar conclusion was reached by Alaranta et al. [15].

These findings raise doubt about the ability of the current dope testing programme to detect banned substances because the relatively high level of recreational drug use is not reflected in the number of positive tests, which means that many football players could avoid potential detection [31]. Additionally, official statistics on drug tests could considerably underestimate (8-fold lower) the real prevalence of doping among elite athletes [45]. Therefore, many authors have different opinions regarding the current anti-doping programmes, most consider them to be quite ineffective.

Other studies [46, 47] have highlighted another problem with respect to dope testing, namely false-positive results. Berry [47], in a commentary published in *Nature*, stated that "Floyd Landis, a disqualified cyclist after winning the 2006 *Tour de France* for doping, had an 8 % probability of being innocent". Berry also recommended that this situation must be remedied because cheaters evade detection and innocents are falsely accused. One example is the seven-time *Tour de France* winner Lance Armstrong, who never tested positive during his career, was not free of suspicion, and years later was investigated, found guilty and, consequently, sanctioned. The sensitivity and specificity of a test should also be determined with a high level of accuracy before any conclusion on doping can be reached [47]. This was the case for the *Tour de France* winner Alberto Contador, who tested positive for clenbuterol (concentration, 0.00000000005 g/ml) using a highly sensitive test that had never been used before. In his case, it took more than 1 year of deliberations before his title was eventually stripped.

On the other hand, Waddington et al. [40] highlighted the limited number of controls in English elite-level football and commented that a system which allows many players to say that they do not expect to be tested in the next year is not an efficient system. They reported that one-third of English professional footballers had not been tested within the preceding 2 years and 60 % considered that they were unlikely to be tested in the next year. Surprisingly, only one in eight players ($n = 706$) had undergone blood tests at their club. In this regard, Alaranta et al. [15] concluded in their study, which compared attitudes towards doping according to the type of sport, that "controlling doping only by tests is not sufficient".

Anti-doping researchers are continually searching for new tools to catch cheaters. Indeed, several new

instruments have been introduced, such as the "biological passport"; however, these instruments are still subject to criticism [48]. Additionally, some elite athletes, who are enrolled in a system run by WADA called Anti-Doping Administration & Management System (ADAMS) [2], are required to be available for testing without advance notice throughout the year and must inform the corresponding authorities where they are at each moment. If an athlete provides incorrect information or cannot be found when a test is intended to take place, he or she could be given a warning. According to current anti-doping regulations [2, 4], three such warnings within 18 months may be regarded as a violation of the doping regulations and may lead to exclusion from sport for between 3 months and 2 years. According to Hanstad and Loland [49], however, the location reporting system is controversial because it does not respect ideas of justice or the athletes' autonomy and right to self-determination. De Hon et al. [34], who studied 433 Dutch elite athletes, also consider the ADAMS and location reporting system to be the most controversial anti-doping rule. Overall, 61 % of the athletes in that study had experience of reporting their location, but 33 % regularly experienced problems with fulfilling the ADAMS requirements. However, the testing procedure itself was slightly less controversial, as more than half of the athletes supported the principle of out-of-competition testing.

There is a lack of studies comparing attitudes among different sports, particularly the attitudes of athletes to doping controls. To our knowledge, no studies have compared the impact of geographical or cultural influences on these attitudes, for example how doping controls are perceived by European versus African elite athletes, or whether religion and/or economic status can affect these perceptions. These factors should be taken into account in further research.

3.1.4 Attitudes Towards Punishment

According to Waddington et al. [40], 59 % of 706 football players considered the level of punishment for the use of banned drugs was correct, 25 % felt it was not severe enough, and 3 % suggested that the punishment was too severe. Similar results were reported in the study by Striegel et al. [21], where 74 % ($n = 74$) of the athletes supported governmental interventions in anti-doping efforts through the establishment of anti-doping laws. In the study by Pitsch et al. [22], 16.7 % of the responders ($n = 448$) admitted knowing of cases where athletes had tested positive for doping but were not sanctioned. Consequently, the punishment system was considered to be too weak.

Based on these findings, we suggest that the involved institutions (i.e. WADA, International Olympic Committee, national anti-doping agencies and national/international sport federations) develop a testing protocol directed at athletes under suspicion of doping, taking into account their competitive calendar and doping-sensitive moments during the season, rather than conducting randomized tests or conducting tests only during competitions.

On the other hand, D'Angelo and Tamburrini [50] considered that the doping debate has traditionally been dominated by stakeholders who desire to see doping forbidden (i.e. the prohibitionist view) and those who want to see it acceptable (i.e. the ban abolitionist view). These authors proposed a third position, starting from the assertion that dope use is a symptom of the paradigm of highly competitive elite sports, in the same way addictions reflect the current social paradigms in the wider society.

Future studies should attempt to discriminate between the views and opinions of elite athletes involved in different sports (e.g. football vs. cycling) on testing and punishments. As described above, these studies should also take into account possible geographical/cultural differences.

3.2 Doping and Different Types of Sport

The status of doping in different sports has been examined in several studies. For example, Waddington et al. [40] reported that English professional footballers undergo drug tests less often than many other elite athletes, with only about 33 % undergoing tests each year. The authors also reported that 77 % of elite track and field athletes considered that they were certainly or were likely to be tested out of competition each year, compared with just 40 % of footballers, with 2 % and 38 % certainly or likely to be tested, respectively.

In the study by Peretti-Watel et al. [42], 52.8 % of participants were prone to agree with a variety of statements focusing on the benefits of doping in a sample of 996 young elite athletes. This behaviour was linked to motives to participate in sports, and it was more prevalent among friends, older responders, those practicing an individual sport (e.g. athletics or cycling) without frequent contact with other athletes and those registered in a training centre dependent on a professional club.

Alaranta et al. [15] conducted a study of 446 Finnish elite athletes, of which 30 % knew another athlete who used banned drugs. Notably, 42.5 % were stress power and speed athletes, and 37.0 % were endurance athletes. On the other hand, just 17.8 % of athletes involved in motor skill-demanding activities knew another athlete who used banned drugs. In addition, 15 % of the athletes reported that they had been offered banned substances, including 21 % of the speed and power athletes, 14 % of team sport athletes and athletes in motor skill-demanding events, and 10 % of the endurance athletes. In another study, Alaranta

et al. [51] noted that the type of sport had a significant impact on medication use. Among speed and power athletes, 18.6 % had used prescribed non-steroidal anti-inflammatory drugs (NSAIDs) and 4.4 % had used oral antibiotics during the past 7 days, whereas endurance athletes more frequently reported the use of anti-asthmatic and anti-allergic drugs.

Lazuras et al. [43], took into account the type of sport in their analysis of the use of PES in a cohort of 750 Greek elite athletes. They found that the use of banned drugs was significantly more common ($p < 0.005$) in individual sports (14.4 %) than in team sports (7.4 %). On the other hand, Mottram et al. [35], in a study of 507 elite athletes who represented ten Olympic sports, found that athletes involved in athletics, cycling and weightlifting were more likely to know and understand doping rules than athletes in other sports.

Lentillon-Kaestner et al. [28] highlighted the statements made by young cyclists who reported a distinction between two generations of cyclists: cyclists within the new generation, and those in the older generation who started their cycling career before the "Festina scandal" in 1998 in which different cycling teams participating in the *Tour de France* were involved in the use of banned substances. According to the cyclists in that study, doping use has declined among professional cyclists. The study also highlighted that most current cyclists decide not to use banned substances. In the past, the cyclists that chose not to take banned PES were marginalized. The cyclists surveyed acknowledged that doping organizations appear to have become more individualized. Hence, the authors concluded that, although the use of banned substances is becoming less widespread, the substances used are similar to those used in institutionalized "doping" programmes among cycling teams in the 1990s.

It could be argued that the differences between sports could be related to the independence of sport federations in most competitions, which only seems to be reduced in the Olympic Games. It is also possible that the number and quality of controls in each sport differ substantially (e.g. cycling vs. football). Therefore, because doping is a general issue, we suggest that all sport federations follow the same anti-doping protocols to avoid unfair situations among sports.

3.3 Sources of Information

In terms of advice on supplement use, the studies have revealed different but interesting data. Waddington et al. [40] suggested that English professional footballers took advice from the club's physiotherapist (28 %), 21 % from a fitness trainer, 21 % from another sports scientist (e.g., nutritionist), while the club's doctor was their last option (15 %). Surprisingly, 18 % acknowledged that they used supplements without taking advice from anyone. Nieper [23], in a survey of 34 British junior team athletes, noted that coaches provided the greatest influence (65 %), followed by sports dieticians (30 %) and doctors (25 %). Nieper also emphasized that, even though most athletes (72 %) had access to a sports dietician, they often underutilized this resource. In contrast, Somerville et al. [52] reported that the doctor was the first option for 62 % (46/74) of athletes in their study.

Other studies showed different sources of information. Erdman et al. [25], in a sample of 582 high-performance athletes, showed that the most common sources of information on the use of PES were family/friends (52.7 %), team mates (44.3 %), and coaches (40.7 %). Similar results were obtained in a study of Korean Olympic athletes [24], where the most common sources of information were parents (36 %) and coaches (35 %). In the study by Peters et al. [53], 25 % of elite athletes ($n = 1{,}757$) stated that their coach was the first contact for doping issues. Additionally, only 24.6 % of the athletes actively tried to obtain information, with the Internet being the most used source (42.1 %). In this context, Thomas et al. [54] reported that improving accessibility to reliable information via the Internet could be an effective way to help educate athletes on the effects of doping. Accordingly, we suggest that it is important to educate the people surrounding athletes, as they are often the most influential. People who induce and/or support the use of banned substances by athletes should also be punished. Nevertheless, if we educate athletes, they can search for appropriate sources of information and also evaluate its quality.

3.4 Measurement Instruments

A recent comprehensive review [55] reported that the current research methods used to examine attitudes towards doping in sport are weak. For most of the measurement tools, the scale development process was not reported at all, or not in sufficient detail. Furthermore, the scales were not subjected to psychometric testing, which seriously undermines the validity and reliability of any inference made based on the resulting scores [8]. Consequently, the bespoke measures, such as anonymous self-reported questionnaires that were developed and used for a single research project, could have limited scientific reliability.

Taking into account the few validated measurement tools [5, 25, 31, 39] used to assess attitudes towards doping in sport, the study by Petroczi and Aidman [8] must be emphasized because they developed a specific psychometric instrument, the Performance Enhancement Attitude Scale (PEAS). According to these authors, when the test scores are interpreted as one's attitude, and when

inferences are made for a specific population, it is essential to demonstrate reliability and validity of the scale. Methodologically, repeated use of a scale is encouraged because it provides researchers with empirical evidence for the test's validity and reliability. The PEAS has since been used in other studies, including the study by Uvacsek et al. [31]. In that study, as was expected, of 82 Hungarian competitive athletes assessed, those who confessed to drug use (12 %) scored significantly higher on the PEAS compared with those who reported no use of banned drugs. However, as this validated measurement instrument is completed as a self-report questionnaire, it has some limitations. Chester et al. [44] suggested that data collected using self-report questionnaires should be interpreted with caution because the answers may be intentionally false as the respondents may not wish to reveal that they or their team mates use drugs, even if anonymity and confidentiality are guaranteed by the investigators.

Several authors have considered the use of other instruments or have combined different measurement tools in their studies. For example, interviews, which are considered to be more reliable, were conducted in relatively few studies [22, 27, 28, 45, 53, 56]. Bloodworth and McNamee [1] conducted interviews of focus groups, whose discussions were recorded and transcribed in their qualitative study. Meanwhile, Thomas et al. [54] collected data using quantitative surveys and qualitative interviews with key experts who came into contact with elite athletes. Pitsch et al. [22] considered that interviews can provide more reliable information for questions related to illegal practices. In this context, Striegel et al. [45] sought to estimate the prevalence of doping abuse by surveying 1,394 athletes with an anonymous standardized questionnaire (SQ) and interviewed 480 of them using a randomized response technique (RRT). According to the RRT data, 6.8 % of the athletes confessed to having used banned drugs, whereas the results of the SQ revealed only 0.20 %, 4-fold fewer, had used banned drugs ($p < 0.001$). Although interviews seem to show greater reliability than questionnaires, very few studies have used this technique because access to elite athletes is very difficult [1]. Therefore, discussions between athletes and researchers on such a delicate matter may not be valid.

Another measurement tool that could be used to evaluate attitudes towards doping is Discursive Psychology (DP). However, of all the studies identified in our search, only one used this theoretical and methodological framework [57]. That study explored how one high-profile athlete, the Australian cricketer Shane Warne, accounted for his drug-taking behaviour when talking to the media. The authors argued that, to better understand drug use in sport, researchers need to understand how athletes talk about drugs. However, the use of media interactions as a source of data are not common in sport psychology, possibly because this information could be biased as the users of PED are likely to lie to the media to protect themselves from the possible economic and sociologic consequences associated with admitting to PED use.

A combination of both qualitative and quantitative measurements, ideally including less-invasive biomedical tests (e.g. based on hair and/or salivary samples), should be used to objectively determine attitudes towards doping in sport and to assess the efficacy of intervention programmes by understanding what is working and why. Therefore, we suggest that validated and comparable tools should be used in such research.

3.5 Knowledge About Doping and Its Side Effects

According to Petróczi and Aidman [8], increased knowledge of the risk factors and a better understanding of the causes of doping behaviour are among the priorities of WADA [58]. In this context, Erdman et al. [25] reported that 76.7 % of 582 responders said that they were aware of anti-doping regulations and 89.5 % believed they were following the regulations for anti-doping. However, only 63.2 % of the participants reported having access to anti-doping information. Moreover, Maughan et al. [59] reported that supplements are often used without full understanding or evaluation of the potential benefits and risks associated with their use, and without consultation with sports nutrition professionals. Additionally, Dascombe et al. [36] reported that among athletes who used supplements (63/72), many did not know their supplement's active ingredient (61.9 %, 39/63), possible side effects (57.1 %, 36/63) or the mechanism of action (54.0 %, 34/63). Furthermore, 57.0 % (36/63) admitted that they wanted additional information and only 52.4 % (33/63) knew the recommended supplement dosages. In a study of 706 English professional footballers, Waddington et al. [40] found that 68 % were aware of UK sport guidelines on banned drug use, but the remaining 32 % were not. Backhouse et al. [7], in their report on drug use in sport submitted to WADA in 2007, found similar results, supporting the fact that athletes should be more aware of doping-related information.

To test athletes' understanding of doping in sport, Mottram et al. [35] conducted a questionnaire survey of 507 athletes from four English-speaking nations (Australia, Canada, the UK and the US) in which they were to answer four questions related to their knowledge of punishments for doping and the status of certain substances on the prohibited list. Overall, 50.5 % knew the penalty incurred following a doping violation involving a banned stimulant. The terms "Monitoring Programme" and "Specified Substance List" were known by 43.3 % and 67.5 % of responders, respectively. The status of substances on the

Prohibited List was correctly identified by just 35.1 % of the subjects. Interestingly, younger athletes (aged ≤20 years) were generally less knowledgeable than older athletes, although the difference was not statistically significant ($p = 0.367$).

Peters et al. [53] stated that 66.4 % of 1,757 competitive athletes surveyed wanted more detailed information on doping. Similar results were obtained by Nieper [23] where 25 % of 34 track and field elite athletes surveyed believed they had average knowledge of dietary supplements, while 75 % felt that they needed more information. De Hon et al. [34] surveyed 433 Dutch elite athletes and observed that their knowledge of the Prohibited List and doping regulations was good (7.1–8.8 on a scale of 0–10). They concluded that athletes would support better international coordination, more educational opportunities and more anti-doping instructions for their technical personnel. In, another study [52], 90 % of responders ($n = 74$) had received a doping educational update in the last 6 months, and clearly agreed (with a score of 6.0, on a scale from 1 = strongly disagree, to 7 = strongly agree) with the statement "I have received the information; I need to avoid getting into trouble with the doping laws". However, more than half of the responders agreed with the statements "I should receive reminders more often" and "authorities should do more to educate sportspeople".

Focusing on the side effects of PES based on the studies reviewed here, we can conclude that elite athletes' knowledge of doping and its consequences can be improved. For example, in the study of Erdman et al. [25], 83.5 % of 582 high-performance athletes were ignorant of the possible side effects associated with each supplement or failed to document the known side effects. Also, Dascombe et al. [36] concluded that, of athletes using supplements (63/72), only 57.1 % (36/63) knew the possible side effects. In relation to illicit drug use in sport, a short negative impact on mental functioning, including altered perception, concentration, judgement and decision making, was reported by two-thirds of a sample of 974 Australian elite athletes [60]. Lentillon-Kaestner et al. [28] interviewed eight elite cyclists whose statements let authors reach the conclusion that "most of the time, the cyclists trivialised the side effects of banned substances. Many cyclists said that it was worse for their health if they took nothing than to use these substances. They considered high-level sport as very dangerous for their health and to preserve good health it was necessary to be treated". On the other hand, many studies have evaluated the use of dietary supplements, and an important side effect associated with their use could be the risk of a positive doping test result [58]. Indeed, Dascombe et al. [36] stated that 47/72 Australian elite athletes considered "positive doping results" as a potential risk of supplement use.

Although athletes seem to be more aware about doping in general, we think that it is important that sport federations or organizers are made aware of the fact that everything needs to be standardized and, in some cases, this could require adaption of the competition to preserve the athletes' health. For example, this could entail shortening the length of some stages in cycling events, providing a longer rest between stages and emphasizing, when possible, the importance of technical/tactical aspects of the sport rather than the physical aspects. In fact, it seems that cycling is slowly changing in relation to changes in doping policy and performance, as the speed of major cycling races has slowed following recent anti-doping efforts [61].

3.6 Prevention and Education

"Controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed" [15]. This statement synthesized the current situation in relation to doping in sport according to most of the studies reviewed. Since Backhouse et al. [7] submitted their report on the doping situation to WADA, it seems that, although the biomedical and legal perspectives have been developed and reinforced, this has not been the case in terms of education and prevention. The practical applications from that report in 2007 are still up to date and need to be supported economically by institutions. Since drug testing alone can fail, as was suggested in the case of Lance Armstrong, we believe that education is the only way to truly minimize the doping culture and reduce the cases of doping in the middle to long term.

According to Peters et al. [53] and Lentillon-Kaestner et al. [28], preventive measures are needed to establish and fortify attitudes towards doping at an early stage of an athlete's career. Elite athletes are members of a group that includes family, coaches, support staff and other athletes, and these relationships may encourage or minimize the behaviour towards the use of banned substances [62]. For instance, changing favourable attitudes towards doping into unfavourable ones, and teaching athletes how to resist pressure to engage in doping under risk-conducive circumstances, may help to reduce the intentions to engage in doping, even among athletes with a history of drug use [43]. Therefore, courses allowing for doping-related discussions and informative Internet platforms would be particularly welcome for athletes and coaches [45]. Besides, Sas-Nowosielski and Swiatkowska [39] highlighted that, with the increase in task orientation compared with ego orientation, the attitudes towards doping have become more favourable. They concluded that creating a motivational climate which promotes task orientation may aid anti-doping efforts. Striegel et al. [21] reported that the most frequently suggested methods of improving athletes'

knowledge were to increase awareness using website platforms and provide regular updated lists of acceptable medicines and supplements. Mottram et al. [35] reported that elite athletes required targeted education strategies that would enable them to make informed decisions on the potential properties of medications for therapeutic or performance-enhancing purposes. According to them, delivery of this information is also incumbent on national federations and the support personnel, including team doctors. Indeed, Kim et al. [24] reported that 79 % of Korean Olympians received regular education on anti-doping regulations from Olympic-sponsored education classes (64 %) and coaches (15 %). Striegel et al. [21] reported that 92 % of 74 elite athletes surveyed received a doping education update within the last 6 months, and most believed that the update was relevant. In addition, the educational requirements of team doctors in relation to doping laws need to be assessed [52]. These authors considered that the use of Internet-based resources capable of delivering up-to-date information on banned substances should be promoted. Indeed, the Spanish Cycling Federation has been conducting an intervention project called "Preventing to Win" since 2009, with the aim of educating the cyclists and coaches of the future [63].

Knowledge on doping issues should be maintained, but more personal ways to accommodate for specific individual questions during educational meetings should be considered [34]. In this way, Erdman et al. [25] proposed that individual consultations on dietary supplement use may be a more appropriate educational strategy for older competitors, whereas presentations given by credible sports medicine and sports science professionals may be better suited for younger athletes. Gender differences regarding the types of supplements selected should also be considered within these educational strategies. These authors, similar to Nieper [23], believe that the athletes' advisors, including their family, friends and coaches, would also benefit from education on dietary supplements, particularly in relation to anti-doping laws and associated risks of supplement use. Indeed, many authors have proposed that the immediate and long-term adverse effects of the use of medications should be taken into account in prevention programmes [15, 64].

Several studies have evaluated the efficiency of current anti-doping education programmes. Peters et al. [53] reported that the current development of information has not been sufficient. Most of the preventive messages concerning the use of banned substances in sport are ineffective for three major reasons (1) the content of the message (2) the athletes receiving the information; and (3) the person giving out the information [28]. In this context, these authors explained that informing athletes of the side effects and possible health risks does not necessarily reduce the use of medications or change attitudes. The authors have stated that the messages must be surprising, intense and cause a heightened emotional reaction.

Peretti-Watel et al. [42] suggested that information and preventive actions targeting young athletes should not focus on the anticipated negative effects of doping, because this population already seems to be well aware of the deleterious consequences of doping. Thomas et al. [54] emphasized that many sporting organizations in Australia conduct drug information seminars for their athletes, but it is unclear whether these programmes provide athletes with pertinent drug information in formats that are conducive to information retention. Callaway [48] stated in the journal *Nature*, that "this is an endless whirl" describing his pessimistic view on the phenomenon of doping in sport. On the other hand, a more positive view was recently given by Zabala and Atkinson [65], who suggested that the principles to be followed should build on the so-called "athlete 2.0". This concept supports the idea of sport based on ethics and science as a collaborative challenge for all the stakeholders, which should also provide optimal education to the athletes.

We encourage institutions (e.g. WADA, national anti-doping agencies, national/international sport federations, regional governments in sport, and other national/regional sport foundations or sports institutes) to invest more money by balancing the costs of control and prevention programmes. Sometimes, institutions develop and start prevention or educational programmes without suitable financial investment. Better controls are clearly needed, as are more effective educational programmes that do not necessarily involve greater financial investments.

3.7 Summary of the Analysed Studies

The main findings of the studies included in our review are summarized in Table 1. Based on the studies identified in our search, and as listed in Table 1, there are several aspects that we wish to emphasize. First, the researchers used the following tools: questionnaires (72.73 %, 24/33), interviews (12.12 %, 4/33), questionnaires and interviews (12.12 %, 4/33), and focus groups (3.03 %, 1/33).

Second, most of the studied were conducted in Europe (61.54 %, 24/39), followed by Oceania (20.51 %, 8/39), America (10.26 %, 4/39), Asia (5.13 %, 2/39) and Africa (2.56 %, 1/39). The study conducted by Mottram et al. [35], which included subjects from Australia, Canada, the UK, and the US, was included in each continent. Similarly, the study conducted by Corrigan et al. [64] at the Olympic Games was included in all of the relevant continents. Therefore, the denominator was 39 instead of 33.

The individual countries represented in our review were Australia (18.18 %, 6/33), the UK (18.18 %, 6/33),

Table 1 Sample characteristics, country of study, methodology and topics explored in studies included in the analysis[a]

	Study, year	Sample	Country	Methodology	Topics
1.	Chester et al. [44], 2003	$n = 401$ (199 Track and Field Athletes: 127 men, 72 women; 202 nonathletes: 74 men, 128 women	UK	Questionnaire	Attitudes towards doping controls Measurement instruments
2.	Waddington et al. [40], 2005	$n = 706/2,863$ footballers (response rate <25 %). 22 % premier league; 25 % first division; 26 % second division; 27 % third division	UK	Postal questionnaire	Attitudes towards doping Attitudes towards doping controls Attitudes towards punishments Doping in different types of sport Sources of information Knowledge of Wada's rules
3.	Peretti-Watel et al. [42], 2005	$n = 996/1,197$ French elite students athletes (response rate: 83 %). Age range: 16–24 years; 659 boys and 332 girls; team sports ($n = 357$), individual sport ($n = 639$)	France	Self-administered anonymous questionnaire	Doping in different types of sport Prevention of doping
4.	Alaranta et al. [15], 2006	$n = 446/494$ Finnish elite athletes (response rate: 90.3 %; mean ± SD age: 23.0 ± 4.5; 261 men, 185 women); speed and power ($n = 113$); endurance ($n = 108$); motor skills ($n = 73$); team sports ($n = 152$)	Finland	Structured questionnaire	Attitudes towards doping Attitudes towards doping controls Doping in different types of sport Prevention of doping
5.	Erdman et al. [25], 2007	$n = 582$ high-performance athletes (314 men, 268 women). Mean ± SD age: 19.96 ± 3.91. 27 different sports	Canada	Validated questionnaire	Reasons for use Sources of information Measurement instruments Knowledge of Wada's rules Side effects Prevention of doping
6.	Mottram et al. [35], 2008	$n = 507/557$ elite athletes from four English-speaking nations (electronic responses: 91 %) and 50/557 (9 % postal responses). Canoeing, cycling, gymnastics, hockey, rowing, swimming, triathlon, volleyball and weightlifting	Australia, UK, Canada, US	Electronic and postal questionnaires	Attitudes towards doping Doping in different types of sport Knowledge of Wada's rules
7.	Peters et al. [53], 2009	$n = 800/1,757$ athletes (response rate: 45.5 %) and 252/620 coaches (response rate: 40.7 %)	Germany	Questionnaire and interview	Sources of information Measurement instruments Knowledge of Wada's rules
8.	Hanstad et al. [49], 2009	$n = 236/292$ Norwegian elite athletes (response rate: 80.8 %)	Norway	Survey	Attitudes towards doping controls
9.	Dunn et al. [16], 2010	$n = 974/1,007$ Australian elite athletes (response rate: 80 %); mean age: 23.1; 75.6 % men; 24.4 % women. National Rugby League, Australian Rugby Union, athletics, diving, hockey, netball, softball, triathlon	Australia	(1) Quantitative surveys; (2) Qualitative interviews	Attitudes towards doping controls
10.	Bloodworth and McNamee [1], 2010	$n = 40$ (age = 19.6 years; 22 men, 18 women). 13 sports: swimming, football (soccer), rugby, wrestling, canoeing, rowing, gymnastics, and two from athletics, netball, modern pentathlon, diving, rugby league and cricket	UK	Focus group discussions	Reasons for use Attitudes towards doping Measurement instruments

Table 1 continued

	Study, year	Sample	Country	Methodology	Topics
11.	Bloodworth et al. [26], 2012	$n = 412/1,674$ (response rate: 24.7 %). 33 % men. The largest possible range of Olympic and professional sports	UK	Anonymized questionnaire (modified version of a questionnaire used by UK Sport in its 2005 drug-free sport survey)	Reasons for use Attitudes towards doping
12.	Dascombe et al. [36], 2010	$n = 72$ elite athletes (mean ± SD age: 21.9 ± 3.9 years; 36 men and 36 women). Kayaking ($n = 5$); swimming ($n = 4$); rowing ($n = 14$); athletics ($n = 13$); netball ($n = 7$); field hockey ($n = 21$), and water polo ($n = 8$)	Australia	Questionnaire detailing their daily usage and rationale	Knowledge of Wada's rules Side effects
13.	Lazuras et al. [43], 2010	$n = 750/2,000$ Greek elite athletes. Mean ± SD age: 25.0 ± 5.89 years; 63.9 % men. Team sports: football, handball, basketball, volleyball, ($n = 477$; 63.3 %); individual sports: athletics, swimming, shooting, Taekwondo, and rowing; ($n = 273$; 36.4 %)	Greece	Anonymous questionnaires	Attitudes towards doping Doping in different types of sport Prevention of doping
14.	Thomas et al. [60], 2010	$n = 974/1,007$ Australian elite athletes (response rate: 80 %); mean age: 23.1; 75.6 % men; 24.4 % women. National Rugby League, Australian Rugby Union, athletics, diving, hockey, netball, softball, triathlon	Australia	Self-administered survey	Side effects
15.	Lentillon-Kaestner et al. [28], 2011	$n = 16$ cyclists (8 young elite-level cyclists; 8 former professional cyclists)	Switzerland	Semi-structured interviews	Reasons for use Doping in different types of sport Measurement instruments Side effects Prevention of doping
16.	Barkoukis et al. [41], 2011	$n = 1,040$ valid responses of 1,075/2,000 (response rate: 53.7 %). Mean ± SD age: 22.9 ± 6.39 years. 62.9 % men. Nine Olympic sports represented in the study: football, basketball, volleyball, handball, athletics, swimming, archery, taekwondo and rowing	Greece	Questionnaire	Attitudes towards doping
17.	De Hon et al. [34], 2011	$n = 433$ (337/888 Olympics athletes; 38 % response rate; Olympics athletes and 95/453 professional football players: 21 %)	Holland	Anonymous, internet-based, 83-item questionnaire	Reasons for use Knowledge of Wada's rules Prevention of doping
18.	Gucciardi et al. [5], 2011	$n = 643/2,030$ (response rate: 33 %). Mean ± SD age: 23.75 ± 8.49 years. 285 men, 383 women. Sports represented: team sports (e.g. rowing, hockey, baseball, rugby) and individual sports (e.g. cycling, athletics, triathlon, judo)	Australia	Questionnaire	Measurement instruments
19.	Thomas et al. [54], 2011	$n = 974/1,007$ Australian elite athletes (response rate: 80 %); Mean age 23.1; 75.6 % men; 24.4 % women. National Rugby League, Australian Rugby Union, athletics, diving, hockey, netball, softball, triathlon	Australia	(1) Quantitative surveys; (2) Qualitative interviews	Sources of information Measurement instruments Prevention of doping

Table 1 continued

	Study, year	Sample	Country	Methodology	Topics
20.	Dunn et al. [29], 2012	$n = 974/1{,}007$ Australian elite athletes (response rate: 80 %); Mean age 23.1; 75.6 % men; 24.4 % women. National Rugby League, Australian Rugby Union, athletics, diving, hockey, netball, softball, triathlon	Australia	Self-administered survey	Reasons for use
21.	Striegel et al. [21], 2002	$n = 101$ German competitive and professional Athletes. Mean age: 15–25 years. 60.4 % men, 39.6 % women 72.28 % individual sports, 10.89 % team sports and 16.83 % not specified	Germany	Standardized questionnaire	Reasons for use Attitudes towards doping controls Attitudes towards punishments Prevention of doping
22.	Corrigan et al. [64], 2003	$n = 2{,}758$ Olympic athletes in Sydney 2000	Not defined	Direct question: "what medications have you taken in the past 3 days?"	Prevention of doping
23.	Peretti-Watel et al. [33], 2004	$n = 458/616$ French elite student athletes Response rate (response rate: 74 %). Mean age: 18.3 years. 299 boys and 159 girls	France	Cross-sectional Questionnaire (127 items)	Attitudes towards doping
24.	Nieper [23], 2005	$n = 32/34$ British track and field athletes competing at the 2004 World Junior Championships. Mean age: 18.0 years. 20 men and 12 women	UK	Questionnaire	Reasons for use Sources of information Knowledge of Wada's rules Prevention of doping
25.	Somerville et al. [52], 2005	$n = 74/196$ Olympic level sportspeople (response rate: 38 %). Sports represented: athletics, cycling, rowing and sailing	UK	Mail questionnaire	Sources of information Knowledge of Wada's rules
26.	Huang et al. [56], 2006	$n = 257/271$ Canadian athletes participants at the Atlanta Olympics Games and 300/304 at the Sydney Olympics Games	Canada	Personal interview	Measurement instruments
27.	Alaranta et al. [51], 2006	$n = 446/494$ Finnish elite athletes (response rate: 90.3 %; mean $\pm$ SD age: 23.0 $\pm$ 4.5; 261 men, 185 women); speed and power ($n = 113$); endurance ($n = 108$); motor skills ($n = 73$); team sports ($n = 152$) and $n = 1{,}503/1{,}876$ (response rate 80.1 %; mean $\pm$ SD age: 23.4 $\pm$ 3.5; 765 men, 738 women (general population: control group)	Finland	Structured questionnaire	Measurement instruments
28.	Pitsch et al. [22], 2007	$n = 448/586$ German Olympic athletes (analysable data records rate). 66.1 % men, 28.3 % women. Sports represented: cycling, weightlifting, baseball, hockey, softball, track and field, basketball, swimming, sailing, team handball, other sports ($n \leq 5$)	Germany	Interview: RRT	Reasons for use Attitudes towards punishments Measurement instruments
29.	Sas-Nowosielski and Swiatkowska [39], 2008	$n = 830/1{,}000$ Polish athletes (from local to elite). Response rate: 83 %. Mean $\pm$ SD age: 20.02 $\pm$ 3.96; 567 men, 263 women. Variety of sports: individual and team sports, winter and summer sports, outdoor and indoor sports	Poland	Questionnaires	Attitudes towards doping Measurement instruments Prevention of doping

Table 1 continued

	Study, year	Sample	Country	Methodology	Topics
30.	Breivik et al. [37], 2009	$n = 234/290$ Norwegian elite athletes ([response rate: 80.8 %]. Age range: 16–51 years old. 151 men and 83 women) and $n = 428$ general population (age range: 18–35 years. 275 men and 153 women)	Norway	Mail and e-mail questionnaires	Attitudes towards doping
31.	Lentillon-Kaestner and Carstairs [28], 2010	$n =$ Eight Swiss elite young cyclists (mean age: 22.75 years; 100 % men)	Switzerland	Semi-structured interview	Reasons for use. Attitudes towards doping Measurement instruments
32.	Striegel et al. [45], 2010	$n = 978/1{,}126$ German elite athletes (response rate of questionnaires 86.9; age range 14–18 years; 611 men, 364 women; team sports = 302, individual sports = 658); n = 480/480 (100 % response rate of RRT interview; age range 15–18 years; 301 men, 179 women; team sport 155, individual sport 325)	Germany	Questionnaires and RRT interviews	Attitudes towards doping controls Measurement instruments
33.	Kim et al. [24], 2011	$n = 228$ Korean Olympic athletes. Men: $n = 128$ (56 %). Mean ± SD age: 25 ± 4 years. Women: $n = 100$ (44 %), age = 24 ± 5 years. 14 sport disciplines	Korea	Questionnaires	Reasons for use Sources of information Prevention of doping

[a] Includes articles identified by the first literature search (of several electronic databases) [articles 1–20], and by the second search (of the reference lists of articles identified by the first search) [articles 21–33]

RRT randomized response technique

Germany (12.12 %, 4/33), Canada (6.06 %, 2/33), France (6.06 %, 2/33), Finland (6.06 %, 2/33), Greece (6.06 %, 2/33), Norway (6.06 %, 2/33), Switzerland (6.06 %, 2/33), Holland (3.03 %, 1/33), Korea (3.03 %, 1/33), and Poland (3.03 %, 1/33). Two studies enrolled athletes from multiple countries, with athletes participating in the Olympic Games in one study [64] and athletes from Australia, Canada, the UK, and the US, in the other [35].

It is remarkable that there were no studies conducted in Africa or South America, or in countries like Spain. We encourage researchers to further expand our current knowledge to all geographical and cultural areas to fully understand the global situation in relation to drug use, and to allow better comparisons between countries.

4 Conclusions

It has been emphasized that athletes who use banned substances mainly do so to improve their performance, even though most athletes acknowledge that doping is dishonest, unhealthy and risky because of the impact of sanctions. The "false consensus effect" seems to play a key role in legitimizing the use of banned substances. Anti-doping programmes are generally considered to be ineffective and inefficient, and the way tests are performed is often criticized, particularly WADA's location reporting system. Athletes consider the severity of punishment to be appropriate or not severe enough, although there are some differences between sports. In this sense, the advisors and stakeholders who can influence athletes should also be educated and punished if they are found guilty of supporting doping. In this way, all interested parties would be aware of the magnitude of the problem.

The current generation of athletes are more familiar with anti-doping rules than earlier generations, but there is still a lack of knowledge that should be improved using well designed educational programmes. There is also a distinct lack of information around dietary supplements and the possible side effects of PES.

Future studies should compare the views and opinions of elite athletes' involved in different sports (e.g. football vs. cycling) on tests and punishments. The studies should also take into account the possible geographical and/or cultural differences (e.g. religion and economic status). Furthermore, as doping is a general issue, we think that all sport federations should adhere to the same anti-doping protocols to avoid unfair situations among sports.

The current research methods that focused on attitudes towards doping have some limitations, particularly

questionnaires, which frequently differ among studies, are seldom non-validated and are therefore incomparable. A combination of qualitative and quantitative measurements, using interviews, questionnaires and, ideally, less-invasive biomedical tests (e.g. based on hair or salivary samples) are recommended. There could be a significant difference between what athletes say and what they really think, a major limitation of data collection methods used to date.

To minimize the phenomenon of doping, information and prevention programmes, starting with athletes at a young age, and involving other stakeholders (e.g. the athletes' doctors, coaches or family), are necessary to establish and maintain correct attitudes and behaviours. It is also very important that the sport institutions at all levels (from WADA to regional governments) provide more resources to psychosocial projects in relation to the biomedical approach (i.e. anti-doping controls), which have been the main priority of anti-doping programmes currently in use. Also, event organizers and federations should check that sporting rules do not favour the possible advantages of using banned substances in competitions (i.e. by reducing the distance covered in competitions, allowing longer recovery between stages and encouraging, where possible, the importance of technical/tactical aspects rather than physical aspects). The programmes targeting athletes and those around them must be carefully planned and developed as a middle- to long-term objective and, ultimately, change attitudes towards doping and the doping culture.

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II

SUPPLEMENTS USE IN ELITE ATHLETES IN RELATION WITH ATTITUDES, BELIEFS AND KNOWLEDGE.

Morente-Sánchez, J., & Zabala, M.

Department of Physical Education and Sport.

Faculty of Sport Sciences (University of Granada)

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Corresponding Author: Mr. Jaime Morente-Sánchez, M.D.

Corresponding Author's Institution: Faculty of Sport Sciences

First Author: Jaime Morente-Sánchez

Order of Authors: Jaime Morente-Sánchez; Mikel Zabala

Abstract: Doping in sport has been studied from different perspectives such as medical, physiological and social science since it is sometimes a taboo topic and objective information on banned performance enhancing substances use it is not easy to get. Researches have been looking for predictors of doping behaviour for years. In order to obtain a reliable view of how widespread doping is in sport, estimating the prevalence of doping is a prime goal of many international and national sport-governing bodies. Taking everything into account, the aim of this study was to gather and critically examine the most recent publications describing elite athletes' prevalence rates of supplements and banned substances. For this purpose, we took in advantage and update the excluded data from a previous review about elite athletes' attitudes, beliefs and knowledge regarding doping (Morente-Sánchez & Zabala, 2013). Results shown in this study reported the prevalence rates of doping and supplements use in elite athletes from different sports. In general, the use of supplements is widespread existing differences among sports and countries, so this should be analyzed exhaustively to intervene more effectively on those potentially risky users from prevention perspective.

Suggested Reviewers: Isaac Perez
Phyical education and Sport, Faculty of sport sciences. University of Granada
isaacj@ugr.es

Raquel Escobar
Phyical education and Sport, Faculty of sport sciences. University of Granada
rescobar@ugr.es

Editors-in-Chief of the *International Journal of Drug Policy*

Dear Proffesors Tim Rhodes and Gerry Stimson.

We intend to submit the following manuscript to your attention for publication as work: "**Supplements use in elite athletes in relation with attitudes, beliefs and knowledge"** by JAIME MORENTE SÁNCHEZ & MIKEL ZABALA DÍAZ.

We consider the information contained in the manuscript could be of great interest *International Journal of Drug Policy* readers. The manuscript contains novel and confirmatory work and has not been published elsewhere. It has been approved by all of the authors and by the institution where the work has been carried out.

We consider interesting this study, apart from the high quality of samples (elite athletes), because it analyzes and compares the use of banned and not banned supplements from papers focused on attitudes, beliefs and knowledge towards doping, giving an interesting perspective to this paper. In addition, in order to obtain a reliable view of how widespread doping is in sport, estimating the prevalence of doping is a prime goal of many international and national sport governing bodies. Taking everything into account, the aim of this study was to gather and critically examine the most recent publications describing elite athletes' prevalence rates of supplements and banned substances.

We hope that this contribution is suitable for publication in *International Journal of Drug Policy*

Yours Sincerely

The authors

Jaime Morente and Mikel Zabala

Supplements use in elite athletes in relation with attitudes, beliefs and knowledge.

Authors: Morente-Sánchez, J. ,& Zabala, M.

Affiliation: Faculty of Sport Sciences, University of Granada (Spain)

Jaime Morente Sánchez (first and corresponding author)

Faculty of Sport Sciences, (University of Granada). Department of Physical Education and Sport.Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +0034 651 775 666; Fax: +34 958244369

e-mail: jaimemorente@ugr.es

Mikel Zabala Díaz

Faculty of Sport Sciences, (University of Granada). Department of Physical Education and Sport.Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +0034 626 821 671; Fax: +34 958244369

e-mail: mikelz@ugr.es

Supplements use in elite athletes in relation with attitudes, beliefs and knowledge.

Abstract

Doping in sport has been studied from different perspectives such as medical, physiological and social science since it is sometimes a taboo topic and objective information on banned performance enhancing substances use it is not easy to get. Researches have been looking for predictors of doping behaviour for years. In order to obtain a reliable view of how widespread doping is in sport, estimating the prevalence of doping is a prime goal of many international and national sport-governing bodies. Taking everything into account, the aim of this study was to gather and critically examine the most recent publications describing elite athletes' prevalence rates of supplements and banned substances. For this purpose, we took in advantage and update the excluded data from a previous review about elite athletes' attitudes, beliefs and knowledge regarding doping (Morente-Sánchez & Zabala, 2013). Results shown in this study reported the prevalence rates of doping and supplements use in elite athletes from different sports. In general, the use of supplements is widespread existing differences among sports and countries, so this should be analyzed exhaustively to intervene more effectively on those potentially risky users from prevention perspective.

Keywords: doping, use, attitudes, elite athletes, prevention

Introduction

Dietary supplementation is a common practice in athletes with a desire to enhance performance, training, exercise recovery, and health in spite of being considered a risky habit due to the lack of knowledge or the possibility to be contaminated with banned substances (Lun, Erdman, Fung, & Reimer, 2012).

Recently, Morente-Sánchez and Zabala (2013) developed a deep review doping in elite athletes focused of attitudes, beliefs and knowledge. Complementary, data from other interesting variable such as prevalence rates of doping and permitted supplements use were obtained, but not referred in that study. Despite of being recent, those un-published data could be updated adding last years papers focused in different sports like tennis (Kondric, Sekulic, Uljevic, Gabrilo, & Zvan, 2013), sailing (Rodek, Sekulic, & Kondric, 2012), judo (Kim et al., 2013), cycling (Morente-Sánchez, Mateo-March, & Zabala, 2013), weightlifting (Rodek, Idrizović, Zenić, Perasović, & Kondrič, 2013), or swimming (Sajber, Rodek, Escalante, Olujić, & Sekulić, 2013).

In general, doping in sport has been studied by medical, physiological and social science researchers (Petróczi & Aidman, 2009). In the absence of more objective information on banned performance enhancing substances use, researches have been looking for predictors of doping behaviour for years. According to Backhouse, Whitaker and Petròczi (2011), those athletes who engage in legal performance enhancement practices appear to embody an "at risk" group for transition toward doping. Exactly, they observed in their study with 212 competitive athletes that doping use is 3.5 times more prevalent in supplements users compared with non-users, and emphasized that is finding is accompanied by significant differences in doping attitudes, norms and beliefs.

We consider interesting this study, apart from the high quality of samples (elite athletes), because it analyzes and compares the use of banned and not banned supplements from papers focused on attitudes, beliefs and knowledge towards doping, giving an interesting perspective to this paper. In addition, following Petróczi & Aidman (2009), in order to obtain a reliable view of how widespread doping is in sport, estimating the prevalence of doping is a prime goal of many international and national sport governing bodies. Taking everything into account, the aim of this study was to gather and critically examine the most recent publications describing elite athletes' prevalence rates of supplements and banned substances.

Methods

A systematic literature search was performed using a set of relevant criteria and scientific methodology that were described in a previous review about elite athletes' attitudes, beliefs and knowledge regarding doping (Morente-Sánchez & Zabala, 2013). We searched PubMed, Medline, Web of Knowledge, Scopus, and SPORTDiscus using a set of doping-related keywords to identify potentially relevant articles. From each database has unique indexing terms, bespoke search strategies were developed. The first search terms included combinations of "doping", "sport", "elite athletes", "attitudes", "beliefs", and "knowledge". To complete the search, and because of the nature of terms, like "doping", in the scientific literature, we repeated the search by replacing "doping" with "performance-enhancing substance" and "performance-enhancing drugs". We next performed a manual search of the references cited in the studies retrieved in the electronic search. The review developed by Morente-Sánchez and Zabala (2013) only contained papers until December 2011 and was not focused on nutritional supplements use, so data that only reported the prevalence rates or that did not specifically refer to

attitudes, beliefs and knowledge related to doping in sport were excluded. In this manuscript, this non-published information about prevalence of use rates was shown and updated. A total of 22 papers were retrieved and evaluated (table 1). Only full papers published in peer-reviewed journals in English were included in this review.

table 1 near here

Results and Discussion

Many studies reveal different and interesting data about use of different PES by elite athletes; however, we have to take into account that not all of them are doping. We are duty bound to tell that dietary supplements may be contaminated with banned substances (Waddington, Malcolm, Roderick, & Naik, 2005). Slater, Tan and Kong-Chuan (2003) stated that use of supplements was widespread in Singaporean elite athletes (n=160) with a 77% of responders acknowledging use of at least one product. Many athletes use dietary supplements as part of their regular training or competition routine, including about 85% of elite track and field athletes (Maughan, Depiesse, & Geyer, 2007). Nevertheless, a small number of them admitted the use of International Olympic Committee (IOC) banned or restricted substances. Somerville and Lewis (2005) conducted a similar survey (n=74) in elite athletes from UK and stated that 55% of responders took supplements. Similar results were obtained in Canada (n= 582 high-performance athletes) by Erdman, Fung, Doyle-Baker, Verhoef and Reimer (2007) who observed that there was an extensive dietary supplement use (88,4%). Nieper (2005) observed that the use of supplements was widespread with 62% of responders (n=34) that acknowledged it. Kondric et al. (2013) stated that use of supplements was widespread (80%; n=43) in females high level tennis players. Lun et al. (2012),

observed that 87% of 440 athletes from 34 different sports used dietary supplementation. In a study with high level sailing athletes (n=44), more than 77% of them stated using supplements (Rodek et al., 2012). Kim et al. (2013) observed similar prevalence (61% and 59%) in Japanese (n=71) and Korean (n=101) judo athletes. Similar results were showed by Goldman, Bush and Klatz (1984) in Connor, Woolf, & Mazanov (2013), where the prevalence of banned substances use for 198 world class athletes was of 52% (103/198). Alaranta et al. (2006a) conducted a survey (n=446) among Finish elite players and only 23% of the athletes surveyed believed that there was no steroid use in their sport. Stimulants were the most often offered substance group (to 7% of all the athletes) followed by anabolic steroids (4%). In addition, of the athletes knowing another athlete using banned substances, 28.4% (38/134) had used stimulants by themselves compared with 6.7% (21/302) of those who reported not to know users.

Pitsch, Emrich and Klein (2007) interviewed 448 German top athletes about their current use of doping practices as well as their exposure to such practices in the past. Results showed the following data: 25.8% of these athletes admitted had taken banned substances (honest dopers), 51.9% stated that they did not used this kind of substances (honest non-dopers) and 22.3% that had taken banned substances but they did not acknowledge (deniers). According to Pitsch, Emrich, & Klein (2007), there were significantly more honest dopers in “centimeters, grams or seconds sports” than in “sport games”. In relation to cited data, Lazuras, Barkoukis, Rodafinos, and Tzorbatzoudis (2010) analyzed a sample of 750 Greek elite athletes and observed that one out often athletes reported doping use (9.9% or n=74). Particularly, 32 athletes (4.3%) acknowledged they used doping substances once but not ever since, 27 (3.6%)

reported occasional consume of banned substances, and 15 (2%) stated systematic use of prohibited PES.

Several studies showed a sample composed by Olympic athletes. Corrigan and Kazlauskas (2003) reported that 78% of the 2758 athletes tested in Olympic Games in Sydney took a large variety of medications and supplements. A total of 25.6% recognized that had taken non-steroid anti-inflammatory drugs (NSAIDs) in the past three days. Similar results were showed by Huang et al. (2006) who analyzed the use of dietary supplements by Canadian athletes in Olympic Games in Atlanta (n=257) and Sydney (n=300). At the Atlanta Games, 69% of the athletes used some form of dietary supplements, whereas 74% of the athletes used them at the Sydney Games. Overall use of medications was stated by 61% and 54% of the athletes in Atlanta and Sydney, respectively. NSAIDs were used by 33% of the athletes in Atlanta and by 38% of those in Sydney. Tsitsimpikou et al. (2009) examined the use by elite Olympic athletes (N=445) of food supplements and pharmaceutical preparations at the Athens 2004 Summer Olympic games and 24.3% of the athletes tested for doping control declared no use of medications or food supplements while NSAIDs and analgesics were also commonly used by athletes (11.1% and 3.7%, respectively). Kim et al. (2011) examined dietary supplements in Korean Olympians during Bejing 2008 Summer Olympic Games. Results showed that 79% of male and 82% of female Korean Olympians took more than one supplement during the training period. Spanish national teams of cycling were assessed in training camps previous 2012 London Olympic Games by Morente-Sánchez et al., (2013) and five riders of the total (5/72, 6.94%) recognized that had been suggested to dope while seven (7/72, 9.72%) had ever seen other people inciting others teammates.

According to Chester, Reilly and Mottram (2003) some over-the-counter (OTC) medicines, especially those used for the treatment of upper respiratory tract (URT) infections, contain substances that are banned by sports governing bodies. This paper reported on a survey of athletes (elite and non-elite) and non-athletes (n=401) with regard to use of and attitudes toward these substances. Almost four percent (3.4%) of athletes stated they had used OTC drugs to enhance performance, but less than half of those believed they had been effective. A higher proportion of elite, as opposed to non-elite, athletes did not take OTC medicines. Of those that did use OTC treatments, elite athletes were more likely to use only those which did not contain banned substances. Alaranta, Alaranta, Heliövaara, Airaksinen and Helenius (2006) assessed, on the other hand, the use of physician-prescribed medication in elite athletes (n=446) compared with a representative control sample of the general population (n=1503). The use of physician-prescribed antiasthmatic (7.0% vs 2.3%) and antiallergic (12.6% vs 6.0%) medications, NSAIDs (8.1% vs 2.7%), and oral antibacterials (2.7% vs 1.3%), during the past 7 days was 2 to 4 times higher in elite athletes compared with the general population of the same age.

Waddington et al., (2005) examined several issues related to drug use in English professional football (n=706). Almost the half of the sample (49%) felt that there was no use of illicit performance enhancing substances in professional football. Although one third (34%) felt that some players were using doping. Almost 6% of responders indicated that they personally knew players that used non-permitted substances (anabolic steroids, stimulants). Couriously, it was indicated the use of recreational drugs (cocaine, cannabis) was more widespread than banned performance enhancing substances (PES). Only 29% of professional football players stated that these kind of

substances were not used by professional footballers. Almost a half of all players (45%) indicated that they personally knew players who used recreational drugs. Finally, they emphasized as conclusion that in spite of the use of recreational drugs in English is common, there is no evidence to affirm that the utilization of PES is common. Similarly, Dunn, Thomas, Swift & Burns (2011) conducted a survey to investigate the prevalence of illicit drug use among elite Australian athletes and 33% of the sample (n=974) had been offered or had the opportunity to use illicit drugs in the past year. It was stated that knowing other athletes who use illicit drugs, being offered or having the opportunity to use drugs and identifying as a 'full-time athlete' were significant predictors of recent drug use. On the other hand, Alaranta et al. (2006a) conducted a survey among Finish elite players (n=446) and stated that recreational drugs (cannabis, ecstasy, amphetamines, cocaine) were never used by 91.5% (408/446) of the athletes. A total of 7.6% (34/446) of the athletes had used cannabis one to five times in their life and an additional 0.4% (2/446) over six times.

Regarding gender, few studies carried out interesting comparisons between males and females. Alaranta et al. (2006a) reported that 30% of 446 Finnish elite athletes knew another athlete using banned drugs to boost performance. Men knew doping users significantly more often than women (35.2% vs. 23%; p=0.0044). Uvacsek et al. (2011) observed that of the 82 athletes who comprised the sample, 12 (14.6%) admitted using banned PES and 26 (31.7%) reported using recreational drugs. In addition, it drew attention that more male athletes admitted using banned drugs than females (18.9% vs 11.1%). No differences were found in other variable such as age, training volume, or type of event. On the contrary, it was observed a prevalence in female athletes (75%) in comparison to male athletes (55%) but was not statistically significant. In the same way,

in relation to gender and use of PES, Lazuras et al. (2010) found no significant differences in doping use (ever/never) between female and male athletes.

In order to contrast with objective values, Rossi and Botrè (2011) analyzed 95,000 urine samples from doping control samples that were analyzed in the 10-year period from 2000 to 2009. The samples originated from elite sporting events in Italy and were collected both in and out of competition. The percentage of adverse analytical findings varies on a yearly basis, but it is in the range 1.0–1.8% (not considering atypical findings, such as an altered endogenous steroid profile). Among positive results, there was a high prevalence of stimulants and illicit drugs. The drug of abuse most frequently found is the tetrahydrocannabinol (cannabis) metabolite and the second most frequently encountered drug is cocaine, as detected from cocaine metabolites, accounting for 0.1% of the total samples analyzed (7% of positive results). These data are indicative of the widespread prevalence of cocaine and cannabis use among the young adult population. However, due to the particular population studied, it must be considered an underestimation of the phenomenon among elite athletes with respect to the general population.

Finally, according to Bloodworth, Petróczi, Bailey, Pearce, and McNamee (2012), the extent to which banned substances are being utilized by elite athletes is difficult to determine. In that study, it was stated that the number of athletes reported as testing positive by anti-doping bodies is small, often around 2% in terms of World Antidoping Agency (WADA) (2002–2008). However, the percentage of positive test results in some Olympic sports in which athletes can benefit from using performance enhancements (by increasing endurance or power) exceeds the usual 2% average (e.g. cycling 4.7%, baseball/softball 5.8%, weightlifting 2.9%, triathlon 2.8% and boxing 2.4%) (Petróczi &

Aidman, 2009). In words of Rossi and Botrè (2011) we cannot generalize results because all data from elite athletes suppose an underestimation of the phenomenon of doping for general public. It is due to athletes to take better care of their health and they to be aware of anti-doping testing.

This analysis of this kind of doping related data is not free of limitations since results from studies based on questionnaires covering a banned practice has limits, answers may be deliberately false as the participants questioned may not wish to reveal that they or others use banned substances. However, we suggest taking into account two aspects: one is that access to this population (elite athletes) is extremely difficult, and another one is the difficulty in getting elite athletes to open up to talk on such a taboo topic. We suggest further investigation in terms of descriptive studies to assess the situation properly and, consequently, to design effective intervention programs. One problem that we found establishing comparisons among different samples from different sports or countries was the lack of existence of common measurements tools (e.g. surveys, interviews, etc.). This type of studies should be carried out by means of the same or similar validated tools in every sport so that data could be more reliable, comparisons and inferences could be made, and practical applications could be developed more efficiently. Controls are obviously needed, but also more effective educational programs that do not require large investments.

Conclusion

The present study reported the prevalence rates of doping and supplements use in elite athletes from different sports, showing that the use of supplements is widespread in elite sport. As expected, the frequencies of non-banned substances use are higher than doping substances. However, results provided specific information about doping use to detect

risky groups and, consequently, to be able to intervene more successfully from prevention perspective.

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Morente-Sánchez, J., Mateo-March, M., & Zabala, M. (2013). Attitudes towards Doping and Related Experience in Spanish National Cycling Teams According to Different Olympic Disciplines. *PloS one*, *8*(8), e70999.

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Rodek, J., Idrizović, K., Zenić, N., Perasović, B., & Kondrič, M. (2013). Differential Analysis of the Doping Behaviour Templates in Three Types of Sports. *Collegium Antropologicum*, *37*(2), 211-217.

Rodek, J., Sekulic, D., & Kondric, M. (2012). Dietary supplementation and doping-related factors in high-level sailing. *J Int Soc Sports Nutr*, *9*(1), 51.

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Collegium Antropologicum, *37*(2), 179-186.

Slater, G., Tan, B., & KongChuan, T. (2003). Dietary supplementation practices of Singaporean athletes. *International journal of sport nutrition and exercise metabolism*, *13*(3), 320-332.

Somerville, S., & Lewis, M. (2005). Accidental breaches of the doping regulations in sport: is there a need to improve the education of sportspeople? *British journal of sports medicine*, *39*(8), 512-516.

Strano Rossi, S., & Botrè, F. (2011). Prevalence of illicit drug use among the Italian athlete population with special attention on drugs of abuse: a 10-year review. *Journal of sports sciences*, *29*(5), 471-476.

Tsitsimpikou, C., Tsiokanos, A., Tsarouhas, K., Schamasch, P., Fitch, K. D., Valasiadis, D., & Jamurtas, A. (2009). Medication use by athletes at the Athens 2004 Summer Olympic Games. *Clinical Journal of Sport Medicine*, *19*(1), 33-38.

Uvacsek, M., Nepusz, T., Naughton, D., Mazanov, J., Ranky, M. Z., & Petróczi, A. (2011). Self admitted behavior and perceived use of performance enhancing vs psychoactive drugs among competitive athletes. *Scandinavian journal of medicine & science in sports*, *21*(2), 224-234.

Waddington, I., Malcolm, D., Roderick, M., & Naik, R. (2005). Drug use in English professional football. *British journal of sports medicine*, *39*(4), e18-e18.

Table I. Summary of the articles retrieved and asessed.

Reference	n	Country	Methodology	Main results
Waddington, I., Malcolm, D., Roderick, M., & Naik, R. (2005). Drug use in English professional football. British journal of sports medicine, 39(4), e18-e18.	706	United Kingdom	Postal questionnaire	6% personally knew players who used performance enhancing drugs 45% knew players who used recreational drugs.
Slater, G., Tan, B., & KongChuan, T. (2003). Dietary supplementation practices of Singaporean athletes. International journal of sport nutrition and exercise metabolism, 13(3), 320-332.	160	Singapour	Anonymous questionnaire	77% used of supplement. Each athlete using on average 3.6±0.3 different products. Sports drinks, caffeine, vitamin C, multivitamin/mineral supplements, and essence of chicken were most commonly ingested products. Respondents ingested a total of 59 different supplements.
Maughan, R. J., Depiesse, F., & Geyer, H. (2007). The use of dietary supplements by athletes. Journal of Sports Sciences, 25(S1), S103-S113.	310	United Kingdom	Survey	85% of elite track and field athletes used dietary dupplement Most commonly: vitamins and antioxidants (84%), minerals (73%), protein and creatine supplements (53%), and ergogenic supplements, including coenzyme Q10, caffeine, ginseng, and ephedrine (52%).
Somerville, S., & Lewis, M. (2005). Accidental breaches of the doping regulations in sport: is there a need to improve the education of sportspeople? British journal of sports medicine, 39(8), 512-516.	74	United Kingdom	Mail-questionnaire	Four athletes admitted taking a banned substance by accident. Forty one (55%) reported taking supplements.
Erdman, K. A., Fung, T. S., Doyle-Baker, P. K., Verhoef, M. J., & Reimer, R. A. (2007). Dietary supplementation of high-performance Canadian athletes by age and gender. Clinical Journal of Sport Medicine, 17(6), 458-464.	582	Canada	Anonymous questionnaire	88.4% of participants taking >=1 DS (mean of 3.08±1.87 per user) during the previous 6 months. Overall, sport drinks (22.4%), sport bars (14.0%), multivitamins and minerals (13.5%), protein supplements (9.0%), and vitamin C (6.4%) were most frequently.

Nieper, A. (2005). Nutritional supplement practices in UK junior national track and field athletes. British journal of sports medicine, 39(9), 645-649.	32	United Kingdom	Anonymous questionnaire	62% of respondents declaring supplement use. Prevalence in female athletes (75%) was higher than in males (55%). No differences for age, training volume, 17 different supplements were taken, with each athlete using an average of 2.4 products, multivitamins and minerals being the most popular.
Lun, V., Erdman, K. A., Fung, T. S., & Reimer, R. A. (2012). Dietary supplementation practices in Canadian high-performance athletes. International Journal of Sport Nutrition and Exercise Metabolism, 22(1), 31-37.	440	Canada	Validated survey	87% declared having taken 3 dietary supplements within the previous 6 months. Sports drinks, multivitamin and mineral preparations, carbohydrate sports bars, protein powder, and meal-replacement products were the most prevalent supplements reported.
Rodek, J., Idrizović, K., Zenić, N., Perasović, B., & Kondrič, M. (2013). Differential Analysis of the Doping Behaviour Templates in Three Types of Sports. Collegium Antropologicum, 37(2), 211-217.	44	Croatia	Anonymous questionnaire	More than 77% of athletes used sietary supplements and 38% did so on a regular basis (daily).
Kondric, M., Sekulic, D., Uljevic, O., Gabrilo, G., & Zvan, M. (2013). Sport nutrition and doping in tennis: an analysis of athletes'attitudes and knowledge. Journal of Sports Science and Medicine, 12, 290-297.	65	Slovenia	Anonymous questionnaire	Almost of all the females and 80% of the males using nutritional supplements at least occasionally. Athletes showed a low tendency regarding future doping usage, although most of them are convinced that doping does exist in tennis.
Connor, J., Woolf, J., & Mazanov, J. (2013). Would they dope? Revisiting the Goldman dilemma. British journal of sports medicine, 47(11):697-700.	212	USA	Interview and online questionnaire	25/212 indicated that they would take banned substances (no death condition). 13/212 even with death as a consequence. No statistical difference between the interview and online collection method
Alaranta, Antti, Alaranta, H., Holmila, J., Palmu, P., Pietilä, K., & Helenius, I. (2006). Self-reported attitudes of elite athletes towards doping: differences between type of sport. International journal of sports medicine, 27(10), 842-846.	446	Finland	Structured questionnaire	35% males and 23% of females reported they personally know an athlete using banned substances. 15% reported that they had been offered banned substances. Stimulants were the most often offered substance group (to 7% of all the athletes) followed by anabolic steroids (4%).

Pitsch, W., Emrich, E., & Klein, M. (2007). Doping in elite sports in Germany: results of a www survey. European Journal for Sport and Society, 4(2), 89-102.	448	Germany	Interview	38.7% admitted to using illegal drugs or methods. Throughout their whole athletic career, we calculated 51.9% honest non-dopers and in the current season 61.3%.
Lazuras, L., Barkoukis, V., Rodafinos, A., & Tzorbatzoudis, H. (2010). Predictors of doping intentions in elite-level athletes: a social cognition approach. Journal of sport & exercise psychology, 32(5), 694-710.	750	Greece	Anonymous questionnaires	9.9% of athletes reported doping use. Ever users were significantly more in individual (14.4%) than in team sports (7.4%). No significant differences in doping use (ever/never) were found between female and male athletes.
Corrigan, B., & Kazlauskas, R. (2003). Medication use in athletes selected for doping control at the Sydney Olympics (2000). Clinical Journal of Sport Medicine, 13(1), 33-40.	2758	United Kingdom	Anonymous questionnaire	78% took medications and supplements. 542 athletes took 5 or more, including one who took 26, 2 who took 19 and 2 others took 20.
Huang, S.-H. S., Johnson, K., & Pipe, A. L. (2006). The use of dietary supplements and medications by Canadian athletes at the Atlanta and Sydney Olympic Games. Clinical Journal of Sport Medicine, 16(1), 27-33.	257 (Atlanta) and 300 (Sydney)	Canada	Interview	At the Atlanta Games, 69% of the athletes used some form of dietary supplements, whereas 74% of the athletes used dietary supplements at the Sydney Games.
Tsitsimpikou, C., Tsiokanos, A., Tsarouhas, K., Schamasch, P., Fitch, K. D., Valasiadis, D., & Jamurtas, A. (2009). Medication use by athletes at the Athens 2004 Summer Olympic Games. Clinical Journal of Sport Medicine, 19(1), 33-38.	493	Greece	Anonymous questionnaire	64.2% declared use of medications or food supplements, and 81.3% of these athletes declared intake of fewer than four preparations. Food supplements (42.1%),non-steroidal anti-inflammatory agents (9.8%), analgesics (5.6), inhaled beta2-agonist (4.8%)
Kim, J., Lee, N., Lee, J., Jung, S., Kang, S., & Yoon, J. (2013). Dietary Supplementation of High Performance Korean and Japanese Judoists. International journal of sport nutrition and exercise metabolism, 23(2):119-27.	172	Republic of Korea	Anonymous questionnaire	88% of high-level judoists consumed dietary supplements. Oriental supplements (34%), vitamins (23%), and protein powder (12%) were the most commonly consumed dietary supplements in Korean judoists. Vitamins (45%), protein powder (33%), and minerals (15%) were the most commonly consumed dietary supplements in Japanese judoist.

Morente-Sánchez, J., Mateo-March, M., & Zabala, M. (2013). Attitudes towards Doping and Related Experience in Spanish National Cycling Teams According to Different Olympic Disciplines. PloS one, 8(8), e70999.	72	Spain	Anonymous questionnaires	5% riders recohnized having been suggested to dope. 9.72% saw other people inciting others or being incited.
Chester, N., Reilly, T., & Mottram, D. (2003). Over-the-counter drug use amongst athletes and non-athletes. Journal of sports medicine and physical fitness, 43(1), 111-118.	199	United Kingdom	Anonymous questionnaire	3.4% used over-the-counter drug enhance performance, but less than half of those believed they had been effective. 23.5% believed that OTC drugs should be banned.
Alaranta, A, Alaranta, H., Heliövaara, M., Airaksinen, M., & Helenius, I. (2006). Ample use of physician-prescribed medications in Finnish elite athletes. International journal of sports medicine, 27(11), 919-925.	446	Finland	Structured questionnaire	The most frequently reported physician-prescribed medications: anti-allergic medicines (12.6% of the respondents), nonsteroidal anti-inflammatory drugs (NSAIDs; 8.1%), anti-asthmatic medicines (7.0 %), and oral antibiotics (2.7 %).
Dunn, M., Thomas, J. O., Swift, W., & Burns, L. (2011). Recreational substance use among elite Australian athletes. Drug and alcohol review, 30(1), 63-68.	974	Australia	Survey	One-third of the sample had been offered or had the opportunity to use illicit drugs in the past year.
Kim, J., Kang, S., Jung, H., Chun, Y., Trilk, J., & Jung, S. H. (2011). Dietary supplementation patterns of Korean olympic athletes participating in the Beijing 2008 summer olympic games. International Journal of Sport Nutrition and Exercise Metabolism, 21(2), 166-174.	112	Republic of Korea	Anonymous questionnaire	Almost 80% of Olympians take more than 1 dietary supplements during the training period and that vitamins and Oriental supplements are the 2 top-ranked supplements.

CROSS-CULTURAL ADAPTATION AND VALIDATION OF THE SPANISH VERSION OF THE PERFORMANCE ENHANCEMENT ATTITUDE SCALE (PETRÓCZI, 2002)

III

Morente-Sánchez, J.[1], Femia-Marzo, P.[2], & Zabala, M[1].

[1]Department of Physical Education and Sport; Faculty of Sport Sciences (University of Granada)

[2]School of Medicine, University of Granada (Spain).

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Research article

Cross-Cultural Adaptation and Validation of the Spanish Version of the Performance Enhancement Attitude Scale (Petróczi, 2002)

Jaime Morente-Sánchez [1]✉, Pedro Femia-Marzo [2] and Mikel Zabala [1,3]
[1] Faculty of Sport Sciences, University of Granada, Spain; [2] School of Medicine, University of Granada, Spain; [3] Spanish Cycling Federation, Madrid, Spain

Abstract
The aim of the present study was to cross-culturally adapt and validate the Spanish version of the Performance Enhancement Attitude Scale (PEAS). A cross-sectional multi-sample survey with 17 independent datasets was carried out. Cross-cultural adaptation of the PEAS into Spanish was conducted through forward/backward translations, consensus panels and comparative analyses of known-groups to establish evidence for its reliability and validity. Weighted Kappa coefficients with quadratic weighting were used to assess the reliability of each item, with Cronbach's internal consistency coefficients for overall scale's reliability and Spearman's correlation coefficient for test–retest reliability over a one-week period. Confirmatory factor analysis (CFA) was performed to assess the scale's structure. Differences between self-admitted doping users and non-users were analysed to verify the PEAS' construct validity in 8 datasets. Spearman's correlation coefficient was also used to assess the relationships between the PEAS and self-esteem, self-efficacy and perceived descriptive norm to establish convergent validity. The scale showed satisfactory levels of internal consistency ($\alpha = 0.71–0.85$), reliability of each item (Kappa values range 0.34-0.64) and temporal stability ($r = 0.818$; $p < 0.001$). CFA showed acceptable fit (RMSEA <0.08, mean RMSEA = 0.055; $\chi^2/df < 3$, mean $\chi^2/df = 1.89$) for all but one samples. As expected, self-admitted doping users showed more positive attitude toward doping than non-users. Significant and strong negative relationship was found between PEAS and self-efficacy; weak negative correlation with self-esteem and and positive correlation with perceived descriptive norm. The Spanish version of PEAS showed satisfactory psychometric properties. Considerations for application and improvement are outlined.

Key words: Doping, assessment, psychometric properties, reliability, validity.

Introduction

Doping has marked the world of competitive sport in the last years, with the Puerto case in 2006 or the Lance Armstrong case in 2012 being evident examples. The World Anti-Doping Agency (WADA) issued and periodically updates the Anti-Doping Code with the aims of protecting the athlete's fundamental right to participate in doping-free sport and thus promotes health, fairness and equality for athletes worldwide, warranting harmonized, coordinated and effective anti-doping programmes at the international and national level relating to the detection, deterrence and prevention of doping (David, 2013).

Doping in sport has been studied by medical, physiological and social science researchers for many years with the purpose of developing a better understanding and prevention (Backhouse et al., 2007; Morente-Sánchez and Zabala, 2013). According to the Theory of Planned Behaviour (Ajzen, 1991) behaviour depends on people's plans of actions towards that behaviour (intentions), which are regulated by people's perceived behavioural control, their subjective norms, and attitudes. Lucidi et al. (2008) defined "attitudes" as "positive or negative evaluative appraisals of the behaviour" and, showed that attitudes towards doping are known to influence doping use and to play an important role as predictor of intention to use banned substances (doping behaviour). In a recent study (Barkoukis et al., 2013), it was stated that distal influences (self-determination, sportpersonship orientations and achievement goals) have an indirect effect on proximal influences such as situational temptation and perceived behavioural control, descriptive and subjective norms, and attitudes, and in turn these have a direct influence on doping intentions. Thus research aiming to investigate doping attitude can generate useful information to inform the fight against doping. Through the high profile doping cases, it has become evident that controlling doping only by tests is not sufficient. A profound change in the attitudes is needed, which should be continuously monitored (Alaranta et al., 2006).

In relation to the type of measurement tools used in the scientific literature to assess attitudes towards doping, just a few studies used validated tools while the majority of researchers used ad hoc bespoke measurements without psychometric testing, and thus potentially jeopardised the validity and reliability of the obtained data (Morente-Sánchez and Zabala, 2013). Furthermore, such bespoke measurements make direct comparisons and meta-analyses of independent studies impossible. In order to address this gap, Petróczi and Aidman (2009) proposed using the Performance Enhancement Attitude Scale (PEAS), originally developed by Petróczi (2002), as a standard general doping attitude measure in doping behaviour studies.

However, the applicability of this kind of measurement should be tested in different cultural contexts and languages than the ones in the original version, in which the scale showed good psychometric properties in both English and Hungarian speaking participants (Petróczi and Aidman, 2009). Therefore, the adaptation and psychometric validation of this scale to other widely spoken

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languages is an important issue to facilitate cross-cultural comparisons.

According to Lewis (2009), Spanish, also calledCastilian, is the second most spoken language worldwide, with 406 million of first-language speakers in 31 countries. In addition, regarding sport, Spanish is considered as an important and common language due to the fact that Spain is one the most main references in the sporting world in recent years, along with other Spanish speaking countries (e.g. in South-America). From this point of view, the cross-cultural adaptation of the PEAS for Spanish is an essential step in doping behaviour research, anti-doping prevention and intervention and related decision-making. Although the PEAS has been already used in studies with samples comprised of Spanish participants (Morente-Sánchez et al., 2013), psychometric validation and cross-cultural adaptation of its Spanish version is not yet available in the scientific literature. Therefore, taking everything into account and considering the international view about the phenomenon of doping in Spanish sport, the aim of this study was to cross-culturally adapt and validate the Spanish version of the original Performance Enhancement Attitude Scale (Petrɔczi, 2002).

Methods

In this study, expressions such as “doping” and use of “prohibited performance enhancements”, or “banned substances and/or methods” are used interchangeably and they refer to using any substance or method prohibited by the World Anti-Doping Agency (David, 2013). The data used in this paper with the purpose of validating the questionnaire is part of a larger project, that will be published with more complementary data but with the purpose of being focused in the specific content (attitudes towards doping, not the questionnaire and its validation, in each sport or sample).

The instrument

The PEAS is a 17-item one-dimensional self-report instrument measuring general attitude toward doping (Petrɔczi, 2002). The final response format is a 6-point Likert-type scale, with points anchored as strongly disagree (1), disagree (2), slightly disagree (3), slightly agree (4), agree (5) and strongly agree (6). No neutral response option is offered and all 17 items are scored in the same direction (Table 1). Thus the overall PEAS score ranges from 17 to 102.

Table 1. Translation of the items of the Performance Enhancement Attitude Scale (PEAS).

***1**. Legalizing performance enhancements would be beneficial for sports.* **1.** Legalizar productos para mejorar el rendimiento sería beneficioso para el deporte.
***2.** Doping is necessary to be competitive.* **2.** Doparse es necesario para ser competitivo.
***3.** The risks related to doping are exaggerated.* **3.** Se exageran los riesgos relacionados con el dopaje.
***4.** Recreational drugs give the motivation to train and compete at the highest level.* **4.** Las drogas recreacionales motivan para entrenar y competir al más alto nivel.
***5.** Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.* **5.** Los deportistas no deberían sentirse culpables por saltarse las reglas y tomar fármacos para mejorar el rendimiento.
***6.** Athletes are pressured to take performance-enhancing drugs.* **6.** Los deportistas son presionados para tomar fármacos que mejoran el rendimiento.
***7.** Health problems related to rigorous training and injuries are just as bad as from doping.* **7.** Los problemas de salud y las lesiones derivados del entrenamiento riguroso son tan perjudiciales como las repercusiones del dopa je
***8.** The media blows the doping issue out of proportion.* **8.** Los medios de comunicación exageran el asunto del dopaje.
***9.** Media should talk less about doping.* **9.** Los medios de comunicación deberían hablar menos de dopaje.
***10.** Athletes have no alternative career choices, but sport.* **10.** El deporte es la única alternativa profesional de los deportistas.
***11.** Athletes who take recreational drugs, use them because they help them in sport situations.* **11.** Los deportistas que toman drogas recreacionales lo hacen porque les ayudan en situaciones deportivas.
***12.** Recreational drugs help to overcome boredom during training.* **12.** Las drogas recreacionales ayudan a superar el aburrimiento durante los entrenamientos.
***13.** Doping is an unavoidable part of the competitive sport.* **13.** El dopaje es una parte inevitable del deporte competitivo.
***14.** Athletes often lose time due to injuries and drugs can help to make up the lost time.* **14.** Los deportistas suelen perder tiempo debido a lesiones y los fármacos pueden ayudarles a recuperar el tiempo perdido.
***15.** Doping is not cheating since everyone does it.* **15.** Doparse no es hacer trampas ya que todo el mundo lo hace.
***16.** Only the quality of performance should matter, not the way athletes achieve it.* **16.** Sólo debería valorarse la calidad del rendimiento, no la manera en que los deportistas lo logren.
***17.** There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.* **17.** No hay diferencia entre utilizar fármacos, formas aerodinámicas o bañadores especiales, ya que todos sirven para mejorar el rendimiento.

Table 2. Sample characteristics and PEAS score distribution statistics and reliability estimates

Sample	n	Gender (M/F)	Age M (±SD)	PEAS						Raw Data		Horn's PA
				Data collection	Score M (±SD)	K-S Test	Cronbach α	SEM	Velicer's dim	L1	L2	L1
SSUS Granada 2013 pre test-retest	519	406/99	21.5 (2.6)	Pen&Pap	33.5 (8.3)	.076 ***	.73	4.323	1	2.63	1.04	1.32
SSUS Granada 2013 post test-retest	519	406/99	21.5 (2.6)	Pen&Pap	32.6 (9.2)	.081 ***	.80	4.112	1	3.62	.94	1.33
Sport Sciences Students Granada 2009	273	222/51	22.2 (3.4)	ElVer	33.4 (9.1)	.073 ***	.76	4.406	1	2.96	.93	1.45
Elite Female Cycling	80	0/80	28.9 (9.6)	Pen&Pap	35.0 (13.5)	.163 ***	.85	5.236	1	5.56	1.58	1.90
Elite Female Triathletes	126	0/126	30.1 (8.1)	Pen&Pap	31.0 (11.0)	.148 ***	.78	5.197	1	3.31	1.17	1.45
Spanish Cycling National Team Elite	74	53/21	18.4 (3.0)	Pen&Pap	34.8 (9.0)	.094	.71	4.872	1	2.98	1.40	1.94
Football Coaches Sport Sciences Students	167	129/38	23.4 (5.5)	ElVer	33.2 (10.3)	.124 ***	.82	4.386	1	4.21	1.07	1.60
High Level Cycling Coaches	113	109/4	33.7 (7.2)	Pen&Pap	38.8 (10.6)	.109 **	.75	5.267	1	3.47	1.13	1.74
Elite Female Footballers	35	0/35	24.8 (6.3)	Pen&Pap	28.8 (10.1)	.127	.82	4.282	1	5.27	1.73	2.46
Elite Footballers	263	263/0	25.9 (4.4)	Pen&Pap	29.4 (8.5)	.075 **	.73	4.457	1	2.62	.91	1.47
Professional Footballers	286	286/0	24.0 (5.5)	Pen&Pap	32.8 (9.7)	.063 *	.78	4.546	1	3.58	.97	1.44
Amateur Footballers	294	294/0	24.3 (4.8)	Pen&Pap	34.4 (8.9)	.058 *	.72	4.674	1	2.72	.85	1.44
Elite U18-U16 Footballers	282	282/0	16.8 (1.3)	Pen&Pap	34.4 (10.5)	.104 ***	.80	4.665	1	3.79	1.10	1.45
Football Coaches From 1st Division-U16	98	98/0	37.0 (9.1)	Pen&Pap	31.0 (9.7)	.114 **	.76	4.742	1	3.54	1.32	1.80
SSUS Granada 2013 Postest	625	501/123	21.6 (2.9)	Pen&Pap	32.8 (9.5)	.081 ***	.81	4.158	1	3.87	1.08	1.21
SSUS Granada 2013 Pretest	705	563/142	21.6 (2.8)	Pen&Pap	34.3 (8.6)	.076 ***	.73	4.484	1	2.61	.98	1.29
Ciclotourists QH Challenge 2011	2022	1977/45	41.0 (9.4)	ElVer	39.9 (11.9)	.059 ***	.78	5.586	1	3.14	1.01	1.16
Ciclotourists QH Challenge 2012	382	372/10	41.3 (8.8)	ElVer	38.0 (12.4)	.095 ***	.81	5.383	1	3.79	.99	1.33
Environment OF Footballer (Physiother, Doctor…) From 1st Div to-U16	65	63/2	34.1 (8.1)	Pen&Pap	30.9 (10.9)	.113	.84	4.376	1	5.21	1.68	2.02

SSUS: Sport Sciences University Students. K-S normality=Kolmogorov-Smirnov Test. Z (P) *=non-normality; Velicer's dim=Factor dimensions obtained by the method of Velicer; L1=maximum eigenvalue of the correlation matrix; L2=second eigenvalue of the correlation matrix; LH=maximum eigenvalue by Horn's parallel analysis. Pen&Pap: pencil and paper, ElVer: electronic version. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Cross-cultural adaptation

The sequential methodological approach proposed by Guillemin et al., (1993) and Beaton et al., (2000) was used for guiding the cross-cultural adaptation process of the PEAS. First, the 17 items were translated into Spanish by two independent native Spanish translators. A synthesis of the two was performed by an expert committee composed of a panel of experts (including the authors of this work). Then the resulting Spanish questionnaire was back-translated into English by two independent English-native translators and the two questionnaires obtained were reviewed by the expert committee. Finally, the Spanish-translated questionnaire (Table 1) was tested with 30 participants (pilot study) to ensure that the questionnaire was perfectly clear and understandable like they confirmed immediately after by means of an interview one by one.

Samples

This paper summarizes a series of studies that used the PEAS as a measure of doping attitudes. Eighteen independent datasets collected from different sporting contexts, mainly cycling and football, were considered for this study. Specifically, six samples from individual sports such as cycling and triathlon were assessed: high level cycling team managers, elite female cyclists and triathletes, elite male cyclists from Spanish

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national team, amateur cyclists or ciclotourists who participated in a long-distance (205 km) Spanish road cyclist event called "Quebrantahuesos" (2011 and 2012 editions). Similarly, seven samples related to a team sport such as football were evaluated: male players (under16, amateur, professionals and elite), female players (elite), coaches from different categories and a sample comprised of the so-called environment of footballers (doctor, physiotherapist, etc.). In addition, five sets of student samples were composed of undergraduates from different years of the Faculty of Sport Sciences of Granada (Spain). Details on different samples such as sample sizes, age (mean - standard deviation), gender distribution (expressed as ratio) and data collection, are given in Table 2.

Other measures

In order to establish evidence for convergent validity, the questionnaire for amateur cyclists samples (2011 and 2012 editions) also included measures of variables expected to be related to doping attitudes (measured by PEAS) such as self-esteem, self-efficacy and projected use.

Self-esteem was assessed by the Rosenberg Self-Esteem Scale (RSES), which is made up of 10 items that refer to self-respect and self-acceptance rated on a 4-point Likert-type scale, ranging from 1 (totally disagree) to 4 (totally agree) (Rosenberg, 1965). Martín-Albo et al., (2007) cross-culturally adapted and validated the Spanish version of this scale (Cronbach $\alpha = 0.8$-0.85) was used.

Following Bandura's guide for constructing self-efficacy scales (Bandura, 2006), self-efficacy beliefs were also measured with three statements rated on a 10-point scale ranging from "not certain at all" to "totally certain". The items were: a) You can achieve your best results without doping; b) You do not need doping to be a good cyclist, and c) You can succeed (win, beat records) without doping.

Descriptive norms were measured by asking participants to give a projected percentage of those using of doping is their respective sports.

Data collection

Of the 18 datasets in total, 14 used paper-and-pencil instruments, whereas in 4 samples, an electronic version of PEAS was completed via an online link emailed to the potential participants. The paper and pencil questionnaires were handed out at the beginning of the training sessions and/or lectures and non-participation was permitted.

For assessing the test-retest reliability, a sample of Sport Sciences students (n = 519) repeated this questionnaire 7 days later (retest response rate: 99.8%; 518/519). In this case, participants were chose a "nickname" during the first administration and they were asked to use the same "nickname" again for the second administration.

Participation was completely voluntary and anonymous in all studies. The questionnaires were self-completed. Respondents received a detailed explanation of the purpose and implications of the research and gave their implied consent by completing and returning the questionnaires. The study was approved by the Ethics Committee of the University of Granada.

Data analysis

Reliability

Cronbach's α values were calculated for each time the scale was used as a measure of internal consistency, considering the cut-off value of 0.7 (Nunnally, 2010) to determine acceptable scale reliability. Weighted Kappa coefficients with quadratic weighting were used to assess the reliability of each item as well as Spearman's correlation coefficient for test–retest reliability.

Validity

Number of factors was determined using the exploratory factor analysis by Velicer's method and by Horn's parallel analysis (O'connor, 2000). We evaluated construct validity by confirmatory factor analysis (CFA) and the goodness of model fit was expressed as the ratio between the chi-square statistics and the degrees of freedom, with the highest acceptable level set to the recommended 3:1 range (Kline, 2011). It was also used the root mean square error of approximation (RMSEA), which indicates that the model based on the sample employed represents the population if its value is equal to or lower than 0.05, and considers the fit acceptable when it is lower than 0.08 (Jöreskog and Sörbom, 1993).

Comparison tests

Kolmogorov-Smirnov test was used to assess the normality of the distribution of the PEAS scores. Mann-Whitney statistical procedure was used to test differences between groups and repeated measures t-test to contrast difference between measures. Standard error of measurement was calculated by multiplying the scale's standard deviation by the square root of 1 minus Cronbach α (Kline, 2000).

Correlations

Spearman's correlation coefficient was also used to assess the relationships between PEAS and others analysed variables. Statistical analyses were carried out using IBM SPSS version 20.0 and AMOS 20.0.

Results

Reliability

Temporal stability of the total PEAS score was assessed with a sample of Sport Sciences university students (n = 519) over a 7 days interval. The one-week test-retest reliability of the PEAS was evidenced by the correlation coefficient of $r = 0.818$ ($p < 0.001$). Interestingly, a small but statistically significant difference was found between the two measures taken 7 days after [$t(518) = 3.837$, $p < 0.001$], suggesting a relatively dynamic nature of doping attitudes. Respondents obtained a higher score (PEAS score = 35.02 ± 8.7) on the first administration of the survey compared to the second administration (PEAS score= 33.97 ± 9.56). Cronbach's α values, means and standard deviations of PEAS scores and Kolmogorov–Smirnov test statistics for each sample are displayed in Table 2. Cronbach's α values for the PEAS scale were

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Table 3. EFA structure coefficients, CFA factor loadings and squared multiple correlations (R^2) and t-values of the 17 items of the PEAS in the developmental sample (N=519).

	EFA		CFA			
Items of the PEAS*	**PCA***	**ML****	**Sfl**	**SE**	**t-values**	**R^2**
1	.429	.368	.276	.0519	5.319	.076
2	.445	.388	.134	.0549	2.441	.018
3	.434	.375	.452	.0816	5.541	.204
4	.545	.485	.285	.0579	4.922	.081
5	.434	.371	.218	.0527	4.135	.048
6	.423	.361	.234	.0495	4.725	.055
7	.377	.314	.241	.0482	5.001	.058
8	.497	.427	.961	.1709	5.623	.924
9	.423	.364	.580	.1041	5.574	.336
10	.306	.255	.148	.0498	2.972	.022
11	.345	.293	.112	.0450	2.487	.013
12	.471	.414	.082	.0414	1.982	.007
13	.480	.421	.277	.0721	3.841	.077
14	.502	.440	.156	.0442	3.527	.024
15	.553	.495	.075	.0450	1.668	.006
16	.459	.397	.300	.0565	5.309	.090
17	.381	.325	.113	.0436	2.594	.013
R^2*	.947	.957				

* Seventeen items of the PEAS (Table 1). ** Coefficient of determination of the sum of scores and the factor. EFA = Exploratory Factor Analysis; PCA = Principal component analysis; ML = Maximum Likelihood Factor Analysis; CFA = Confirmatory factor Analysis; Sfl = Standarized factor loadings

assessed for each sample and ranged between 0.71 and 0.85 indicating a good internal consistency for the scale. Weighted Kappa coefficients with quadratic weighting were considered in order to assess the reliability of each item. Acceptable Kappa values were obtained ranging from 0.34 to 0.64 (standards errors were around 0.044).

Validity

Structural validity: Results of the exploratory and confirmatory factor analyses are summarised in Table 3. Factor loadings on the 17 items of the PEAS ranged between 0.08 and 0.96 and standard errors between 0.04 and 0.17. The t-values were calculated by dividing the factor loading by the corresponding standard error. As the t-value has an underlying z distribution, t >1.96 (equates to 2 standard deviation) are considered statistically significant (Byrne, 2009). For all 17 items of the PEAS (but item 15, t = 1.67) t-values ranged between 1.9 and 5.6, hence were significant. The overall squared multiple correlation, which symbolizes the proportion of the variance explained by the predictors of the latent variable in question (Byrne, 2009), was 0.96 showing a good overall proportion of explained variance of the PEAS measurement model.

Confirmatory factor analysis was performed on all datasets. Model fit of the measurement model was addressed by the RMSEA and the ratio of the goodness of fit index (χ^2) and its corresponding degree of freedom (df). The mean RMSEA value for the independent samples was 0.055 which was an acceptable value using criteria RMSEA <0.08 (Jöreskog and Sörbom, 1993). The mean $\chi 2/df$ ratio was 1.89 (ranging from 0.9 to 3.8), similar data (mean χ^2/df =1.85) was obtained by Petróczi and Aidman (2009), showing both an acceptable measurement model fit using criteria χ^2/df <3 (Kline, 1998).

Results for the independent samples are presented in Table 4. In order to interpret results from different tests and samples, it must be considered the limitations of chi square test (Hooper et al., 2008) since this always assumes multivariate normality (this sample follows non-normal distribution) and nearly always rejects the model when large samples are used. Notably, the initial CFA showed a poor absolute model fit (χ^2/df = 8.61) for one sample with large number of participants (n = 2022). Further investigation using Modification Indices revealed that the error terms between certain items were correlated, and thus caused a poor model fit in a restricted model. Allowing for correlations between three pairs of measurement errors (items 4, 11 and 12); the model fit improved dramatically (Table 4). On the other hand, the correlations between errors terms fit for all samples suggests that is likely to have a latent factor lurking in the background (one that that the PEAS scale does not intend to measure). The most correlated items (4, 11 and 12) are related to recreational drugs; this latent background factor is not strong enough to come up in the factor analysis but because the sample size is large, it became more visible (see additional material).

Construct validity: Using known-group method, differences between self-admitted users and non-users of doping were investigated to support the previously established construct validity of the PEAS. It was expected that users and potential users would show higher scores and, consequently, a more lenient attitude toward doping.

Participants of 8 studies were requested to report if they had ever used doping. Overall scores of PEAS were compared between self-admitted doping users and non-users. As expected, those who admitted current use or have used doping scored higher on the attitude tests in all samples, reaching statistical significance in 5 datasets. Means, standard deviations, test results and corresponding p-values are summarised in Table 5.

Convergent validity: Spearman's correlations among PEAS score and, self-efficacy, self-esteem and descriptive norms taken in two samples of amateur cyclists in two consecutive years showed evidence for

Table 4. Confirmatory factor analysis results (chi-square goodness of fit statistics, chi-square/degrees of freedom ratio, significance and root mean square error of approximation) from subsequent use of PEAS.

Samples	n (*)	Chi-squared (df=98)	χ2/df ratio	Discrepancy Estimation (**)	p	RMSEA	Low	High
SSUS Granada 2013 pre test-retest***	519	180.0	1.84	ADF	.000	.040	.031	.049
SSUS Granada 2013post test-retest	519	208.3	2.13	ADF	.000	.047	.038	.055
SSUS Granada 2009	273	257.2	2.62	ADF	.000	.077	.066	.089
Elite Female Cycling	80	150.9	1.52	GLS	.001	.078	.066	.090
Elite Female Triathletes	126	118.4	1.20	GLS	.089	.040	.000	.064
Spanish Cycling National Team Elite	74	143.9	1.47	GLS	.002	.080	.050	.107
Football Coaches Sport Sciences Students	167	150.8	1.54	GLS	.000	.057	.038	.074
High Level Cycling Coaches	113	166.8	1.70	GLS	.000	.079	.058	.099
Elite Female Footballers	35	88.3	0.90	GLS	.748	.000	.000	.068
Elite Footballers	263	165.4	1.69	ADF	.000	.051	.037	.065
Professional Footballers	286	281.2	2.87	ADF	.000	.081	.070	.092
Amateur Footballers	294	249.9	2.55	ADF	.000	.073	.062	.084
Elite U18-U16 Footballers	282	256.1	2.61	ADF	.000	.076	.064	.087
Football Coaches From 1st Division-U16	98	135.0	1.38	GLS	.008	.032	.033	.087
SSUS Granada 2013 Postest	625	218.6	2.23	ADF	.000	.032	.027	.038
SSUS Granada 2013 Pretest	705	209.0	2.13	ADF	.000	.033	.027	.040
Ciclotourists QH Challenge 2011	2022	282.7#	3.80	ADF	.000	.038	.034	.043
Ciclotourists QH Challenge 2012	382	226.7	2.31	ADF	.000	.052	.043	.061
Environment of Footballer (Physiother., Doctors 1st Div-U16	65	137.8	1.41	GLS	.005	.080	.045	.109

SSUS: Sport Sciences University Students. *Missing values were imputed with the average. ** Discrepancy estimation method:ADF = Asymptotically distribution-free estimation; GLS = Generalized Least Squares. *** Test-retest design. # Degrees of freedom (df)=74

convergent validity in the expected direction. Correlation coefficients are shown in Table 6.

It was expected that those with high anti-doping self-efficacy (i.e. confidence in not needing doping) have a less lenient view of doping used and vice versa. This hypothesis was supported by the results showing significant negative correlations. Self-admitted doping users also reported a lower avoiding doping self-efficacy than non-users (8.41 ± 2.20 and 7.13 ± 3.03, respectively) and this difference was statistically significant ($U = 314028$; $p < 0.001$).

Furthermore, small but statistically significant negative correlation was found between PEAS and self-esteem, suggesting a weak inversed connection between general self-esteem and the explicit evaluation of using additional means (doping) to achieve sport success.

Positive correlations were expected and found between doping attitude and perceived descriptive norms regarding doping. Participants who perceived doping at a higher prevalence rate in their sports showed more positive attitude toward doping. Self-admitted doping users estimated doping prevalence at a higher level compared to non-users (58.25 ± 33.36 and 46.56 ± 33.32 respectively; $U = 79853.5$; $p < 0.001$).

Gender and age differences: In order to see if age has any effect on doping attitude, the sample of 2022

Table 5. Self-reported use of doping and PEAS score means (M), standard deviations (±SD), test statistics and corresponding p-values by doping user groups.

Samples	n	User M (±SD)	Non-user M (±SD)	U Mann Whitney	p
Ciclotourists QH Challenge 2011	2022	48.87 (15.98) (n=164)	40.98 (11.95) (n=1858)	108775.500	.000
Ciclotourists QH Challenge 2012	382	46.18 (17.11) (n=33)	38.88 (12.27) (n=349)	4368.500	.022
Footballers	1120	38.48 (12.48) (n=48)	33.71 (10.33) (n=1072)	19911.500	.008
Professionals Footballers	273	40.18 (16.54) (n=11)	34.10 (10.11) (n=262)	1177.000	.303
Amateur Footballers	280	42.13 (10.45) (n=16)	35.24 (9.52) (n=264)	1321.500	.012
Elite U18 - U16 Footballers	272	49.75 (10.77) (n=4)	35.19 (11.35) (n=268)	171.000	.019
Elite Female Footballers	35	34.33 (4.89) (n=6)	29.24 (10.77) (n=29)	43.500	.055
Football Coaches Sport Sciences Students	167	38.28 (15.65) (n=18)	34.23 (10.28) (n=149)	1152.000	.329

Table 6. Spearman correlations among PEAS score and other variables (self-esteem, self-efficacy, projected use, age).

Spearman correlations between PEAS and	Sample = 2022			Sample = 382		
	Total sample	users (n=164)	non-users (n=1858)	Total sample	Users (n=33)	non-users (n=349)
Projected use	.259 **	.380 **	.232 **	.235 **	.277	.224 **
Self esteem	-.148 **	.007	-.167 **	.168 **	-,382 *	-.124 *
Self-efficacy	-.376 **	-..580 **	-.324 **	-.442 **	-,639 **	-.409 **
Age	-.046 *	-.196 *	-.023	-.055	.021	-.047

* $p < 0.05$, ** $p < 0.001$

amateur cyclists was divided in two groups of 35 and younger and over 35. The age of 35 years old was selected as midpoint because most athletes end their sport competitive career at this age. Thirty-five-years and younger participants scored significantly higher in PEAS than others (42.61 ± 12.87 and 41.18 ± 12.318; $p < 0.031$) and lower in self-efficacy (8.05 ± 2.47 and 8.42 ± 2.21; $p < 0.001$). Contrary to literature precedence, no significant differences were found between males and females.

Discussion

This cross-cultural adaptation study provided sufficient evidence for the validity and reliability of the Spanish version of the PEAS (PEAS-ESP), which can be recommended with confidence for future doping studies among Spanish speaking athletes and their entourage.

Internal consistency values, ranging between acceptable to very good, indicated good reliability of the PEAS-ESP across several samples. The one-week test-retest reliability suggested that PEAS-ESP measures a relatively stable construct. However, the significant difference between the first and the second administration of the PEAS-ESP was in line with Petróczi and Aidman (2009) who justified this using the theory of dynamics attitudes (Eiser, 1994) and the attitudes priming model (Fazio, 1995). Taking everything into account, it is reasonable that in the second administration participants gave more socially desirable responses because it is possible that the first administration of the questionnaire may have sensitized the participants.

CFA results confirmed the factorial structure similar to the original version in all but one sample. The correlations between the errors terms of items 4, 11 and 12 suggested the possible presence of an additional, albeit weak, latent factor. Upon closer investigation of these items, it became apparent that all three items refer to recreational drug use in sport context. Thus it is conceivable that the large sample size in this particular study afforded the emergence of an additional latent factor related to recreational drugs in general or in sport that was not intended to be measured by the PEAS but potentially confounded the measures taken by these particular items on doping. This latent factor could have remained hidden previously as most studies utilised a considerably small samples and in any case, relatively non-significant as neither Velicer's or Horns' tests indicated the presence of more than one factor. Further research is required to fully explore the potential confounding effect of an attitude toward recreational drugs in doping context.

In addition, according to Hooper et al., (2008), we suggest that limitations of chi square test must be taken into account when interpreting results from this particularly large sample of over 2000 participants. Firstly, this test assumes multivariate normality whereas in our study, most samples are non-normal. Severe deviations from normality may result in model rejections even when the model is properly specified; secondly, because the chi-square statistic is in essence a statistical significance test it is sensitive to sample size leading to the model nearly always being rejected when large samples are used. In addition to its apparent validity, it was also found evidence favorable to construct and convergent validity. It was expected that self-admitted doping users would show higher PEAS scores and, consequently, a more lenient attitude toward doping. In 5 of the 8 analysed samples significant differences were found between confessed users and non-users ($p < 0.05$). In the other 3 samples in which statistical difference was not reached, the small sample size of users could be the reason. We suggest that "practical differences" (Atkinson, 2003) were observed in all comparisons (always higher scores for users), despite not always reaching statistical differences. This is in line with other studies, where confessed doping users, as expected, scored significantly higher on the PEAS when compared with those who reported no use of banned drugs (Petróczi and Aidman, 2009; Uvacsek et al., 2011)

Regarding relationship between self-esteem and attitude towards doping, we found a significant negative correlation in both samples. Consequently, although this relationship is weak, the fact that similar data were obtained one year later with a smaller sample size could reinforce the idea that this relationship exists and is consistent. The relationship between self-esteem and attitudes toward doping could be the function of the driving forces behind doping use (i.e. aesthetic vs. performance). We suggested that this relationship may be relatively weak because the sample characteristics. Amateur cyclists most likely looked for other aims such as performance improvement instead of appearance. Moreover, Spearman's correlations from users in relation to anti-doping self-efficacy and doping attitude could support the hypothesis that, at least in part, participants' self-esteem and self-efficacy are related to attitudes towards doping. Doping behaviour research would benefit from further research in this under-researched aspect in doping.

In relation to perceived descriptive norms, it seems participants who admitted using prohibited performance-enhancing substances believe that a higher percentage of the others are taking banned substances; and exhibited a more positive attitude toward doping on the PEAS-ESP scale. This phenomenon, called "false consensus effect"

(Ross, Greene, & House, 1977) has been shown in doping before (Petróczi, Mazanov, Nepusz, Backhouse, & Naughton, 2008). Similarly, in the study of Uvacsek et al. (2011), domain specificity of this effect was evidenced.

Contrary to previous research, gender did not have an effect on doping attitudes, but age did. Participants under 35 years of age (younger than limit age to be competitive in sport which we established) showed more permissive attitudes towards doping in the analysed sample what could be because they are supposed to be more competitive and more focused on performance in comparison to the oldest.

From a doping prevention point of view, PEAS could be used as a standard measurement instrument to assess attitudes towards doping so that data were reliable and valid, and practical applications could be developed efficiently (Mandic et al., 2013). In addition, PEAS could be complemented with other tools such as interviews (Lentillon-Kaestner et al., 2012), implicit association tests (James et al., 2010) or ideally biomedical tests (Morente-Sanchez and Zabala, 2013). We suggested that Sport sciences researchers could play an important role in the fight against doping applying these researching methods to assess the current situation deeply in order to design, consequently, specific programs and other activities for doping prevention (Kisaalita and Robinson, 2014).

Conclusion

This study has showed that the Spanish version of the Performance Enhancement Attitude Scale has satisfactory psychometric properties. Internal consistency and test-retest correlation were good, supporting the reliability of the scale. Moreover, it was demonstrated acceptable measurement model fit and we suggest that there is sufficient evidence to sustain the construct validity of the scale. Therefore, the results provide justification for the use of the PEAS in its Spanish version.

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Key points

- First study that crosses culturally adapted the PEAS to the Spanish language.
- The Spanish version of PEAS has satisfactory psychometric properties.
- Users scored higher than non-users indicating a satisfactory construct validity. Significant positive correlation was found between PEAS and projected use.
- Significant negative correlation between PEAS and self-esteem and self-efficacy.

AUTHORS BIOGRAPHY

Jaime MORENTE -SÁNCHEZ
Employment
Department of Physical Education and Sport, University of Granada, Spain
Degree
MSc
Research interest
Doping prevention, elite athletes, football training and sport performance.
E-mail: jaimemorente@ugr.es

Pedro FEMIA-MARZO
Employment
Senior Lecturer in the Faculty of Sport Sciences and Faculty of Medicine, University of Granada (Spain)
Degree
PhD
Research interest
Statistics and sport performance.
E-mail: pfemia@ugr.es

Mikel ZABALA
Employment
Lecturer in the Faculty of Physical Activity and Sport Sciences, University of Granada, Spain / Performance director of Movistar Cycling Team
Degree
MSc, PhD
Research interest
Cycling and sport performance.
E-mail: mikelz@ugr.es

✉ **Jaime Morente Sánchez**
Faculty of Sport Sciences, University of Granada, Department of Physical Education and Sport. Carretera de Alfacar s/n 18011, Granada, Spain

ATTITUDES TOWARDS DOPING IN SPANISH NATIONAL CYCLING TEAMS ACCORDING TO DIFFERENT OLYMPIC DISCIPLINES

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Morente-Sánchez, J.[1], Mateo-March, M.[2], & Zabala, M[1].

[1]Department of Physical Education and Sport; Faculty of Sport Sciences (University of Granada)

[2]Faculty Miguel Hernández, University of Elche (Valencia; Spain)

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Attitudes towards Doping and Related Experience in Spanish National Cycling Teams According to Different Olympic Disciplines

Jaime Morente-Sánchez[1,2], Manuel Mateo-March[2,3], Mikel Zabala[1,2]*

1 Faculty of Sport Sciences, University of Granada, Granada, Spain, **2** Spanish Cycling Federation, Madrid, Spain, **3** Miguel Hernández University, Elche, Spain

Abstract

Attitudes towards doping are considered an influence of doping intentions. The aims of the present study were 1) to discover and compare the attitudes towards doping among Spanish national team cyclists from different Olympic disciplines, as well as 2) to get some complementary information that could better explain the context. The sample was comprised of seventy-two cyclists: mean age 19.67±4.72 years; 70.8% males (n = 51); from the different Olympic disciplines of Mountain bike -MTB- (n = 18), Bicycle Moto Cross -BMX- (n = 12), Track -TRA- (n = 9) and Road -ROA- (n = 33). Descriptive design was carried out using a validated scale (PEAS). To complement this, a qualitative open-ended questionnaire was used. Overall mean score (17–102) was 36.12±9.39. For different groups, the data were: MTB: 30.28±6.92; BMX: 42.46±10.74; TRA: 43.22±12.00; ROA: 34.91±6.62, respectively. In relation to overall score, significant differences were observed between MTB and BMX ($p = 0.002$) and between MTB and TRA ($p = 0.003$). For the open-ended qualitative questionnaire, the most mentioned word associated with "doping" was "cheating" (48.83% of total sample), with "responsible agents of doping" the word "doctor" (52,77%), and with the "main reason for the initiation in doping" the words "sport achievement" (45.83%). The major proposed solution was "doing more doping controls" (43.05%). Moreover, 48.67% stated that there was "a different treatment between cycling and other sports". This study shows that Spanish national team cyclists from Olympic cycling disciplines, in general, are not tolerant in relation to doping. BMX and Track riders are a little more permissive towards the use of banned substances than MTB and Road. Results from the qualitative open-ended questionnaire showed interesting data in specific questions. These results empower the idea that, apart from maintaining doping controls and making them more efficient, anti-doping education programs are needed from the earliest ages.

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* E-mail: mikelz@ugr.es

Introduction

The use of performance enhancements has been a problem in competitive sport for decades [1]. Bloodworth et al. [2] mentioned that the use of doping substances in cycling appeared in the 1890s, when cyclists were given substances such as extra caffeine, strychnine and even cocaine to improve their performance. More recently, the Festina case scandal in Tour de France of 1998 provided evidence of a systemic doping problem in sport [2,3]. With the purpose of preventing it, the phenomenon of doping in sport has been studied by medical, physiological and social science researchers in recent years [4].

For Lucidi et al. [5], "attitudes" were the strongest predictors of intention to use banned substances. Nevertheless, a recent work published by Barkoukis et al. [6] argues that doping intentions are influenced by a) Distal influences (self-determination, sportpersonship orientations, and achievement goals), and b) Proximal influences (situational temptation and perceived behavioral control, descriptive and subjective norms, and attitudes). Distal influences have an indirect effect on proximal influences, and the latest have a direct influence on doping intentions. So, attitudes seem to play an interesting role in doping intentions, as achievement goals in sports and sportpersonship beliefs seem to influence doping intentions indirectly through the effects of attitudes and self-efficacy beliefs.

Other previous studies also related attitudes a) to achievement goal orientations [7], b) to situational temptation [8], c) to doping intention itself [9], or d) to knowledge, behaviors and education [10].

In relation to the type of tools employed to assess attitudes towards doping in sport in the scientific literature, just a few used validated tools but not in elite athletes [1]. Although past evidence used "non-validated" instruments, these were based on well-established theories and got very useful information. The advantage of using a standard validated questionnaire is mainly that different contexts (sports, countries, gender or age) could be better compared. By the way, it has been suggested the use of both non-validated and validated tools (qualitative and quantitative) and, ideally including less-invasive biomedical tests [1].

Most of the studies related to attitudes towards doping in elite sport used samples of a mix of athletes from different disciplines or analyzed big samples from team sports, so that there exists a

relative dearth of scientific research in relation to our object of study, doping and elite cycling, probably the most persecuted sport [1]. According to Lentillon-Kaestner et al. [3], in top-performing cycling the use of PED was endemic among the cycling teams to the extent that it became institutionalized [11–13] and was quasi-tolerated by the professional cycling community [14] before the Festina scandal in 1998. They also concluded that the use of banned substances is less widespread nowadays. In Spain, after infamous and unfortunate scandals like "Operación Puerto" in 2006 or the Armstrong case in 2012, it has been suggested that studies of this type about doping in sport, and more concretely focused on elite cycling and doping, are necessary [1].

Considering the international view about the phenomenon of doping in Spanish cycling and taking into account the lack of relevant related studies, we have undertaken an investigation of Spanish elite cyclists' attitudes (using psychometric testing) and experiences (by means of some open-ended questions related to the context).

The reasons why we consider this study as very important are 1) because Spain has been a reference for cycling all over the world due to the big sporting success in the past, especially in road cycling (2006–2009 tour de France consecutive wins −2010 winner was dispossessed for doping reasons-, gold medal in road men cycling at Beijing 2008, etc.), and 2) the scandal of Puerto case in Spain involved an important number of cyclists and other athletes from this and other countries. So, the aims of the present study were 1) to discover and compare the attitudes towards doping among Spanish national team cyclists from different Olympic disciplines, as well as 2) to get some complementary information that could better explain the context.

Methods

Sample

A total of 72 Spanish national team cyclists (mean age: 19.67±4.72 years) participated in the study. The gender distribution was 70.8% males (n = 51) and 29.2% females (n = 21). The total sample was divided into four groups according to the 4 different Olympic cycling disciplines: Mountain bike -MTB- (n = 18; mean age: 17.6±2.53 years; age range: 16–26 years; 83.3% men), Bicycle Moto Cross -BMX- (n = 12; mean age: 19.1±3.89 years; age range: 16–28 years; 100% men), Track -TRA- (n = 9; mean age: 27.67±6.18 years; age range: 22–38 years; 77.8% men) and Road -ROA- (n = 33; mean age: 18.62±2.82 years, age range: 16–30 years; 54.5% men). The high range of age in the samples is because the national Federation usually combine in training camps riders of different ages: those that will participate in the next Olympics and those who would be potentially Olympic athletes in the near future who in that moment are competing at the highest level in lower categories like Junior or Under 23 (world and European championships). All of the participants of this study belonged to the Spanish National cycling team and consequently had competed previously in international championships (the European championship, World Cup, and, for some of them, previous Olympic Games). Additionally, 11 participants of this study were among the 17 cyclists representing Spain who participated in the London 2012 Summer Olympics. Therefore, all were considered elite athletes. The testing protocol and data handling were approved by the Ethics Committee of the University of Granada (Spain).

Measures

A cross-sectional descriptive design was carried out by means of a validated questionnaire, as well as using a bespoke open-ended questionnaire to better explain the context. Performance Enhancement Attitude Scale (PEAS) [4]. The PEAS is a 17-question 6-point Likert-type scale, with points anchored from strongly disagree (1) through disagree (2), slightly disagree (3), slightly agree (4), agree (5) to strongly agree (6). No neutral response if offered and all 17 items are scored in the same direction. The overall scores range from 17 to 102 points (giving a theoretical middle-point of 59.5), with higher scores representing a more lenient attitude toward doping. This scale has been used in previous studies and has shown good psychometric properties [4,15]. Although its satisfactory validation in Spanish is still in publication process, we found Cronbach Alpha values ranging from 0.70 to 0.84 among all the groups studied. Participation was completely voluntary. To provide the participants with a sense of security, and thus to obtain reliable data, the principle of anonymity was secured.

To complement the PEAS, a qualitative open-ended questionnaire about the athletes' own experience and opinion was used. This questionnaire, used in other previous studies [16–18], was considered to better understand the context of the PEAS values. Athletes were asked to respond to seven questions delving into the reasons for doping in professional cycling: 1) words associated with doping; 2) agents responsible for doping; 3) differences between cycling and other sports; 4) reasons for initiation into doping; 5) has doping been suggested to you?; 6) have you seen another person inciting or being incited to dope?; and, finally, 7) proposed solutions.

For the purpose of this study, "doping", "drugs" or "banned substances" were considered as those substances that are prohibited by the WADA or other governing body in training and/or sport competition, and this was explained to participants before responding.

Data collection

Participants were recruited via personal and professional contacts in their national team training camps prior to the London 2012 Olympics Games. After the participants gave written informed consent, the anonymous questionnaires were self-administered. Written informed consent was obtained from parents or guardians on the behalf of minors involved in the study. There was no time limit for completing them. A regular coding system was used by the research assistant and the data were submitted in Excel files.

Analyses

Data characteristics were shown as frequencies, percentages, means, and standard deviations. For the PEAS, the Kolmogorov-Smirnov Test was applied to ensure a Gaussian distribution of the results, followed by the Levene test to verify the homogeneity of variance. Then, when we noted that the results followed a non-normal distribution, a non-parametric analysis was conducted. The Mann-Whitney U-test, using Bonferroni post-hoc correction, was carried out (critical statistical significance: $p<0.0125$). Statistical analyses were performed using IBM-SPSS 20.0 software.

Results

PEAS - Performance Enhancement Attitude Scale

In general, the mean overall score (17–102) was 36.12±9.39. Taking the different analyzed groups into account, overall scores

Table 1. Descriptive statistics and comparisons between different Olympic cycling disciplines (Total sample, Road, MTB, BMX and Track) for the overall score of the Performance Enhancement Attitudes Scale (PEAS).

	Total sample (n = 72) Mean (SD)	MTB team (n = 18) Mean (SD)	BMX team (n = 12) Mean (SD)	Track team (n = 9) Mean (SD)	Road team (n = 33) Mean (SD)	p*
PEAS Overall Score	36.12 (9.39)	30.28 (6.92)	42.46 (10.74)	43.22 (12.00)	34.91 (6.62)	$p = 0.002^{1-2}$; $p = 0.003^{1-3}$

*$p \leq 0.0125$.
$^{1-2}$Significant differences between MTB and BMX groups.
$^{1-3}$Significant differences between MTB and Track groups.
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were, respectively: MTB: 30.28±6.92; BMX: 42.46±10.74; TRA: 43.22±12.00; ROA: 34.91±6.62. Regarding overall scores (*see* Table 1), significant differences were observed between MTB and BMX ($p = 0.002$) and between MTB and TRA ($p = 0.003$).

Open-ended qualitative questionnaire

The data obtained were expressed in terms of percentage of participants who make a specific statement (% n). Participants did not have a limit on their number of possible answers, and consequently the sum of the percentages is not adjusted to 100%. Different groups (Total sample, BMX, MTB, TRA and ROA) were compared (see Table 2 and Figure 1):

1. Words associated with doping: the three most mentioned expressions were "cheating" (% n: 48.83), "lie" (% n: 29.16), and "healthy" (% n: 12.5). In the group comparison, the most repeated words were: MTB ("lie"; % n: 55.56), BMX ("cheating"; % n: 33.33), TRA ("cheating"; % n: 66.67) and ROA ("cheating"; % n: 42.42).
2. Agents responsible for doping: the three most mentioned agents were "doctor" (% n: 52.77), "cyclists" (% n: 50.00), and "coach/manager" (% n: 41.66). In relation to different analyzed groups, the most suggested agents responsible of doping were: MTB ("cyclists"; % n: 56.56), BMX ("cyclists"; % n: 41.67), TRA ("cyclists"; % n: 33.33) and ROA ("doctor"; % n: 84.85).
3. Differences between Cycling and Other sports: the four most mentioned differences were "cycling receives a different treatment in comparison with other sports" (% n: 48.67), "numbers of controls" (% n: 20.83); "hardness of cycling" and "media coverage" (% n: 19.44). For different groups, the most mentioned differences were: MTB ("media coverage"; % n: 33.33), BMX ("hardness of cycling"; n: 25.00), TRA ("cycling receives a different treatment in comparison with other sports"; % n: 55.56) and ROA ("cycling receives a different treatment in comparison with other sports"; % n: 66.67).
4. Reasons for the initiation of doping: the three most mentioned reasons were "sport achievements" (% n: 45.83), "external pressures" (% n: 29.16), and "contract/money" (% n: 26.38). Taking into account the different groups, the most repeated reason was "sport achievements": MTB ("% n: 44.44), BMX (% n: 25.00), TRA (% n: 88.89), and ROA (% n: 100.00). For BMX riders, the previous option was mentioned as frequently as "Contract/Money" (% n: 25.00).
5. Has doping been suggested to you?: five riders of the total sample stated "yes" (5/72, 6.94%). In relation to different groups, respectively: MTB (nobody), BMX (1/12, 8.33%), TRA (3/9, 33.33%), and ROA (1/33, 3.03%). Riders from the TRA and ROA groups were suggested by "another cyclist" while the rider from BMX was recommended by a friend.
6. Have you ever seen other people inciting others or being incited?: seven riders of the total sample stated "yes" (7/72, 9.72%). The breakdown by different groups was: MTB (nobody), BMX (1/12, 8.33%), TRA (4/9, 44.44%), and ROA (2/33, 6.06%). The four riders from TRA group were suggested by "another cyclist" while the rider from BMX was recommended by a friend.
7. Proposed solutions: the three most mentioned suggestions to eradicate doping in sport were "more controls" (% n: 43.05), "prevention at early ages" (% n: 22.22), and "no solution" (% n: 20.83). For different groups, the most suggested solution was "more controls": MTB (% n: 72.22), BMX (% n: 41.67), TRA (% n: 44.44), and ROA (% n: 36.36).

General Discussion

The results of the present study showed that the cyclists of the Spanish national teams of cycling are generally not tolerant in relation to doping. However, BMX and Track riders were a little more permissive towards the use of banned substances than MTB and Road. In addition, results from the open-ended qualitative questionnaire have shown interesting and specific data (e.g., reasons for use or responsible agents), which should be taken into account. Regarding those potentially dangerous groups, it could be interesting to analyze them more exhaustively to look for the causes of that certain permissiveness, to intervene more effectively. These findings empower the idea that, apart from more efficient controls, anti-doping education programs are needed from early ages.

According to the systematic review carried out by Morente-Sánchez and Zabala [1], there were no previous specific studies that assessed attitudes towards doping in elite athletes by means of this validated scale. According to Petróczi and Aidman [4], demonstrated reliability and validity were poor and inferences could not be made in the majority of the studies in this field. One of the few studies that have used this PEAS (the higher the score, the more permissive the attitude towards doping shown) was developed by Uvacsek et al. [15]. In this study, among 82 Hungarian competitive (non-elite) athletes assessed, confessed doping users (12%) scored, as expected, significantly higher on the PEAS ($p<0.05$) when compared with those who reported no use of banned drugs (46.8±13.32 and 34.43±8.74, respectively). Likewise, in another study [19], with 2022 amateur cyclists as a sample (confessed users = 164; non-users = 1858), overall scores were, respectively: 48.87±15.98 and 40.98±11.95. Petróczi and Aidman [4] analyzed several samples such as elite athletes from Hungary (n = 102; confessed users = 5; non-users = 97), obtaining the following scores, respectively (39.20±17.54 vs. 35.85±10.12). According to the present study, in general, Spanish cyclists of the national teams are against of doping, though BMX and Track

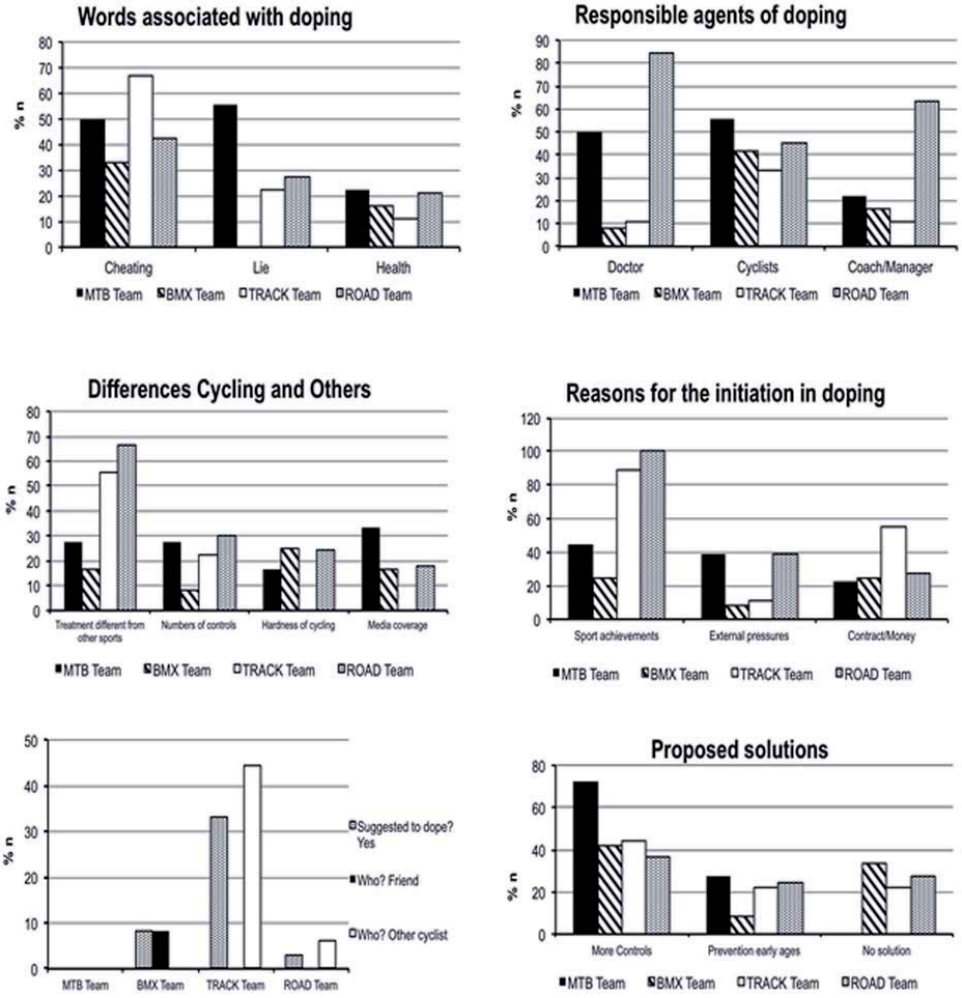

Figure 1. Percentage of participants who make a specific statement (% n).
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riders are more permissive towards PED use than MTB and Road. The case of track cyclists is especially risky because this sample is the oldest and, as a result, their attitudes and beliefs should be stronger as a consequence of their larger experience. It is interesting that MTB cyclists, the youngest group, showed a very low score, which could mean that new generations are more aware of doping. As a practical application, we could consider that for those more permissive groups, whose scores are close to those of confessed users, a deep analysis and monitoring of this sample appears necessary.

Conversely, ad-hoc questionnaires allow getting more specific information by using direct questions in different perspectives related to this topic like "words associated to doping", "reasons for use", or "agent responsible". For instance, it has been shown that, for all the Olympic cycling disciplines, the word most associated with doping was "cheating" (% n: 48.83), except for the BMX team mentioning a related term ("lie", % n: 55.56). It is remarkable that terms like "performance" or "win" did not appear in the first positions in the order of the most mentioned answers.

Regarding agents responsible for doping, similar open-ended questionnaire was used with a sample of 87 Spanish cycling team managers who recognized themselves like the main responsible [16,17]. In a similar study, Zabala et al. [18] stated that for professional cyclists the main responsible agents that evoke doping were 1) Team Managers, 2) Doctors, and 3) the cyclists, while for the team managers the responsible were the 1) pressure of sponsors, 2) cyclists,3) team managers, and 4) doctors. Nieper [20] in a survey of 34 British junior team athletes noted that coaches provided the greatest influence (65%), followed by sports dieticians (30%) and doctors (25%). By contrast, Somerville et al. [21] reported that the doctor was the first option for 62% (46/74) of

Table 2. Descriptive statistics (percentage of total sample of each group −% n−), for the different Olympic cycling disciplines (Total sample MTB, BMX, Track and Road).

	%Total sample (n = 72)	%MTB Team (n = 18)	%BMX Team (n = 12)	%Track Team (n = 9)	%Road Team (n = 33)
Words associated with doping*					
Cheating	45.83	50.00	33.33	66.67	42.42
Lie	29.16	55.56	0	22.22	27.27
Health	12.50	22.22	16.17	11.11	21.21
Responsible agents of doping*					
Doctor	52.77	50.00	8.33	11.11	84.85
Cyclists	50.00	55.56	41.67	33.33	45.45
Coach/Manager	41.66	22.22	16.67	11.11	63.64
Differences Cycling and Other sports*					
Treatment different from other sports	48.67	27.78	16.67	55.56	66.67
Numbers of controls	20.83	27.78	8.33	22.22	30.30
Hardness of cycling	19.44	16.67	25.00	0	24.24
Media coverage	19.44	33.33	16.67	0	18.18
Reasons for the initiation in doping*					
Sport achievements	45.83	44.44	25.00	88.89	100
External pressures	29.16	38.89	8.33	11.11	39.39
Contract/Money	26.38	22.22	25.00	55.56	27.27
Have you been suggested to dope?					
Yes	6.94	0	8.33	33.33	3.03
Who?					
Friend	1.39	0	8.33	0	3.03
Other cyclist	5.56	0	0	33.33	0
Have you seen other people inciting others or being incited?					
Yes	9.72	0	8.33	44.44	6.06
Who?					
Friend	1.39	0	8.33	0	0
Other cyclist	5.56	0	0	44.44	6.06
Proposed solutions*					
More Controls	43.05	72.22	41.67	44.44	36.36
Prevention early ages	22.22	27.78	8.33	22.22	24.24
No solution	20.83	0	33.33	22.22	27.27

*Each participant could mention as many answers as needed, but just the most relevant are presented (the rest ranged from 1.39 to 5.56% are not considered).
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athletes in their study. Conversely, in this study, following Lentillon-Kaestner et al. [22], who stated that the pressure of team staff and doctors on cyclists' use of banned substances has become less important and direct after the latest doping scandals, three of the four groups (MTB, BMX and Track) recognized themselves, "cyclists", as the main agents responsible for doping. Therefore, it seems essential to raise awareness and re-educate both professional groups (doctors and coaches) in addition to cyclists, because of their recognized and important influence on athletes. In line with this conclusion, other authors show how sport should change according to the so-called "athlete 2.0" concept as a collaborative challenge [23].

In relation to the reasons for initiation of doping, Lentillon-Kaestner and Carstairs [24] interviewed 8 young elite cyclists who admitted that they were open to using doping substances themselves if it was the key to continuing their cycling career, but only after they became professional. Similar results were stated by Backhouse et al. [10] in their extensive review to WADA in 2007. The results of our study are relevant to this since "sport achievements" was the most mentioned motive for all the groups, though BMX riders also considered "contract/money" at the same level of importance as an inducement to doping behavior. In the same way, Striegel et al. [25], studying the prevalence of doping in 978 German elite athletes, reported that the most repeated reasons for drug use were to achieve athletic success (86%) and for financial gain (74%). In addition, in another study (n = 40), various factors were acknowledged as potential reasons for use, most notably injury recovery and the economic pressures of elite sport [26]. Moreover, when cyclists were asked about the differences in relation to doping treatment between cycling and other sports, in general, they strongly highlighted the existence of "different treatment to other sports" (% n: 48.67). In this sense,

different treatments among different types of sports in relation to doping have been studied in several investigations. English professional footballers were tested for drugs less often than many other elite athletes, only about 33% per year, according to Waddington et al. [27]. It could be argued that differences between sports could be related to the independence that sport federations have in this respect in most competitions, and this possible difference seems to be reduced only in the Olympic Games. In this sense, Spanish elite cyclists' opinions are in accordance with other studies that also consider that there is a different treatment in the quantity and quality of drug testing among sports [28].

Focusing on the direct questions such as "Has doping ever been suggested to you" or "Have you ever seen other people inciting others or being incited?", it was observed that 5/72 (6.94%) and 7/72 (9.72%) riders answered "yes", respectively, for each question. The Track rider's group, despite being a small sample, reported a high percentage of affirmative answers (3/9, 33.3%; and 4/9, 44.4%, respectively). When this result is added to their mean age and their PEAS score, this makes the Track group at greater risk in relation to doping. The percentage of "yes" for those questions was higher (approximately 50%) in a study that involved 87 Spanish cycling team managers [16,17]. In addition, in reviewing the latest scientific literature in this field on attitudes towards doping in elite athletes, it is interesting to observe the emergence of a concept of so-called "false consensus effect" [15,29], which suggests that athletes who have a history of PED use overestimate the prevalence of drug use among other athletes. Tangen and Breivik [30] also showed that an individual's decision to take banned substances is influenced by the assumption that his or her competitors are also taking drugs [31]. Therefore, it seems clear that if athletes believe that others are taking doping substances, this can push some of them to start using them as well, and this could be like a vicious circle that feeds the pro-doping culture.

Finally, regarding proposed solutions when they were asked about what they would do to eradicate the phenomenon of doping in sport, it was interesting to observe the pessimistic point of view of Spanish national team cyclists since 20.83% of them stated that this problem had no solution. The most proposed option for all the groups was "more controls"(% n: 43.05). In spite of this, increasing drug testing is not synonymous with success in relation to doping prevention. According to Alaranta et al. [28], "controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed". This statement summarizes the current situation in relation to doping in sport in accordance with most of the studies reviewed. According to Peters et al. [32] and Lentillon-Kaestner et al. [22], in the fight against doping, preventive measures are necessary to establish and fortify attitudes towards doping at an early stage. We encourage institutions to invest more money by balancing the costs of controls and prevention programs from early ages as suggested by Morente-Sánchez and Zabala [1]. Controls are obviously needed, as are more effective educational programs that do not require large investments.

This study is not free of limitations since work based on questionnaires covering a banned practice has limits: answers may be deliberately false as the participants questioned may not wish to reveal that they or their teammates use PED, even if anonymity and confidentiality are guaranteed by the researchers. However, a bigger sample size could be more representative although the quality of the selected participants is high: the Spanish National Team cyclists of the four Olympic disciplines (MTB, BMX, track and road).

Taking everything into account, we suggest that descriptive studies to design effective intervention programs should be carried out by means of the same tools. For this purpose, the PEAS could be used as a standard measurement instrument to assess attitudes towards doping so that data are more reliable and valid, and practical applications can be developed efficiently, even when complemented with other tools such as interviews or ideally biomedical tests. Focusing on cycling in particular, we consider, after the most recent media doping cases (such as Puerto or Armstrong), that now is the ideal moment to establish a cooperative structure among the interested parties [most importantly, cycling events organizations (Tour, Giro and Vuelta), the International Cycling Union (ICU), the World Anti-Doping Agency (WADA), and the world of sport science research] to analyze the current situation deeply and subsequently to design specific programs and other activities for prevention and to fight against the phenomenon of doping.

Conclusions

The main conclusion of this study is that the Spanish national team cyclists of the different Olympic disciplines in general are not tolerant of doping. However, BMX and Track riders appear more permissive towards the use of banned substances than MTB and Road. Additionally, results from an open-ended qualitative questionnaire have shown interesting and specific data (e.g., reasons for use or responsible agents), which should be taken into account. Regarding those potentially dangerous groups, it could be interesting to analyze them more exhaustively looking for the causes of that certain permissiveness to intervene more effectively. This emphasizes the idea that, apart from maintaining doping controls and making them more efficient, anti-doping education programs are needed from the earliest ages, focusing not only on athletes but also on their context-doctors, coaches, and family.

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Author Contributions

Conceived and designed the experiments: JMS MMM MZ. Performed the experiments: JMS MMM MZ. Analyzed the data: JMS MZ. Contributed reagents/materials/analysis tools: JMS MMM MZ. Wrote the paper: JMS MMM MZ.

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ATTITUDES TOWARDS DOPING IN

SPANISH ROAD CYCLING NATIONAL TEAMS

Morente-Sánchez, J.[1], Mateo-March, M.,[2]& Zabala, M[1].

[1]Department of Physical Education and Sport; Faculty of Sport Sciences (University of Granada)

[2]Faculty Miguel Hernández, University of Elche (Valencia; Spain)

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De: Anna Davids <akdavids@gmail.com>
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Dear Morente-Sanchez,

We are pleased to inform you that your manuscript, "Attitudes Towards Doping in Spanish Road Cycling National Teams"

has now been accepted for publication Thank you for submitting your manuscript to IJSP.

Best regards,

Anna Davids

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Anna Davids
IJSP Editorial Assistant
akdavids@gmail.com

Attitudes Towards Doping in Spanish Road Cycling National Teams

Morente-Sánchez, Jaime[1], Mateo-March, Manuel[2,3] & Zabala, Mikel.[1,3]

[1] *Faculty of Sport Sciences, University of Granada, Granada, Spain*

[2] *Faculty Miguel Hernández, University of Elche, Valencia, Spain*

[3] *Spanish Cycling Federation, Madrid, Spain*

Corresponding author:

Mikel Zabala Díaz

Faculty of Sport Sciences, University of Granada, Department of Physical Education and Sport, Carretera de Alfacar s/n, Granada 18011, Spain

Phone: +34 626 821 671; Fax: +34 958244369

E-mail: mikelz@ugr.es

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Attitudes Towards Doping in Spanish Road Cycling National Teams

ATTITUDES TOWARDS DOPING ELITE SPANISH CYCLING

Abstract

The aim was to compare attitudes towards doping in cyclists from the Spanish National road cycling teams. 33 cyclists aged 18.62 ± 2.88 years were allocated to four groups (junior men, under-23 men, junior women, and elite women). We used the Performance Enhancement Attitude Scale (PEAS) and a qualitative open-ended questionnaire. The overall PEAS score (17–102) was 34.91 ± 6.62. The word most associated with "doping" was "cheating" (% n: 42.42; % total answers: 14.89%), for "agents responsible for doping" it was "doctor" (84.85%, 30.11%), the "main reason" was "sport achievement" (100%, 50.75%) and the most proposed solution was "more controls" (36.36%; 29.27%). Many riders stated that "cycling and other sports are treated differently" (66.67%, 47.83%). Thus, Spanish elite road cyclists do not support doping, though younger cyclists showed more pro-doping attitudes; alongside controls, early age prevention programs may be effective to educate both cyclists and their close people.

Keywords: doping substances, attitudes, elite athletes, cycling, prevention

ATTITUDES TOWARDS DOPING ELITE SPANISH CYCLING

Doping has marked the world of competitive sport in recent years, especially in sports like cycling; the Landis case in 2006 or the Armstrong case in 2012 are evident examples (Morente-Sánchez & Zabala, 2013). Unfortunately, the use of performance-enhancing substances (PES) is not a new sporting phenomenon (Bloodworth & McNamee, 2010). "Doping in sport? This is an endless whirl" Callaway stated in *Nature*, outlining his pessimistic point of view regarding the phenomenon of doping in sport. Other authors are more optimistic and show how sport should change according to the so-called "athlete 2.0" concept as a collaborative challenge (Zabala and Atkinson, 2012).

Fighting against doping in sport has been recently studied by medical, physiological and social science researchers (Petróczi & Aidman, 2009). Owing to the absence of more objective information on the use of banned PES, researches have been looking for predictors of doping behavior for years. Some research has linked doping behavior and supplements use, concluding that doping use is three and a half times more prevalent in supplements users compared with non-users, and emphasized that these findings are accompanied by significant differences in doping attitudes, norms and beliefs (Backhouse, Whitaker, & Petróczi, 2013). In the same way, others studies have shown that attitudes towards doping could be a predictor of doping practices (Lucidi, Grano, Leone, Lombardo, & Pesce, 2004; Lucidi et al., 2008).

In terms of the type of measurement tools used in the scientific literature to assess attitudes towards doping, the majority of studies used bespoke questionnaires (Backhouse, Mc Kenna, Robinson, & Atkin, 2007; Chester, Reilly, & Mottram, 2003; Morente-Sánchez & Zabala, 2013); the vast minority used validated tools (Erdman, Fung, Doyle-Baker, Verhoef, & Reimer, 2007; Gucciardi, Jalleh, & Donovan, 2011;

Sas-Nowosielski & Swiatkowska, 2008; Uvacsek et al., 2011). In this sense, Petróczi and Aidman's study (2009) must be emphasized because a specific psychometric instrument was developed: the Performance Enhancement Attitude Scale (PEAS), which we use in our study in combination with other bespoke questionnaires. According to these authors, when test scores are interpreted as one's attitude and inferences are made for the athlete population, demonstrated reliability and validity are fundamental. Methodologically, repeated use of a scale is encouraged because it provides researchers with empirical evidence regarding the test's validity and reliability.

In the recent scientific literature, there are several studies on doping in sport in general, and also in various specific sports, such as tennis (Kondric, Sekulic, Uljevic, Gabrilo, & Zvan, 2013), sailing (Rodek, Sekulic, & Kondric, 2012), judo (Kim et al., 2012), weightlifting (Rodek, Idrizović, Zenić, Perasović, & Kondrič, 2013) or swimming (Sajber, Rodek, Escalante, Olujić, & Sekulić, 2013). However, there is a relative lack of scientific research related to attitudes towards doping in elite cycling, probably the most severely controlled sport (Morente-Sánchez & Zabala, 2013). In addition, most studies related to attitudes towards doping in elite sport use samples comprising a mix of athletes from different disciplines, or analyze a large sample of team sports (Alaranta et al. 2006; Lazuras et al. 2010; Mottram et al. 2008).

Regarding studies about doping and cycling, we found the statements of elite cyclists in Lentillon-Kaestner, et al. (2011) quite interesting. According to them, in the past (before the 1998 "Festina scandal"), cyclists who chose not to take PES were marginalized. Moreover, the authors conclude that although use of banned substances is nowadays less widespread, the substances used are similar to those used in institutionalized "doping" programs among cycling teams in the 1990s. In Spain, after popular and unfortunate scandals like "Puerto" or "Galgo" (Morente-Sánchez & Zabala,

2013), it has been suggested that more of these kinds of studies about doping in sport, more specifically focused on elite cycling and doping, are necessary. Therefore, the aim of the present study was to obtain and compare attitudes towards PES in the Spanish National road cycling teams.

Methods

Sample

The sample was composed of 33 elite road cyclists from the Spanish national teams with a mean age of 18.62 ± 2.88 years (18 males and 15 females). The total sample was divided into groups according to competing category (9 Junior men -JM-, 9 Under-23 men -U23-, 10 Junior women -JW-, and 5 Elite women -EW- categories). The data used in this manuscript belong to a larger project composed of many samples from different sport modalities that will be published with additional data, but with different treatment and purposes.

Measures

A cross-sectional descriptive design was carried out using a validated questionnaire: the Performance Enhancement Attitude Scale (Petróczi & Aidman, 2009). The PEAS is a 17-question attitude scale with defined response options ranging from “strongly disagree” to “strongly agree” on a six-point Likert-type scale. The mean score ranges from 1 to 6 and the overall score from 17 to 102; higher scores represent a more lenient attitude toward doping. The PEAS has been used in previous studies showing good psychometric properties (Petróczi & Aidman, 2009; Uvacsek, et al., 2011). Participation was completely voluntary and, in order to provide the participants with a sense of security, and thus to obtain reliable data, the principle of anonymity was guaranteed.

Additionally, a qualitative open-ended questionnaire about participants' doping beliefs, knowledge and habits was used. Therefore, athletes were asked about aspects that seek to delve into the reasons for doping in professional cycling: *words associated with doping*; *agents responsible for doping; differences between cycling and other sports; reasons for initiating doping*; *has anyone suggested that you use doping*?; *have you seen another person inciting/being incited*?; and *proposed solutions*.

Data collection

Participants were recruited via personal and professional contacts in a national team training camp in Segovia (Spain) in January 2011, before the London 2012 Olympic Games. After giving written informed consent, the anonymous questionnaires were self-administered. Written informed consent forms were signed by parents, or guardians, on the behalf of the minor/child participants involved in the study. There was no time limit for completing them. A regular coding system was used by the research assistant, and the data were submitted in Excel files. The study was approved by the Ethics Committee of the University of Granada.

Analyses

Data characteristics were displayed as frequencies, percentages, mean, and standard deviation. The Kolmogorov-Smirnov Test was applied, and noting that the results followed a non-normal distribution, a non-parametric analysis was conducted.

The Mann Whitney-U test for PEAS variables, following Bonferroni post-hoc correction, was carried out (critical statistical significance: $p < 0.0125$). Statistical analyses were performed using IBM-SPSS 20.0 software.

Results

PEAS – Performance Enhancement Attitude Scale

In general, the mean score (1–6) was 2.06 ± 0.39 (2 = Disagree) and the overall score (17–102) was 34.91 ± 6.62. The lowest score was observed for the item "Doping is not cheating since everyone does it" with 1.09 ± 0.38, and the highest for "The media blows the doping issue out of proportion" with 4.53 ± 1.48 (4 = Slightly Agree; 5 = Agree).

Taking the different analyzed groups into account, the mean and overall scores were, respectively: JM: 2.33 ± 0.42, 39.67 ± 7.07; U23 men: 1.84 ± 0.39, 31.33 ± 6.67; JW: 1.95 ± 0.29, 33.10 ± 4.93; EW: 2.15 ± 0.30, 36.17 ± 4.71. There were just two items ("The risks related to doping are exaggerated" and "There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance") where significant differences were observed between J (3.00) and the other groups [U23 (1.22), JW (2.40), and EW (1.17); $p = 0.000$], and between J (2.22) and the other groups [U23 (1.00), JW (1.10), and EW (2.00); $p = 0.001$], for each item respectively. As shown in Table 1, no significant differences between groups were observed in the remaining items.

(Table 1 near here)

Open-ended qualitative questionnaire

The data obtained were expressed in terms of the percentage of participants who made a specific statement (% n) and in terms of the percentage of times that specific statement was mentioned with respect to the total answers given (% total answers), because participants did not have a limit on the number of possible answers. Different groups (Total sample, JM, U23 Men, JW, EW) were compared (Table 2).

1. Words associated with doping. The three most mentioned expressions were "cheating" (% n: 42.42; % total answers: 14.88), "lie" (% n: 27.27; % total answers:

9.57), and “punishment” (% n: 21.21; % total answers: 7.45). In the group comparison, the most common word was “cheating” for all groups: JM (% n: 33.11; % total answers: 11.11), U23 men (% n: 33.33; % total answers: 11.11), JW (% n: 50.00; % total answers: 17.24) and EW (% n: 20.20; % total answers: 20.20).

2. Agents responsible for doping. The three most mentioned agents were “doctor” (% n: 84.85; % total answers: 30.11), “coach/manager” (% n: 63.64; % total answers: 19.53) and “cyclists” (% n: 45.45; % total answers: 13.95). In relation to the different groups, the most frequently suggested agents responsible for doping were: JM (“doctor”; % n: 100; % total answers: 37.5), U23 men (“coach/manager”; % n: 88.89; % total answers: 28.57), JW (“doctor”; % n: 90; % total answers: 32.14) and EW (“coach/manager”; % n: 100; % total answers: 28.57; “cyclists”; % n: 100; % total answers: 21.43).

3. Differences between cycling and other sports. The three most repeatedly mentioned differences were “cycling receives different treatment compared with other sports” (% n: 66.67; % total answers: 47.83), “the amount of controls” (% n: 30.3; % total answers: 21.74); “difficulty of cycling” and “media coverage” (% n: 24.24; % total answers: 17.39). For all groups, the most commonly mentioned difference was “different treatment regarding other sports”: JM (% n: 88.89; % total answers: 66.67), U23 men (% n: 44.44; % total answers: 30.77), JW (% n: 50.00; % total answers: 31.25) and EW (% n: 100; % total answers: 62.50).

4. Reasons for using doping. The three most frequently mentioned reasons were “sport achievement” (% n: 100; % total answers: 50.75), “external pressures” (% n: 39.39; % total answers: 19.40), and “contract/money” (% n: 27.27; % total answers: 13.43). For all groups, the most common reason was “sport achievements”: JM (% n: 66.67; % total answers: 37.5), U23 men (% n: 100; % total answers: 52.38), JW (% n:

100; % total answers: 59.09), and EW (% n: 80; % total answers: 44.44). For EW riders, "Contract/Money" was mentioned equally often (% n: 80; % total answers: 44.44).

5. Has anyone suggested that you use doping? One rider of the total sample stated "yes" (1/33, 3.03%). For the different groups: JM (nobody), U23 men (1/9, 11.11%), JW (nobody), and EW (nobody).

6. Have you ever seen other people inciting others or being incited? Two riders of the total sample stated "yes" (2/33, 6.06%). For the different groups: JM (nobody), U23 men (1/9, 11.11%), JW (nobody), and EW (2/5, 40%).

7. Proposed solutions. The three most frequently mentioned suggestions to eradicate doping in sport were "more controls" (% n: 36.36; % total answers: 29.27), "no solution" (% n: 27.27; % total answers: 16.67), and "prevention from early ages" (% n: 24.24; % total answers: 19.51). For the different groups, the most repeated suggestions to eradicate doping were: JM ("more controls"; % n: 44.33; % total answers: 33.33), U23 men ("Prevention from earliest ages"; % n: 55.56; % total answers: 38.46), JW ("more controls" and "no solution"; % n: 40.00; % total answers: 33.33) and EW ("more controls"; % n: 60.00; % total answers: 50.00).

(Table 2 near here)

Discussion

The present study showed that, in general, road cyclists from Spanish national teams are not permissive of the phenomenon of doping. Only the youngest cyclists (JM) are slightly more permissive towards the use of PES than the rest of the groups on two items ("The risks related to doping are exaggerated" and "There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance"). This reinforces the idea that, apart from controls, information and

education are needed from the earliest ages and psychosocial intervention programs are desirable to educate cyclists as well as the people around them.

In the words of Lucidi et al. (2004), "attitudes were the strongest predictors of intention to use doping substances". In another study, Lazuras et al. (2010) examined the predictors of doping intentions in 750 Greek elite athletes and expected that attitudes, social norms (descriptive and injunctive), and behavioral control beliefs (reflecting both internal and external control processes) would significantly predict doping intentions. Pearson's correlation indicated that social desirability was negatively but significantly correlated with doping intentions ($r = -0.16$; $p < 0.001$) and situational temptation ($r = -0.27$; $p < 0.001$). Hence, the findings also showed that past and current doping behavior strongly predicted doping intentions. According to these authors, behavioral control and attitudinal beliefs can be changed accordingly to reduce the future risk of doping.

However, all the studies assessing attitudes towards doping in elite athletes in the scientific literature use ad-hoc tools; the lack of validated tools like the PEAS is particularly remarkable. Therefore, demonstrated reliability and validity are poor and inferences cannot be made in the majority of the studies in this field. One of the few studies that used the PEAS (in which a higher score reflects a more permissive attitude towards doping) were Uvacsek, et al. (2011). In this study, as expected, among 82 Belgian competitive athletes assessed, confessed doping users (12%) scored significantly higher on the PEAS ($p < 0.05$) compared with those who reported no use of banned drugs (46.8 ± 13.32 vs. 34.43 ± 8.74, respectively). Likewise, in another study (Morente-Sánchez, Freire, Ramírez-Lechuga, & Zabala, 2012) with a sample of 2022 amateur cyclists (confessed users = 164; non users = 1858), the overall scores were 48.87 ± 15.98 and 40.98 ± 11.95, respectively. Petróczi & Aidman (2009) assessed

several samples, such as elite athletes from Hungary, to validate the PEAS (n = 102; confessed users = 5; non-users = 97) and obtained the scores 39.20 ± 17.54 and 35.85 ± 10.12 respectively. Taking the different analyzed groups of our study into account, overall scores were: JM: 39.67 ± 7.07; U23 men: 31.33 ± 6.67; JW: 33.10 ± 4.93; EW: 36.17 ± 4.71. Therefore, elite Spanish cyclists are generally against doping use, and only the youngest cyclists (JM) are slightly more permissive towards the use of PES than the rest of the groups. The Junior Men group was a little more lenient towards doping than the other samples analyzed. Furthermore, this is another example that reinforces the idea that antidoping education programs are needed from an early age.

Ad-hoc questionnaires provide more specific perspectives using direct questions in different directions related to this topic, such as “reasons for use”, “words associated with doping” or “agent responsible”. Pitsch et al. (2007), who assessed a sample of 448 German Olympic athletes, stated that 5.1% of the participants were encouraged to engage in doping practices by coaches and 6.5% were persuaded by family members and friends. On the other hand, Lentillon-Kaestner et al. (2011) stated that the pressure of team staff and doctors on cyclists’ use of banned substances has become less important and direct after the latest doping scandals. In addition, in another study (n = 40), athletes perceived no external pressure to use PES, although various factors were acknowledged as potential reasons for use, most notably, injury recovery and the economic pressures of elite sport (Bloodworth & McNamee, 2010). Striegel et al. (2010), in a research with 978 Dutch elite athletes, observed that the most frequently reported reasons for drug use were “achievement of athletic success” (86%) and “financial benefits” (74%). Similar results were stated by Backhouse et al. (2007) in their comprehensive review for WADA in 2007. Therefore, it seems essential to raise

awareness and re-education of both professional groups (doctors and coaches) as well as athletes, owing to their recognized and proven influence on sportspeople. In this sense, the results from the open-ended qualitative questionnaire provided us additional information. For instance, for the Spanish national road team cyclists, the word most associated with doping was “cheating” (% n: 42.42; % total answers: 14.89), the main reasons for the use of PES were “sport achievements” (% n: 100; % total answers: 50.75) and “external pressures” (% n: 39.39; % total answers: 19.4), whereas the main agents responsible for doping were “doctors” (% n: 84.85; % total answers: 30.11) and “Coaches/Managers” (% n: 63.64; % total answers: 19.53), in that order.

Moreover, when cyclists were asked about the differences in relation to doping treatment between cycling and others sports, the existence of discrimination against cycling was strongly highlighted (% n: 66.67; % total answers: 47.83). According to our results, different treatments in different types of sports in relation to doping have been studied in several investigations. English professional footballers are tested for drugs less often than many other elite athletes: only about 33% per year, according to Waddington et al. (2005). It could be argued that differences between sports are related to the independence that sport federations have in this respect in most competitions, and this possible difference only seems to be reduced in the Olympic Games. In this sense, Spanish elite cyclists’ opinions agree with other studies that also conclude that there is a different treatment in the quantity and quality of drug testing in different sports (Alaranta, et al., 2006).

Focusing on direct questions such as “Has anyone suggested that you use doping?” or “Have you ever seen other people inciting others or being incited?", we could state that U23 men and EW groups require special attention. However, we have to take into account that answers may be intentionally false, as the questioned participants

may not wish to reveal that they or their teammates use PES, even if anonymity and confidentiality are guaranteed by the investigators. Regarding this point, an interesting emergence of the so-called concept "false consensus effect" can be observed in the literature (Petróczi, Mazanov, Nepusz, Backhouse, & Naughton, 2008; Uvacsek, et al., 2011). This term suggests that athletes who have a history of PES use overestimate the prevalence of drug use among other athletes. Tangen & Breivik (2001) also showed that an individual's decision to take banned substances is influenced by the assumption that his or her competitors are also taking drugs (Vangrunderbeek & Tolleneer, 2010). Therefore, it seems quite clear that if athletes believe that others are taking doping substances, this can push some of them to start using them as well, which could create a vicious circle that feeds the pro-doping culture.

Finally, when they were asked about what they would do to eradicate the phenomenon of doping in sport, the most proposed solution was "more controls" (% n: 36.36; % total answers: 29.27); thus, increasing drug testing could be the best solution for the prevention of doping in sport, apart from intervention from an early age, as suggested recently by Morente-Sánchez & Zabala (2013).

Other studies, such as Lentillon-Kaestner & Carstairs (2010) used other tools, such as interviews. All of the young elite cyclists (n = 8) interviewed in this study said that they had taken nutritional supplements because they believed that they could improve their performance. They also admitted that they would use doping substances themselves if it was the key to continuing their cycling career, but only after they became professionals; this agrees with the EW group's opinion, which gave more importance to "Contract/money" (% n: 80; % total answers: 44.44) as the reason for initiating PES use than the other groups.

ATTITUDES TOWARDS DOPING ELITE SPANISH CYCLING

In Alaranta et al. (2006), the statement "controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed" synthesizes the current situation in relation to doping in sport in accordance with most of the studies reviewed. According to Peters et al. (2009) and Lentillon-Kaestner, et al. (2011), in the fight against doping, preventive measures are necessary to establish and reinforce attitudes towards doping at an early stage. On the contrary, in our study, only the U23 male cyclists group agreed with this statement, while other groups (JM, JW and EW) gave more importance to "drug testing". Also, we have to consider that elite athletes are also part of a group that includes family, coaches, support staff, and other athletes, and that these relationships may encourage or minimize the behavior towards banned substances use (Perneger, 2010). For instance, changing favorable attitudes towards doping into unfavorable ones, and teaching athletes how to resist pressures to engage in doping under risk-conducive circumstances, may potentially lead to weaker intentions to engage in doping, even among athletes with a history of past use (Lazuras, et al., 2010). Therefore, we encourage institutions to invest more money by balancing the costs of controls and prevention programs, as suggested by Morente-Sánchez & Zabala (2013). Controls are obviously needed, as well as more effective educational programs, which do not imply great investments.

This study has certain limitations, since the difficulty of getting athletes to open up and discuss such a taboo subject with researchers accounts for a general lack of available scientific literature about elite athletes' attitudes towards doping (Backhouse, et al., 2007; Bloodworth & McNamee, 2010), and consequently, an improving discussion of results is not always possible. Besides, the main limitation of this kind of data collection could be a significant difference between what some of the athletes say and what they really think. In addition, although a larger sample size could be more

representative, we consider that the excellent quality of the selected participants should be taken into account: the best Spanish road Cyclists.

We suggest that descriptive and intervention programs should be assessed using validated tools similar to the PEAS. Focusing on cycling cases specifically, event organizers, federations and other stakeholders should reach an agreement to modify sporting rules (by allowing longer recovery between stages, decreasing physical exigencies, introducing or extending break times, and encouraging, where possible, the importance of technical/tactical aspects rather than physical aspects) to lower the possible advantages of using banned substances in competitions.

Conclusion

Road cyclists from the Spanish national teams are not permissive towards PES. Only the youngest cyclists (JM) showed a slightly lower opposition towards the use of PES than the rest of the groups (U23, JW and EW), but only on two items. In addition, results from an open-ended qualitative questionnaire showed interesting and specific data (e.g., reasons for use or words associated with doping), which should be taken into account. It is suggested that, to minimize the phenomenon of doping, more antidoping information and prevention programs, starting with athletes at a young age and involving other stakeholders such as athletes' doctors, coaches, or family, are necessary to establish and reinforce correct attitudes and behaviors regarding doping.

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ATTITUDES TOWARDS DOPING ELITE SPANISH CYCLING

Table 1. Descriptive Statistics and Comparison between Different Categories for Each PEAS Item*.

PEAS (Performance Enhancement Attitude Scale)	Total sample (n=33) Mean (SD)	Junior Men (n=9) Mean (SD)	Under-23 Men (n=9) Mean (SD)	Junior Women (n=10) Mean (SD)	Elite Women (n=5) Mean (SD)	*P*
1. Legalizing performance enhancements would be beneficial for sports.	1.47 (0.83)	1.44 (0.73)	1.67 (1.12)	1.60 (0.84)	1 (0.00)	NS
2. Doping is necessary to be competitive.	1.12 (0.41)	1.22 (0.67)	1.11 (0.33)	1 (0.00)	1.17 (0.41)	NS
3. The risks related to doping are exaggerated.	2.03 (1.14)	3 (1.32)	1.22 (0.44)	2.40 (0.84)	1.17 (0.41)	0.001[1-2]; 0.002 [1-4]
4. Recreational drugs give the motivation to train and compete at the highest level.	1.56 (0.96)	1.78 (1.39)	1.44 (0.88)	1.70 (0.82)	1.17 (0.41)	NS
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1.47 (0.90)	1.56 (0.73)	1.11 (0.33)	1.60 (1.26)	1.67 (1.03)	NS
6. Athletes are pressured to take performance-enhancing drugs.	3.03 (1.40)	3.89 (1.17)	2.11 (1.17)	2.80 (1.40)	3.50 (1.38)	NS
7. Health problems related to rigorous training and injuries are just as bad as from doping.	1.91 (1.13)	1.56 (1.01)	1.33 (0.50)	2.60 (1.07)	2.20 (1.64)	NS
8. The media blows the doping issue out of proportion.	4.53 (1.48)	4.56 (1.74)	4.89 (1.69)	4.10 (1.45)	4.67 (0.82)	NS
9. Media should talk less about doping.	3.79 (1.81)	3.78 (1.79)	4.11 (2.09)	3 (1.76)	4.67 (1.21)	NS
10. Athletes have no alternative career choices, but sport	2.00 (1.13)	2.67 (1.41)	1.89 (0.93)	1.50 (0.85)	2 (1.10)	NS
11. Athletes who take recreational drugs use them because they help them in sport situations.	2.15 (1.10)	1.67 (1.00)	2.44 (1.42)	2 (0.67)	2.67 (1.21)	NS
12. Recreational drugs help to overcome boredom during training.	1.41 (0.74)	1.22 (0.44)	1.44 (1.01)	1.40 (0.52)	1.67 (1.03)	NS
13. Doping is an unavoidable part of the competitive sport.	2.00 (1.58)	3.11 (2.37)	1.33 (0.71)	1.50 (0.97)	2.17 (1.17)	NS
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2.47 (1.35)	3.33 (1.12)	2.11 (1.27)	2 (1.05)	2.50 (1.87)	NS
15. Doping is not cheating since everyone does it.	1.09 (0.38)	1.22 (0.67)	1.11 (0.33)	1 (0.00)	1 (0.00)	NS
16. Only the quality of performance should matter, not the way athletes achieve it.	1.41 (0.82)	1.44 (0.73)	1 (0.00)	1.80 (1.23)	1.33 (0.52)	NS
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1.53 (0.83)	2.22 (0.97)	1 (0.00)	1.10 (0.32)	2 (0.89)	0.004[1-2]; 0.008 [1-3]
Mean Score	**2.06** (0.83)	**2.33 (0.42)**	**1.84 (0.39)**	**1.95 (0.29)**	**2.15 (0.30)**	**NS**
Overall Score	**34.91** (6.62)	**39.67 (7.07)**	**31.33 (6.67)**	**33.1 (4.71)**	**36.17 (4.93)**	**NS**

Note*: *1 = Strongly disagree; 2 = Disagree; 3 = Slightly disagree; 4 = Slightly agree; 5 = Agree; 6 = Strongly agree.*
[1-2] Junior Men vs. Under-23 Men; [1-3] Junior Men vs. Junior Women; [1-4] Junior Men vs. Elite Women; NS = non-significant

Table 2. Descriptive Statistics and Comparison between Different Categories for Qualitative Analysis.

	Total sample (n=33)		Junior Men -JM- (n=9)		U23 men (n=9)		Junior Women -JW- (n=10)		Elite Women -EW- (n=5)	
	% n	% Total Answers	% n	% Total Answers	% n	% Total Answers	% n	% Total Answers	% n	% Total Answers
Words associated with doping										
Cheating	42.42	14.89	33.33	11.11	33.33	11.11	50.00	17.24	20.00	20
Lie	27.27	9.57	22.22	7.41	55.56	18.52	10.00	3.45	20.00	6.67
Punishment	21.21	7.45	33.33	11.11	22.22	7.41	20.00	6.90	0	0
Others		68.09		70.37		62.96		75.86		73.33
Responsible agents of doping										
Doctor	84.85	30.11	100	37.5	66.67	21.43	90.00	32.14	80.00	26.67
Coach/Manager	63.64	19.53	44.44	16.67	88.89	28.57	80.00	28.57	100	28.57
Cyclists	45.45	13.95	55.56	20.83	66.67	21.43	30.00	10.71	100	21.43
Others		36.41		25.00		28.57		28.57		23.33
Differences Cycling and Other sports										
Treatment different from other sports	66.67	47.83	88.89	66.67	44.44	30.77	50.00	31.25	100	62.50
Numbers of controls	30.3	21.74	33.33	25.00	11.11	7.69	40.00	25	40.00	25.00
Hardness of cycling	24.24	17.39	11.11	8.33	33.33	23.08	30.00	18.75	20.00	12.50
Others		13.04		0		38.46		25		0
Reasons for the initiation in doping										
Sport achievements	100	50.75	66.67	37.5	100.00	52.38	100	59.09	80.00	44.44
External pressures	39.39	19.40	33.33	18.75	66.67	28.57	30	13.64	1.05	11.11
Contract/Money	27.27	13.43	44.44	25	11.11	4.76	0	0	80.00	44.44
Others		16.42		18.75		14.29		27.27		0
Have you been suggested to dope?										
Yes	3.03	3.03	0	0	11.11	11.11	0	0	0	0
Have you seen other people inciting others or being incited?										
Yes	6.06	6.06	0	0	0	0	0	0	40.00	40.00
Proposed solutions										
More Controls	36.36	29.27	44.44	33.33	11.11	7.69	40.00	33.33	60.00	50.00
No Solution	27.27	21.95	22.22	16.67	33.33	23.08	40.00	33.33	0	0
Prevention early ages	24.24	19.51	11.11	8.33	55.56	38.46	10.00	8.33	20.00	16.67
Others		29.27		41.67		30.77		25.00		33.33

Note*: %n:* percentage of total sample of each group (Total sample, Junior Men, Under-23 Men, Junior Women, Elite Women); *%Total Answers*: percentage of total answers.

ATTITUDES TOWARDS DOPING IN SPANISH COMPETITIVE FEMALE CYCLISTS VS TRIATHLETES.

Morente-Sánchez, J.[1], Leruite, M.,[1] Mateo-March, M.[2], & Zabala, M[1].

[1]Department of Physical Education and Sport; Faculty of Sport Sciences (University of Granada)

[2]Faculty Miguel Hernández, University of Elche (Valencia; Spain)

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RESEARCH ARTICLE **Open Access**

Attitudes towards doping in Spanish competitive female Cyclists vs. Triathletes

Jaime Morente-Sánchez[1] *✉, Mayte Leruite[1]*, Manuel Mateo-March[2,3] & Mikel Zabala[1,3]

Abstract

The aim of the present study was to know and compare the attitudes towards doping in Spanish competitive female cyclists and triathletes. All the female cyclists and triathletes who competed (U23 and elite) under license in Spain in 2012 (n = 206; 29.62±8.70 years) in the highest national competitions level comprised the sample. The total sample was divided into two: cyclists (n = 80; 28.86±9.64 years), and triathletes (n = 126; 30.10±8.06 years). Descriptive design was carried out using a validated questionnaire (Performance Enhancement Attitude Scale: PEAS). Complementary, four top-level athletes of each group were interviewed. Regarding results from PEAS, for the whole sample, overall score (17-102) was 34.02±12.74. Regarding different groups, data were: cyclists: 36.63±14.27; and triathletes: 32.37±11.41 (p=0.032). Regarding semi-structured interviews (n = 8). The most mentioned word associated with doping was "cheating" (% n: 62.5). As responsible agents of doping was the word "coach/manager" (% n: 75.0) and the main reason for the initiation in doping was "sport achievement" and "Contract/Money" (% n: 75.0). This study shows that Spanish competitive female cyclists and triathletes, in general, are not tolerant in relation to doping. Nevertheless, competitive female cyclists are significantly more permissive towards the use of banned substances than female triathletes. Results from semi-structured interviews have shown interesting data in specific open-ended questions. The current findings may contribute to the development of anti-doping prevention programmes and interventions in an appropriate and effective manner, which could be the key to better fight the battle against doping in sport.

Keywords: doping prevention, female, competitive athletes, cycling, triathlon.

✉ **Contact email:** jaimemorente@ugr.es (J. Morente-Sánchez)

[1] 1 Faculty of Sport Sciences. University of Granada, Spain

[2] Faculty Miguel Hernández. University of Elche, Spain

[3] Spanish Cycling Federation. Madrid, Spain

* *Both authors contributed equally to this study*

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Introduction

The use of banned substances in sport is a well-known phenomenon that has been studied mainly from a biomedical point of view. Even though psychosocial approaches are also considered key factors in the fight against doping. The Tour de France of 1998 provided evidence of a systemic doping problem in sport (Bloodworth and McNamee 2010; Lentillon-Kaestner et al. 2012). Later, the World Anti-Doping Agency (WADA) was established in 1999, providing a centralized body that aimed to harmonize anti-doping strategies across elite sports (Catlin et al. 2008). In this sense, since 2004, the WADA has produced an annually updated code and related documents that outline official international anti-doping standards.

Estimating the prevalence of doping is a major objective of many international and national sport governing bodies (Petróczi and Aidman 2009) in order to get a reliable view of how widespread doping is in sport. However, the number of athletes reported as testing positive by anti-doping bodies is often smaller than what scientific literature shows. The statistics of adverse analytical findings of WADA (i.e. positive doping tests) suggest that, in an average year, 2% of elite athletes use doping substances and this number has been quite stable over the past 10 years (WADA) (Uvacsek et al. 2011). On the contrary, prevalence rates obtained by means of self-report usually vary between a range of 1.2% and 26% (Backhouse et al. 2007; Ohaeri et al. 2004; Özdemir et al. 2005; Papadopoulos et al. 2006; Petróczi 2007; Pitsch et al. 2005; Tahtamouni et al. 2008). Furthermore, according to Lentillon-Kaestner and Ohl (2011), it is important to emphasize that drug testing and questionnaires do not provide the true prevalence of doping substances users. These authors, in a study with 1810 amateur athletes, observed that depending on the definition of doping and the type of question used, the prevalence of doping obtained could differ enormously, between 1.3 and 39.2% of athletes.

In the absence of more objective information on performance enhancing drugs (PED) use, attitudes are often used as an alternative for doping behaviour, assuming that doping users are more permissive towards doping than non-users (Petróczi and Aidman 2009). Attitudes were also in the foci of doping behavioural models (Dodge and Jaccard 2008; Donovan et al. 2002; Lucidi et al. 2008; Strelan and

Boeckmann 2003) aiming to identify risk factors that lead to doping. The "theory of planned behaviour" (Ajzen 1991) suggests that behaviour depends on people's plans of actions towards that behaviour (intentions), which are regulated by people's perceived behavioural control. their subjective norms, and attitudes (Lucidi et al. 2008).

We have found that there is an important lack of investigations that have studied attitudes towards doping in female athletes being the most of studies related to attitudes towards doping in sport using samples comprised by a mix of male athletes from different disciplines or analysing big samples of team sports (Morente-Sánchez; and Zabala 2013). Specifically, here is not any study in triathlon, which has more and more followers and practitioners (some of them coming from cycling and few from running or swimming). Some authors stated that in elite cycling the use of performance enhancing drugs (PED) was endemic among the cycling teams to the extent that it became institutionalized (Bassons 2000; Kimmage 1998; Voet 1999) and was quasi-tolerated by the professional cycling community (Schneider 2006) before the "Festina scandal" in 1998, although other authors suggest that use of banned substances is nowadays less widespread (Lentillon-Kaestner et al. 2012; Zabala et al. 2009). In Spain, after so famous and unfortunate doping scandals like "Operación Puerto" in 2006. it has been suggested that this type of studies about doping in individual sports are necessary, and more specifically focused on sports like cycling (Morente-Sánchez; and Zabala 2013).

Considering the international negative view about the phenomenon of doping in Spain, (especially after the shameful resolution of Puerto case) and taking into account the lack of studies focused on female athletes, we have considered developing a qualitative research using as a sample all the Spanish female cyclists and triathletes that compete under licence in 2012 (U23 and elite) in Spanish cup (the highest competing level for both cycling and triathlon). So, the aim of the present study was to know and compare the attitudes towards doping in Spanish female cyclists and triathletes of the highest competitive level in Spain.

Methods

The current research methodologies used to study athletes' attitudes towards doping are weak (Backhouse et al. 2007). In addition, scientific literature research typically shows findings obtained by means of ad hoc measurements, while other scales focused on attitudes toward specific substances, mainly steroids (Anshel and Russell 1997; Schwerin and Corcoran 1996a, b; Tricker and Connolly 1997). For the majority of the measurement tools, the scale development process was not reported (or not in sufficient details) and the scales used were not subjected to psychometric testing, which seriously undermines the validity and reliability of any inference made based on the test scores obtained from those bespoke scales (Petróczi and Aidman 2009). On the other hand, a qualitative approach seemed to be the best way to capture the complexity of doping behaviour (Lentillon-Kaestner et al. 2012). In this sense, after analysing scientific literature about researching methodology in this field, we have considered the combination of two attitudes towards doping assessment tools: a validated questionnaire (PEAS) (Petróczi and Aidman 2009) and semi-structured interviews (Lentillon-Kaestner and Carstairs 2010; Lentillon-Kaestner et al. 2012).

Sample

All the female cyclists and triathletes who competed (since U23 category) under license in Spain in 2012 (n = 206; 29.62±8.70 years) in the highest national competing level comprised the sample. The total sample was divided into two groups from mentioned disciplines: cyclists (n = 80; 28.86±9.64 years) and triathletes (n = 126; 30.10±8.06 years).

Measures

A cross-sectional descriptive design was carried out by means of a validated questionnaire: Performance Enhancement Attitude Scale (PEAS) (Petróczi and Aidman 2009). This scale is a 17-question attitude scale with response options ranging from strongly disagree to strongly agree on a six-point Likert-type scale (1= Strongly Disagree; 2=Through disagree; 3= Slightly disagree; 4=Slightly Agree; 5=Agree; 6= Strongly Agree). So, overall score ranges from 17 to 102, so higher scores represent a more lenient attitude toward doping. This tool has been used in previous studies showing good psychometric properties (Petróczi and Aidman 2009; Uvacsek et al. 2011, Morente-Sánchez, Mateo-March and Zabala, 2013). Participation was completely voluntary and to provide the subjects with a sense of security, and thus to obtain reliable data, the principle of anonymity was secured.

Although its satisfactory validation in Spanish is still in publication process (Morente-Sánchez, Femia-Marzo, Petròczi & Zabala, submitted), we found Cronbach alpha values ranging from 0.70 to 0.84 among all the groups studied. In fact, the manuscript is being developed in collaboration with the original author of PEAS (Andrea Petròczi), and the process has been carefully followed (double translation and back translation by two experts, experts review, pilot study, test-retest using a sample of 519 participants, and the use of PEAS with 18 different samples (n=5861 in total), ranging from 12 to 75 years -amateur and professional football players, young football players, young cyclists, university students from Spain and UK (in English), coaches of different sports, women elite cyclists, women elite triathletes, women elite footballers, men elite cyclists, and recreational cyclists. Cronbach alphas for analysed sample in this study were 0.85 female triathletes and 0.78 for female cyclists, respectively.

On the hand, from the total sample, four cyclists and four triathletes (n=8) were interviewed about some aspects related to better know their experience and opinion about the issue, by means of a semi-structured interview. All of interviewed participants were top-

level athletes who had belonged to Spanish National cycling/triathlon teams, and consequently, they had competed in International Championships previously (European championship, world cup, or Olympic Games). Along the research, similar terms such as "doping", "drugs" or "banned substances" were considered those substances that are prohibited by the WADA or other governing body in training and/or sport competition, and so it was explained to subjects before answering the questionnaire.

Data collection

The whole sample completed the PEAS (by means of a personal online link). Written informed consent was sent in the same mail to read before completing the anonymous questionnaire voluntarily. There was no time limit for completing them.

Semi-structured interviews were conducted by one of the authors. The interviewer was a female researcher specifically trained. Interviews lasted on average for more than 2 hours and took place in a location chosen by the participants. All interviews were audio taped and transcribed accurately to be analysed by means of the software QSR NVivo 8. The semi-structured interview protocol and data treatment was adapted from a similar study (Lentillon-Kaestner and Carstairs 2010). Participants were asked about aspects that seek to delve into the reasons of doping in their sport: three words associated with doping; three reasons for initiation in doping; three responsible agents of doping; "do you know any doping user?"; "have you ever been suggested to dope?"; "have you ever used doping substances?"; and, finally, "would you use an undetectable drug that would significantly improve performance?". In order to win participants' confidence and raise the data's reliability, the next steps were taken. First, before the interviews, the aim of this study was clearly explained. Second, the athletes were warranted complete anonymity: the names of towns, teams, races, cyclists and other people were deleted from the transcript. Third, the cyclists signed a form with their names and the names of the researchers and indicated their rights (i.e. participate was voluntary and they were allowed to stop the interview or their participation in this study whenever they decided). Finally, the document with information concerning the interviewees (names. e-mail. and phone number) was deleted to guarantee anonymity; and data is presented by means of acronyms (C: cyclist; T: triathlete).

Analyses

Data characteristics were shown as frequencies, percentages, mean, and standard deviation. Regarding PEAS data, the Kolmogorov-Smirnov Test was applied to ensure a normal distribution of the results, followed

Table 1. Descriptive statistics and comparison between Spanish female competitive under-licensed cyclists and triathletes*

	Total sample (n=206)		Cyclists (n=80)		Triathletes (n=126)		
PEAS (Performance Enhancement Attitude Scale)	Mean	SD	Mean	SD	Mean	SD	p
1. Legalizing performance enhancements would be beneficial for sports.	1.70	(1.43)	1.79	(1.51)	1.65	(1.38)	.503
2. Doping is necessary to be competitive.	1.32	(1.01)	1.41	(1.19)	1.25	(0.87)	.379
3. The risks related to doping are exaggerated.	1.80	(1.47)	1.99	(1.61)	1.68	(1.37)	.162
4. Recreational drugs give the motivation to train and compete at the highest level.	1.54	(1.32)	1.68	(1.49)	1.46	(1.19)	.333
5. Athletes should not feel guilty about breaking the rules and taking performance-enhancing drugs.	1.36	(1.12)	1.31	(1.04)	1.40	(1.17)	.596
6. Athletes are pressured to take performance-enhancing drugs.	3.21	(1.81)	3.34	(1.87)	3.13	(1.78)	.313
7. Health problems related to rigorous training and injuries are just as bad as from doping.	3.11	(1.95)	3.33	(2.07)	2.98	(1.87)	.147
8. The media blows the doping issue out of proportion.	2.96	(1.96)	3.60	(1.99)	2.55	(1.83)	.000[1-2]
9. Media should talk less about doping.	2.66	(1.89)	3.33	(2.02)	2.23	(1.67)	.000[1-2]
10. Athletes have no alternative career choices. but sport	1.62	(1.37)	1.80	(1.54)	1.51	(1.24)	.155
11. Athletes who take recreational drugs use them because they help them in sport situations.	2.72	(1.85)	2.76	(1.89)	2.70	(1.83)	.749
12. Recreational drugs help to overcome boredom during training.	1.41	(1.11)	1.46	(1.18)	1.37	(1.07)	.572
13. Doping is an unavoidable part of the competitive sport.	2.17	(1.71)	2.21	(1.77)	2.15	(1.68)	.839
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2.23	(1.53)	2.09	(1.29)	2.32	(1.67)	.649
15. Doping is not cheating since everyone does it.	1.40	(1.00)	1.74	(1.21)	1.18	(0.77)	.000[1-2]
16. Only the quality of performance should matter, not the way athletes achieve it.	1.44	(1.15)	1.60	(1.19)	1.33	(1.10)	.002[1-2]
17. There is no difference between drugs, fibreglass poles, and speedy swimsuits that are all used to enhance performance.	1.37	(1.03)	1.20	(0.58)	1.48	(1.22)	.822
Overall Score	34.02	(12.73)	36.63	(14.28)	32.37	(11.4)	.031[1-2]

*1: Strongly Disagree; 2: Through disagree; 3: Slightly disagree; 4: Slightly Agree; 5: Agree; 6: Strongly Agree.
1-2 Cyclists vs. Triathletes
NS non-significant

by the Levene test to verify the homogeneity of variance. Noting that the results followed a non-normal distribution a non-parametric analysis was conducted. The Mann Whitney-U test for PEAS variables was carried out (critical statistical significance: $p<0.05$). Statistical analyses were performed using IBM-SPSS 20.0 software. Semi-structured interviews were recorded and transcribed. Transcriptions were analysed and coded with the use of QSR NVivo 8. Lexical and thematic analyses were used concerning the interview data.

To ensure that the software did not lose information, also two researchers used manual-coding system and the data were checked until 100% concordance was got.

Results

PEAS - Performance Enhancement Attitude Scale

In general, the overall score (17-102) was 34.02±12.74. The lowest score was observed for the item "Doping is necessary to be competitive" with 1.32±1.01 (1 = Strongly disagree), and the highest for "Athletes are pressured to take performance-enhancing drugs" with 3.21±1.81 (3 = Slightly disagree; 4 = Slightly agree).

Taking different groups into account, mean and overall score were respectively: cyclists: 36.63±14.27 and triathletes: 32.37±11.41. For overall score, significant differences were observed between cyclists and triathletes (p=0.032). In addition, there were significant differences among mean score of different groups in relation to item 8: "The media blows the doping issue out of proportion" (p=0.000); item 9: "Media should talk less about doping" (p=0.000); item 15: "Doping is not cheating since everyone does it" (p=0.000); and item 16: Only the quality of performance should matter. Not the way athletes achieve it (p=0.002). For the rest of the items no significant differences between groups were observed (see Table 1).

Semi-structured interviews

Summary of the data obtained from semi-structured interviews is shown in table 2. Results are expressed in terms of percentage and frequencies of number of participants who made a specific statement (% n) and number of times that a specific statement was mentioned respect to the total answers given (% total answers). To make the content easy to understand we do include "others" because each one of these categories does not reach an important percentage (range of 1.39-5.56% of the total sample). Although participants had limit in their number of possible answers (e.g. three reasons for doping, three agents or

Table 2. Summary of Qualitative Analysis from interviews: Descriptive Statistics and Comparison between Spanish female competitive under-licensed cyclists and triathletes.

	Total sample (n = 8)		Cyclists (n = 4)		Triathletes (n = 4)	
Three words associated with doping	% n	% Total Answers	% n	% Total Answers	% n	% Total Answers
Cheating	62.5 (5/8)	20.8 (5/24)	25.0 (1/4)	8.3 (1/12)	100 (4/4)	25.0 (4/12)
EPO	25.0 (2/8)	8.3 (2/24)	25.0 (1/4)	8.3 (1/12)	25.0 (1/4)	8.3 (1/12)
Illness	25.0 (2/8)	8.3 (2/24)	0 (0/4)	0 (0/12)	50.0 (2/4)	16.7 (2/12)
Others		62.5 (15/24)		83.3 (10/12)		41.6 (5/12)
Three responsible agents of doping						
Coach/Manager	75.0 (6/8)	33.3 (6/24)	75.0 (3/4)	25.0 (3/12)	75.0 (3/4)	25.0 (3/12)
Athletes	62.5 (5/8)	20.8 (5/24)	50.0 (2/4)	16.7 (2/12)	75.0 (3/4)	25.0 (3/12)
Doctor	50 (4/8)	16.6 (4/24)	25.0 (1/4)	8.3 (1/12)	75.0 (3/4)	8.3 (1/12)
Others		37.5 (9/24)		50 (6/12)		41.6 (5/12)
Three reasons for initiation in doping						
Sport achievements	75.0 (6/8)	25.0 (6/24)	100 (4/4)	33.3 (4/12)	50.0 (2/4)	16.7 (2/12)
Contract/Money	75.0 (6/8)	25.0 (6/24)	75.0 (3/4)	25.0 (3/12)	75.0 (3/4)	25.0 (3/12)
Others		50.0 (12/24)		41.6 (5/12)		58.3 (7/12)
Do you know any doping user?						
Yes	50.0 (4/8)	50.0 (4/8)	75.0 (3/4)	75.0 (3/4)	25.0 (1/4)	25 (1/4)
Have you ever been suggested to dope?						
Yes	25.5 (2/8)	25.5 (2/8)	25.0 (1/4)	25.0 (1/4)	25.0 (1/4)	25.0 (1/4)
Have you ever used doping substances?						
Yes	0 (0/8)	0 (0/8)	0 (0/4)	0 (0/4)	0 (0/4)	0 (0/4)
Would you use an undetectable drug that would significantly improve performance?						
Yes	12.5 (1/8)	12.5 (1/8)	25.0 (1/4)	25.0 (1/4)	0 (0/4)	0 (0/4)

% n: percentage of total sample of each group (Total sample cyclists and Triathletes);
% Total Answers: percentage of 100% total answers.

yes/no answers), they could keep on talking about the related topic given more interesting information. Besides, to enlighten some data specific statements related to specific topics are shown "quoted". Different groups (total sample. cyclists and triathletes) were then described.

The following information was obtained for each item:

1. Three words associated with doping: the most mentioned words were "cheating" [% n: 62.5 (5/8); % total answers: 20.8 (5/24)], "EPO" [% n: 25.2 (2/8); % total answers: 8.3 (2/24)], and "illness" [% n: 25.5 (2/8); % total answers: 8.3 (2/24)]. Comparing both groups, cyclists mentioned 12 different words on the whole and "cheating" was just one of them [% n: 25% (1/4); % total answers: 8.3% (1/12)], while "cheating" was mentioned for all the triathletes [% n: 100% (4/4); % total answers: 33.33% (4/12)]. We selected two different statements such as: "I think doping is a real problem. I wish the game was 100% free of doping" (T2) and "Doping is always there, who does not admit it is lying" (C1).

2. Three responsible agents of doping: the most mentioned agents were "coach" [% n: 75.0 (6/8); % total answers: 25.0 (6/24)], "athlete" [% n: 62.5 (5/8); % total answers: 20.8 (5/24)], and "doctor" [% n: 50.0 (4/8); % total answers: 16.6 (4/24)]. In relation to different analysed groups, for triathletes the previous three agents were mentioned equally [% n: 75.0 (3/4); % total answers: 25.0 (3/12)] while cyclists mentioned more times "coach" than others [% n: 75.0 (3/4); % total answers: 25.0 (3/12)]. "Of course, that is very difficult to break chain where everyone (doctors, Labs, media...) contributes to the plot" (C3). "Society itself is also culpable for giving such publicity about doping" (C2).

3. Three reasons for the initiation in doping: the most mentioned reasons were "sport achievements" [% n: 75.0 (6/8); % total answers: 25.0 (6/24)], and "contract/money" [% n: 75.0 (6/8); % total answers: 25.0 (6/24)]. Taking into account the different groups, "sport achievements" was mentioned by all cyclists [% n: 100.0 (4/4); % total answers: 33.3 (4/12)] while "money" was the most mentioned reason for triathletes [% n: 75.0 (3/4); % total answers: 33.3 (3/12)]. "Doping is not free, it is not like a box of aspirins; I am not going to spend the salary on something I do not know if it will be worthwhile. If it is guaranteed that using a doping substance I win the Paris-Roubaix and its award of 3 million of Euros. I would spend 70 Euros on this product to go like a motorbike" (C1). "Triathlon is a very young sport. in which there is no money yet; if there is no money, doping is impossible" (T3). "I would accede to dope if my career depended on it" (C1).

4. "Do you know any doping user?" Four riders of the total sample stated, "yes" (4/8; 50.0%). exactly 3 cyclists (3/4; 75.0%) and one triathlete (1/4; 25.0%). "I have seen female cyclists who were injected vitamins and/or recoveries (at least. I guess), but I used to do it as well; in the case of prohibited substances practice I guess everything would be developed in intimacy" (C3). "Unfortunately, more and more people from other sport modalities are becoming to triathlon; because there are fewer doping controls in triathlon than in the sport modalities where they come from" (T1).

5. "Have you ever been suggested to dope?" Two participants of the total sample stated "yes" (2/8; 25.0%). one per each group (1/4; 25.0%). "Managers and coaches used to offer. I have been also offered, and the used to say: 'if you want to get your aims, you should know the rules of the game'; but that takes a significant economic cost, which is not easy to take" (C3)

6. "Have you ever used doping substances?"; all answers were "no".

7. "Would you use an undetectable drug that would significantly improve performance?" One cyclist stated, "yes" (1/8; 12.5%). "No, for the simple fact that it is not my job. I'm not professional, so it is not an obligation for me" (C1). "Probably, most professional cyclists would do it" (C3). "No, today I do not take what is forbidden even without side effects" (AT2).

Regarding impact media, "it does not depend on being male or female; it depends on fame of the rider's name" (C4). "Positive cases were assumed worse in males than female cyclists as male cyclists earn more, their rewards are greater and. Therefore, their media coverage is most widespread" (C3).

The issue related to differences between sports appeared along interviews: "I think cycling has been used like a major scapegoat, we are always at the news media for the same topic (doping), and nobody does not stop to think that thousands cyclists pass doping controls and just 1% fail. However in football, for example, players are not tested so many times. Probably, there are many more positive cases" (C4). "I have been tested in many occasions, so many. For example, I remember in Beijing (2008 Olympics Games), just off the plane they were waiting for us, and they did not let us leave the bag in the Olympic Village" (C3).

Regarding current used strategies and hypothetical solution proposals to eradicate doping in sport, participants also gave their opinion: "The effectiveness of drug testing has changed. Before almost everything was allowed because almost nobody failed in a doping control; but now, if someone uses doping substances is much more easily caught" (C3). Regarding doping prevention from Spanish Cycling Federation. I must say that it was not working on it before, but now it is" (C4). "I have never heard anything related to doping prevention from Federation but I guess they will be the most interested in this topic because it is too dirty for the sport" (T4). "I do not know if from the Spanish Triathlon Federation are doing something related to doping prevention; if they are doing it. I have not seen it" (T3). "We must educate society saying that doping is not good and that high performance can be achieved by means of training naturally. Unfortunately, doping is considered as normal" (C2).

Discussion

The results of this study showed that female competitive under-licensed Spanish cyclists and triathletes, in general, are not permissive in relation to doping. However, cyclists were significantly more permissive towards the use of banned substances than triathletes. In addition, results from semi-structured interviews have shown interesting and specific information and statements (e.g. reasons for use or responsible agents), which should be taken into account. In order to operate consequently, it could be interesting to analyse them exhaustively looking for the causes of that certain permissiveness. This study supports the idea that, apart from more efficient controls, anti-doping prevention and education programmes could be the key to win the battle against doping in sport. The culture can be changed by means of controls but also by means of anti-doping prevention programmes trying to change attitudes and behaviours. In fact, Lance Armstrong argued to justify his doping that "this was the culture", so this could be a key point.

According to the current scientific literature in this field (Morente-Sánchez & Zabala. 2013) there are no previous specific studies that assessed attitudes towards doping in female athletes by means of a validated measurement tool.

Regarding results from PEAS in this study, for the whole sample, overall score (17-102) was 34.02±12.74. Hence, female competitive under-licensed Spanish cyclists and triathletes, in general, are against of doping. Despite of the fact that female triathletes are less permissive towards the banned substances use than female cyclists ($p=0.032$), the comparison with scores from different kind of samples previously mentioned make us believe those scores were low and non-worrying, though comparisons were made with men samples. So, according to this scale the higher score, the more permissive attitude towards doping you show. Other study that used this validated scale (PEAS) was developed by Uvacsek et al. (2011). In this study, among 82 Hungarian competitive athletes assessed (45 females, 45%), confessed doping users (12%) scored, as expected, significantly higher score on PEAS ($p<0.05$) when compared with those who reported no use of banned drugs (46.8±13.32 and 34.43±8.74. respectively). Morente-Sánchez, Mateo-March and Zabala (2013) assessed attitudes towards doping in 72 cyclists (21 females, 29.2%) from Spanish national cycling teams comparing different Olympic disciplines; regarding four different groups, data were: Mountain Bike: 30.28±6.92; Bicycle Motocross: 42.46±10.74; Track: 43.22±12.00; Road: 34.91±6.62. Likewise, in other study (Morente-Sánchez et al. 2012), with a sample of 2022 (45 females, 2.2%) amateur cyclists as sample (confessed users = 164; non users = 1858), overall scores were, respectively: 48.87±15.98 and 40.98±11.95. Petróczi and Aidman (2009) analysed several samples such as elite athletes from Hungary (n=102; confessed users = 5; non-user = 97) obtaining the following scores respectively (39.20±17.54 vs. 35.85±10.12).

This validated tool has also been used in non-athlete sample in this sense. Female competitive Spanish cyclists and triathletes showed a more lenient attitude towards doping (41.59±10.85 34.02±12.74) than USA coaches (30.26±9.28), but less permissive than Sports Sciences UK students (36.23±13.00, age: 21.47±5.53), Canadian students (37.94 ± 11.25, age: 20.9±2.04), USA students (37.57 ± 12.60, age: 20.12±2.18) (Petróczi and Aidman, 2009), and being very similar to Spanish students (34.69±9.31, age: 22.09±3.26) (Freire-SantaCruz et al. 2011).

In the whole, females showed a similar or lower scores than different male groups with which comparisons were established, what could mean that cyclists and triathletes women are made aware of doping. As practical application, we could consider that those more permissive groups, whose scores are quite close to doper's, need a deep analysis and monitoring.

On the other hand, information from semi-structured interviews allowed us to get more specific information using direct questions in different perspectives related to this topic like "words associated to doping", "reasons for use", or "responsible agent". For instance, in general, the most associated word to doping was "cheating", being mentioned for the four interviewed triathletes. It is remarkable that terms like "performance" or "win" did not appear in the first positions in the order of the most mentioned answers. Besides, comparing both groups, cyclists mentioned 12 different words on the whole and "cheating" was just one of them while "cheating" was mentioned for all the triathletes. Moreover, C1 recognized that "doping is always there; who does not recognize it is lying". This honest statement is not new in the scientific literature of this field. "Doping in sport? This is an endless whirl" stated Callaway in the journal Nature (Callaway, 2011: p283) showing his pessimistic point of view regarding this phenomenon of doping in sport. Similar results were stated by Backhouse et al. (2007) in their deep review reported to WADA.

Regarding agents responsible of doping Somerville et al. (Somerville and Lewis 2005) reported that the doctor was the first option for 62% (46/74) of athletes in their study. Other study, using a sample of 34 British junior team athletes, noted that coaches provided the greatest influence (65%). followed by sports dieticians (30%) and doctors (25%) (Nieper 2005). On the other hand, results of this research are in accordance to Lentillon-Kaestner et al. (2011) who stated that the pressure from team staff and doctors on cyclists' use of banned substances has become less important and direct after the latest doping scandals such as Festina case in 1998 or Puerto case in 2006. Though "coach/manager" is considered the main doping influencing agent for this sample, they also recognized themselves like responsible largely. "I would accede to dope if my career depended on it", stated C1. So, despite of the fact that other agents could influence her, the intentions were evident being her the responsible agent. According to C3, "everyone (doctors, labs, media...) contributes to the plot", so it seems essential

to raise awareness and re-education of both professional groups (doctors and coaches) besides athletes, due to their recognized and checked influence on athletes (Morente-Sánchez & Zabala, 2013). It might be worrying a statement from one of the amateur triathlete interviewed (T1) which emphasize the figure of the athlete like agent responsible of doping: "Unfortunately, more and more people from other sport modalities are coming to triathlon because there are fewer doping controls in triathlon than in the sport modalities where they come from". This is a fact as some recognized cyclists that were found positive changed their career to practice triathlon. So it could be suggested that punishments should be for all sports and modalities.

In relation to reasons for initiation in doping, "sport achievements" and "contract/money" were the most mentioned in general, being the first one mentioned for 100% of interviewed cyclists and the second one for 75% of triathletes. "If it is guaranteed that using a doping substance I will win. I will use it" was stated by C1. Similar results were found in others studies. In one of them, 8 young elite cyclists were interviewed and admitted that they were opened to use doping substances themselves if it was the key to continuing their cycling career, but only after they became professional (Lentillon-Kaestner and Carstairs 2010). In the same way, other research with 978 German elite athletes reported that the most repeated reasons for drug use were to achieve athletic success (86%) and for financial gain (74%) (Striegel et al. 2010). In addition, in other study (n=40), various factors were acknowledged as potential reasons for use: most notably injury recovery and the economic pressures of elite sport (Bloodworth and McNamee 2010).

Focusing on the direct questions such as "do you know any doping user?". Have you ever been suggested to dope?" or "Have you ever used doping substances?", it was observed that four (three cyclists. one triathlete) of the eight interviewed athletes recognize to know doping users and no one said that had ever used any doping substances. However, a common limitation of this type of studies is that answers may be deliberately false, as the subjects questioned may not wish to reveal that they or their teammates use banned substances, even if the researchers guarantee anonymity and confidentiality. Revising the latest scientific literature in this field, it is interesting to observe the appearance of a concept so-called "false consensus effect" (Morente-Sánchez; and Zabala 2013; Petróczi et al. 2008; Uvacsek et al. 2011), which suggests that athletes who have a history of PED use overestimate the prevalence of drug use among other athletes. So, an individual's decision to take banned substances could be influenced by the assumption that his or her rivals are also using doping (Vangrunderbeek and Tolleneer 2010). In this sense, the statement made by T2, "I wish the game was 100% free of doping", could have different connotations. In addition, regarding use an undetectable drug that would significantly improve performance, also so-called "magic drug" less than 10% of 403 talented young athletes answered affirmatively (Bloodworth et al. 2010). In this study, just a cyclist said "yes", but there were statements that can be found less optimistic: "Probably, most professional cyclists would do it" (C3).

Triathletes and cyclists showed his disagreement about the differences in relation to doping treatment between cycling and others sports. "I think cycling has been used like a major scapegoat, we are always at the news media for doping cases" said C4. Other statement as interesting as curious was made by C3, "just off the plane they were waiting for us, and not let us leave the bag in the Olympic Village". As a curiosity, the first doping case in Beijing 2008 was the one of a Spanish female cyclist on that occasion. In this sense, different treatments among different types of sports in relation to doping have been studied in several investigations. English professional footballers were tested for drugs less often than many other elite athletes, only about 33% per year, according to Waddington et al. (2005). Therefore, since doping is a general issue, we suggest that all sport federations follow the same anti-doping protocols to avoid unfair situations among sports, and also punishments should be taken into account by all sports and federations, using the same framework.

Finally, regarding to proposed solutions to win the battle against doping it could be interesting to emphasize what C2 stated: "we must educate society saying that doping is not good and that high performance can be achieved by means of training naturally. Unfortunately, doping is considered as normal". According to this perspective appears the so-called "athlete 2.0" concept as a collaborative challenge combining high-quality and individualized training values and ethics in sport (Zabala and Atkinson 2012). This concept supports the idea of sport based on ethics and science as a collaborative challenge for all the stakeholders, which should also provide optimal education to the athletes.

One of the professional female cyclists interviewed, C3, who also work as coach with children, mentioned how young cyclists often inform her about doping cases, which means that doping is present from earliest ages. There are studies that stated that preventive measures are necessary to establish and fortify attitudes towards doping at an early stage (Lentillon-Kaestner et al. 2011; Peters et al. 2009). Controls are obviously needed as well as more effective educational programmes that do not mean great investments since "controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed" (Alaranta et al. 2006). So, we encourage institutions to invest the same amount of money but balancing the costs of controls and prevention programmes from early ages (Morente-Sánchez and Zabala 2013). Indeed, the Spanish Cycling Federation has been conducting an intervention project called "Preventing to Win" since 2009 with the aim of educating the cyclists and coaches of the future (Zabala et al. 2009). It is not about spending more money; it is about giving more importance to psychological

prevention programmes. We encourage institutions not to fail on what we call "institutional hypocrisy" that can be detected when it is said prevention is important but there is no funding or it is just a ridiculous current (0-5 % of the total amount for prevention vs. 95-100% for controls).

Since drug testing alone can fail, as this was proven in the case of Lance Armstrong. We believe that education is the only way to truthfully minimise the doping culture and reduce the cases of doping in the middle to long term. We suggest that it is important to educate the people surrounding athletes, as they are often the most influential or people who induce and/or support the use of banned substances by athletes should also be punished. Nevertheless, if we educate athletes, they can search for appropriate sources of information and also evaluate its quality. Focusing in cycling and triathlon particularly, we consider, after lasts and media doping cases that nowadays is the ideal moment to work together against doping to win this battle. Event organisers and sport federations should work together to modify the rules of each competition in order to deter dopers (i.e. allowing longer recovery between stages and/or reducing the distance covered in competitions). Sport science researching world will play a decisive role in this battle against doping analysing the current situation deeply by means of studies like this to detect risky groups and their causes. Consequently, to design specific training and educational programs to get more "athletes 2.0". The programmes targeting athletes and those stakeholders around them must be carefully planned and developed as a middle- to long-term objective to ultimately change attitudes towards doping, and so the doping culture.

Conclusions

The main conclusion of this study is that female competitive under-licensed Spanish cyclists and triathletes, in general, are not permissive in relation to doping. However, cyclists were significant more permissive towards the use of banned substances than triathletes. In addition, results from semi-structured interviews have shown interesting and specific information and statements (e.g. reasons for use or responsible agents), which should be taken into account. In order to operate consequently, it could be interesting to analyse them exhaustively looking for the causes of that certain permissiveness. This study supports the idea that, apart from more efficient controls, anti-doping prevention and education programmes could be the key to better fight the battle against doping in sport.

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ANALYSIS OF PSYCHOSOCIAL FACTORS IN AMATEUR CYCLISTS ACCORDING TO THEIR DOPING BEHAVIOUR: USERS VS. NON-USERS.

Morente-Sánchez, J.[1], Mateo-March, M.[2], Freire-SantaCruz, C.[1], & Zabala, M[1].

[1]Department of Physical Education and Sport; Faculty of Sport Sciences (University of Granada)

[2]Faculty Miguel Hernández, University of Elche (Valencia; Spain)

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Title: Analysis of psychosocial factors in amateur cyclists according to their doping behaviour: users vs. non-users.

Authors: Jaime Morente-Sánchez[1,2], Manuel Mateo-March[2,3], Mikel Zabala[1,2]

[1] *Faculty of Sport Sciences, University of Granada (Spain)*
[2] *Spanish Cycling Federation, Madrid (Spain)*
[3] *Faculty Miguel Hernández, University of Elche (Valencia; Spain)*

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Address for correspondence:

Jaime Morente Sánchez

Faculty of Sport Sciences (University of Granada). Department of Physical Education and Sport. Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +34 651775666; Fax: +34 958244369

Mail: jaimemorente@ugr.es

Abstract

This study aimed to know, compare, correlate and observe the predictive capacity of a set of psychosocial variables doping among participants of an international cycling long-distance event according to their doping behaviour: users vs. non-users. Total sample was composed of 2366 participants (40.915 ± 9.15 years). Descriptive design was carried out using a bespoke questionnaire to assess self-efficacy and projected use, and two validated instruments to assess attitudes towards doping (Performance Enhancement Attitude Scale: PEAS), and self-esteem (Rosenberg's scale). Significant correlations were observed among PEAS, self-esteem, self-efficacy and projected use ($p<0.01$). Participants assessed were not permissive regarding doping, but they could be considered a risk group. The variables attitudes towards doping and self-efficacy could be potential predictors to detect doping users. Confessed dopers showed more lenient attitudes towards doping, lower levels of self-esteem and self-efficacy, and overestimated the percentage of users among their mates in comparison with non-dopers.

Keywords: doping prevention, self-esteem, self-efficacy, projected use, attitudes

Introduction

The use of banned substances and methods has been always present in competitive sport. In the decade of nineties, the Festina case scandal in Tour de France of 1998 provided evidence of a systemic doping problem in sport (Bloodworth, Petroczi, Bailey, Pearce, & McNamee, 2012; Lentillon-Kaestner, Hagger, & Hardcastle, 2012). More recently in 2012, the Lance Armstrong's confession, seven-times winner of the Tour de France, had as consequence an incessant dribble of former professional cyclists admitting having used performance-enhancing drugs (PED) in a recent past.

Estimating the prevalence of doping is a major objective of many international and national sport governing bodies (Petróczi & Aidman, 2009) in order to get a reliable view of how widespread doping is in sport. However, the number positive drug testing reported by anti-doping bodies is often smaller than what scientific literature shows. The statistics of adverse analytical findings of WADA suggest that, in an average year, 2% of elite athletes use doping substances and this number has been quite stable over the past 10 years (WADA) (Uvacsek, Nepusz, Naughton, Mazanov, Ránky, et al., 2011). On the contrary, prevalence rates obtained by means of self-report usually vary between a range of 1.2% and 26% (Backhouse, Mc Kenna, Robinson, & Atkin, 2007).

According to (Lucidi, Grano, Leone, Lombardo, & Pesce, 2004), attitudes could be considered as a strong predictor of doping intentions. So, in the absence of more objective information on PED use, attitudes could be assessed to identify doping cases or future doping cases, assuming that doping users are more permissive towards doping than non-users (Petróczi & Aidman, 2009).

Scientific literature in this filed evidences that there exists a relative deficiency of scientific research in relation to our object of study, attitudes towards doping in

cycling, the most persecuted sport (Morente-Sanchez & Zabala, 2013). In top-performing cycling the use of PED was common (Lentillon-Kaestner et al., 2012), to the extent that it became institutionalized (Bassons, 2000; Kimmage, 1998; Voet, 1999) and was quasi-tolerated by the professional cycling community (Schneider, 2006) before the mentioned Festina scandal in 1998. They also stated that the use of banned substances is less widespread nowadays. Other authors considered that the 1990-2010 period in professional cycling is labelled by some as the EPO (Erythropoietin) epidemic (Lodewijkx & Brouwer, 2011). In Spain, after famous and unfortunate scandals such as "Galgo" in 2009" or "Puerto" (2006-2013), it has been suggested that studies of this type about doping in Spanish cycling were necessary. In fact, recently, it has been published a paper focused on Spanish elite cyclists' attitudes towards doping, in which Spanish national team cyclists were assessed according to their different Olympic disciplines (Morente-Sánchez, Mateo-March, & Zabala, 2013), although there is still a lack of information regarding non-elite competitive cyclists.

Due to several institutions' efforts to eradicate doping, most of actions have been focused on professional cycling; so, amateur and master athletes keep being risk groups because these categories are less persecuted regarding drug testing while the number of this type cyclists is higher and higher and following no anti-doping controls or related follow-up. In addition, in races of this type of samples, winners often get suspiciously interesting results existing, unavoidably, the doping shadow on them. Several doping scandals have been discovered in Spanish non-profession cycling lately (e.g. "Operacion Máster" or "Operación Cursa"). For these reasons, we considered to focus this study on under-licensed competitive cyclists (amateur and masters) from an International long-distance (205 kilometres) road cyclist event called "Quebrantahuesos" (UCI Golden Bike).

So, the aim of the present study was to know, compare, correlate and observe the predictive capacity of a set of psychosocial variables doping among participants of "Quebrantahuesos" according to their doping behaviour: users vs. non-users.

Methods

Sample

The characteristics of the sample are shown in Table 1. Using the given answer in a specific yes-no question ("have you ever used doping substances?"), total sample could be divided into users and non-users. The data used in this manuscript are part of a larger project composed for many samples from different sport modalities that will be published with complementary data but with different treatment and purposes.

Measures

Attitudes towards doping and Self-esteem

Descriptive design was carried out using a survey composed of bespoke qualitative open-ended questions to assess self-efficacy, and projected use and two validated scales to assess attitudes towards doping -Performance Enhancement Attitude Scale: PEAS- (Petróczi & Aidman, 2009), and self-esteem -Rosenberg Self-Esteem Scale: RSES- (Rosenberg, 1965; Tomas & Oliver, 1999), respectively.

The PEAS is a Likert scale questionnaire that shows values from 1 (Strongly Disagree) to 6 (Strongly Agree), for different statements that support the use of PED in sport. So, the mean scores range from 1 to 6 and overall score from 17 to 102, with higher scores representing a more permissive attitude toward doping. This scale has been used in previous studies and has shown good psychometric properties (Petróczi & Aidman, 2009; Uvacsek et al., 2011; Morente-Sánchez, Mateo-March, & Zabala, 2013). Its satisfactory validation in Spanish has been recently accepted for publication

(Morente-Sánchez, Femia-Marzo & Zabala, 2014). Cronbach's α values were calculated as a measure of internal consistency, considering the cut-off value of 0.7 to determine acceptable scale reliability (Nunnally, 2010). For this study we found a Cronbach Alpha value of 0.81 (table 1).

The RSES is made up of 10 items that refer to self-respect and self-acceptance rated on a 4-point Likert-type scale, ranging from 1 (totally disagree) to 4 (totally agree). Items 1, 3, 4, 7, and 10 are positively worded, and items 2, 5, 6, 8, and 9 negatively. A positively worded item is, for example, "I feel good about myself"; a negatively worded item is, for example, "I certainly feel useless at times". This measurement instrument has been also satisfactory cross-culturally adapted and validated in Spanish (Cronbach α = 0.8-0.85) (Martín-Albo, Núñez, Navarro, & Grijalvo, 2007).

Table 1.

Sample characteristics and PEAS score distribution statistics and reliability estimates.

Sample	n	Age (mean ±SD)	**PEAS**	
			Overall score (mean ± SD)	Cronbach α
Ciclotourists of QH Challenge	2366	40.915 ± 9.15	40.375 ± 12.685	0.811

PEAS: Performance Enhancement Attitude Scale ; SD: Standard deviation

Self-efficacy and projected use

Following Bandura's guide for constructing self-efficacy scales (2006), self-efficacy beliefs were also measured with three statements rated on a 10-point scale ranging from "not certain at all" to "totally certain". The items were: a) You can achieve your best results without doping; b) You do not need doping to be a good cyclist, and c) You can succeed (win, beat records) without doping.

Projected use was measured by asking participants a direct question to give a projected percentage of those using doping in their respective sports.

Data collection

All the participants completed an electronic version of the questionnaires by means of a personal online link sent by email from the database of the race organization. Participation was completely voluntary and anonymous, and respondents received a detailed explanation of the purpose and implications of the research and gave their implied consent. There was no time limit for completing them. The research complies with Spanish laws and the Declaration of Helsinki, and has been approved by the Ethics Committee of the University of Granada.

Analyses

Data characteristics were shown as frequencies, percentages, means, and standard deviations. Due to the results following a non-normal distribution, a non-parametric analysis was conducted. Total sample was divided into doping users and non-users depending on the answer (yes or no) of the question "have you ever used doping substances?". The Mann-Whitney U-test was carried out to compare doping users vs non-users. Spearman's correlation coefficient was also used to assess the relationships among analysed variables. Finally, a multiple regression analysis was executed for all variables to determine the predictor potential to detect doping users. Statistical analyses were performed using IBM-SPSS 20.0 software.

Results

Significant differences were found for the three of four variables analysed (users vs non-users, respectively): PEAS, 40.66±12.061 vs 48.10±16.00 ($p<0.05$); self-efficacy, 8.41±2.21 vs 7.14±3.04 ($p<0.05$); and, projected use 44.71±33.72 vs 55.42±34.52 ($p<0.05$). However, no significant differences were found for self-esteem between users and non-users. Mean values (±SD) are shown in Table 2.

Table 2.

Descriptive values (mean ±Standard deviation) and Mann-Whitney U contrast analysis (user vs. non user) for PEAS, Self-efficacy, Self-esteem, and Projected use in the Ciclotourists of QH Challenge.

	Non user *n*=2174	User *n*=192
PEAS overall Score (17-102)	40.66±12.061	48.10±16.00*
Average of Self efficacy (0-10)	8.41±2.21	7.14±3.04*
Self-Esteem overall Score (4-40)	35.46±5.24	35.04±5.51
Projected use(%)	44.71±33.72	55.42±34.52*

PEAS: Performance Enhancement Attitude Scale ; SD: Standard deviation
* $p<0.01$

Also, significant correlations were observed among PEAS, self-esteem, self-efficacy and projected use each other ($p<0.01$). According to them, the more permissiveness regarding attitudes towards doping, the less self-esteem, the less self-efficacy and the more projected use. Spearman's correlation coefficients are shown in table 3.

Table 3.

Spearman correlations coefficients for the variables assessed in the Ciclotourists of QH Challenge.

	1	2	3	4	5
1. PEAS Overall Score	-	-.0148(**)	-0.328(**)	0.247(**)	0.126(**)
2. Self-Esteem Overall Score	-0.148(**)	-	0.132(**)	-0.144(**)	
3. Average of Self efficacy	-0.328(**)	0.32(**)	-	-0.240(**)	-0.122(**)
4. Projected use	.0247(**)	-0.144(**)	-0.240(**)	-	0.090(**)
5. Have you ever used doping substances?	0.126(**)		-0.122(**)	0.090(**)	-

PEAS: Performance Enhancement Attitude Scale
* $p<0.05$
** $p<0.01$

Finally, multiple regression analysis discovered that the variables attitudes towards doping (PEAS) and self-efficacy could be potential predictors to detect doping users ($p<0.05$) (table 4).

Table 4.

Multiple regression analyses predicting doping user vs. non user for variables assessed in the Ciclotourists of QH Challenge.

Predictors	Dependent variable: have you ever used doping substances? (User vs. Non user)					
F=14.76, p=0.00; R_{adj}^2 0.33)	B	β	CI 95%		t	p
PEAS Overall Score	0.003	0.122	0.002	0.004	4.521	0.000
Self-Esteem Overall Score	0.001	0.005	-0.009	0.011	0.192	0.848
Average of Self efficacy (3 items)	-0.010	-0.083	-0.017	-0.004	-3.070	0.002
Projected use	0.000	0.047	0.000	0.001	1.805	0.071

CI confidence intervals; B coefficients not standardized; β standardized coefficients
$p<0.05$

Discussion

Amateur competitive under-licensed cyclists assessed were not tolerant regarding doping, but in comparison with other studies (Petróczi & Aidman, 2009; Uvacsek, et al., 2011; Morente-Sánchez, Mateo-March, & Zabala, 2013) they could be considered a risk group. Confessed doping users scored significantly higher (more permissive) on the PEAS in comparison with those who reported not using banned substances. In addition, doping users showed lower levels of self-esteem and self-efficacy, and overestimated the percentage of users among their mates in comparison with non-dopers. Also, it was observed that the more permissiveness regarding attitudes towards doping, the less self-esteem, the less self-efficacy, and the more projected use values. It is interesting the negative correlation between attitudes towards doping and self-esteem. Finally, it was suggested that the variables attitudes towards doping and self-efficacy could be potential predictors to detect doping users. Other studies observed

predictor properties for self-esteem (Laure & Binsinger, 2007) but in this study did not support this outcome.

Regarding attitudes towards doping, Petróczi and Aidman (2009) and Uvacsek et al. (2011) also used the PEAS in samples composed of competitive athletes. Both studies obtained similar results in comparison with our study. In the first study, one sample composed of elite athletes obtaining the following scores respectively (n=102; confessed users=5; non-user=97; PEAS: 39.20±17.54 vs. 35.85±10.12, respectively). In the second study (n= 82 competitive athletes assessed), confessed doping users (12%) also scored significantly higher on the PEAS ($p<0.05$) than non-users (46.8±13.32 and 34.43±8.74, respectively). As it was pointed out before, a study that assessed attitudes towards doping in Spanish National Cycling Teams taking into account the Olympic discipline, also using PEAS, was published recently (Morente-Sánchez, Mateo-March, & Zabala, 2013). Data were not analysed differencing between users and non-users, and concerning four different groups analysed descriptive data for overall score from PEAS were: total sample 36.12±9.39; Mountain Bike: 30.28±6.92; Bicycle Motocross: 42.46±10.74; Track: 43.22±12.00; Road: 34.91±6.62. In the present study, total sample were divided into users and non-users and overall scores for both samples were, respectively: 48.10±16.00; 40.66±12.061. Therefore, we consider that the amateur cyclists assessed in this race were not permissive but, on the contrary, they could be considered a risk group because even the non-users' scores, despite of being lower than users', could be considered high values in comparison with other commented studies. In addition, the case of users of this sample is especially worrying because they are older than dopers in similar studies and, as a result, their attitudes and beliefs could be considered stronger as a consequence of their larger experience.

Concerning the direct yes-no question "have you ever used doping?" the vast majority (n=2174; 91.86%) answered "no" while 192 (8.14%) amateur riders confessed having taken PED. For a similar question, "have you been suggested to dope?" the percentage of "yes" was higher (>60%) in a studies that involved 87 Spanish cycling team managers (Freire, Morente-Sánchez, Femia-Marzo, Sánchez-Muñoz, & Zabala, 2011), and lower in another investigation (Morente-Sánchez et al., 2013) that surveyed 72 Spanish elite cyclists (6.9%) compared to the results found in this research. It can be suggested that "something is changing" in the current Spanish professional cycling since the amateur riders assessed in the present study and team managers described previously, who were mainly former professional cyclists, demonstrated to be more permissive in relation to the phenomenon of doping than those elite cyclists assessed by Morente-Sánchez and Zabala (2013), who were younger (19.67±4.72) but less permissive concerning doping. Some authors (Morrow & Idle, 2008) suggested that the decision in 2005 of the governing body of cycling to introduce a new competition, the UCI pro tour, was an important development in professional cycling due to the interaction between its stakeholders and the balance of power among them.

In addition, regarding attitudes towards doping, it was emphasized by means of multiple regression analysis the predictor capacity of this variable to detect doping behaviours. Other studies have also showed that attitudes towards doping could be a predictor of doping practices (Lucidi et al., 2004).

Focusing on self-esteem, the relationship between attitudes towards doping and this variable and self-efficacy was suggested by other authors such as Van Amsterdam, Opperhuizen and Hartgens (2010). They concluded that the typical drug abuser is a poly-substance user who has a low self-esteem due to a poor body image. On the contrary, in this study no differences were found between users and non-users regarding

self-esteem. Multiple regression analyses did not add supportive information in this sense. A significant but weak negative relationship between self-esteem and attitudes towards doping was observed. It could be more or less clear depending on the objectives of subjects' participation (e.g. a body-builder in a Gym with aesthetic competitive purposes should get significantly higher relationship between self-esteem and attitudes toward doping in comparison to those athletes whose main purpose is achieving the best position/time in a long distance event). So, in this study this relationship may not be higher because this type of sample (amateur cyclists) looked for other aims such as performance improvement instead of changing their body image.

Regarding self-efficacy, data from multiple regression analysis showed that this variable also had good properties like predictors of doping behaviour. In addition, Spearman correlation coefficients also reinforced this relationship. In this way, we recommend further investigation regarding this topic because there is an important dearth of studies in this field.

Concerning projected use, in our study, there is a significant positive relationship between the projected use and all other variables assessed (PEAS, self-esteem, self-efficacy and answer to direct yes-no question). However, regarding its predictor capacity of doping behaviour, multiple regression analysis could not show it in a significant way despite of existing an interesting tendency ($p=0.071$). According to this result, it seems that participants who highly believe that others are taking banned substances are more likely to start using them as well. This phenomenon is considered under the so-called concept of the "false consensus effect" (Petróczi, Mazanov, Nepusz, Backhouse, & Naughton, 2008; Uvacsek et al., 2011) that seems to play a key role in legitimizing the use of banned substances. Tangen and Breivik (2001) also showed that an individual's decision to take banned substances is influenced by the assumption that

his or her competitors are also taking drugs (Vangrunderbeek & Tolleneer, 2010). The present study showed that athletes who confessed doping users showed significantly higher values for the variable "projected use" than non-users (55.42% vs. 44.71%, respectively). Similarly, Uvacsek et al. (2011) also detected that those who admitted to use PED overrated the prevalence of doping in their sport compared with those who abstained from doping. Therefore, it seems clear that if athletes believe that others are taking doping substances, this can push some of them to start using them as well, and this could be like a vicious circle that feeds the pro-doping culture which is not in line with the "fair play" and the education of the ideal "athlete 2.0" that rejects the improvement of performance despite the possible health damage (Zabala & Atkinson, 2012).

Taking everything into account and according to Alaranta et al. (2006), "controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed". Due to the absence of more objective information on use of banned performance enhancing substances, the present study support the idea that the battle against doping could be won from the preventive perspective using psychosocial variables such as attitudes towards doping as doping behaviour predictors. Focusing on cycling in particular, "the fight against doping is not over" (Lentillon-Kaestner, 2013). Consequently, we consider that, after the most recent media cycling doping cases (such as Puerto or Armstrong), now is the ideal moment to establish specific programs and other activities to prevent and fight against the phenomenon of doping, not only in elite athletes but also in other stakeholders such as amateur competitive cyclists that could be consider a risk group that should be monitored.

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Author Contributions

M Zabala and Morente-Sánchez developed the study concept. All authors contributed to the study design. Testing and data collection were performed by C Freire, M Zabala and Morente-Sánchez. M Mateo-March and Morente-Sánchez performed the data analysis and interpretation under the supervision of M Zabala. Mateo-March and Morente-Sanchez drafted the manuscript, and M Zabala provided critical revisions. All authors approved the final version of the manuscript for submission.

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OPINIÓN Y EXPERIENCIA RESPECTO AL DOPAJE DE LOS DIRECTORES NACIONALES DE CICLISMO ESPAÑOLES

Morente-Sánchez, J.[1], Mateo-March, M.[2], Freire-SantaCruz, C.[1], & Zabala, M[1].

[1]Department of Physical Education and Sport; Faculty of Sport Sciences (University of Granada)

[2]Faculty Miguel Hernández, University of Elche (Valencia; Spain)

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Artículo original

Opinión y experiencia respecto al dopaje de los directores nacionales de ciclismo españoles

Jaime Morente-Sánchez[1], Manuel Mateo-March[2], Carmen Freire-Santacruz[1], Mikel Zabala[1]

[1]Departamento de Educación Física y Deportiva. Facultad de Ciencias del Deporte, Universidad de Granada. [2]Facultad Miguel Hernández, Universidad de Elche. Valencia.

Recibido:
Aceptado:

Resumen

El objetivo del presente estudio fue conocer y comparar las opiniones y experiencias respecto al dopaje de una muestra de directores nacionales de ciclismo españoles teniendo en cuenta su experiencia como ciclistas y su nivel de formación académica previos. Un total de 87 directores nacionales de ciclismo (más alto nivel) participaron en el estudio. Atendiendo a su experiencia ciclista previa, 40 sujetos habían sido ciclistas "profesionales", 29 habían sido ciclistas hasta categoría "Aficionado" mientras que 18 no habían tenido experiencia como ciclistas. En relación a su formación académica, 15 sujetos eran Licenciados en Ciencias del Deporte, 36 poseían una certificación federativa previa y 36 no tenían ninguna formación técnica o académica previa, pero habían sido previamente ciclistas profesionales. Se llevó a cabo un diseño transversal descriptivo mediante un cuestionario específico consistente en 7 preguntas de respuesta libre. Aunque existen diferencias entre los distintos grupos analizados y comparados, en general, la palabra más mencionada asociada al dopaje fue "trampa", los agentes responsables más mencionados fueron "técnicos" y "laboratorios", la diferencia entre ciclismo y otros deportes más destacada fue "trato discriminatorio" y la razón para recurrir al dopaje fue la búsqueda del "éxito deportivo". La mayoría de los participantes reconocen que en alguna ocasión se les ha sugerido doparse y ser conocedores de casos similares. Las soluciones propuestas fueron "prevención temprana" y "aumentar número de controles". Este estudio muestra que los directores nacionales de ciclismo analizados reconocen el fenómeno del dopaje. La comparación intergrupal muestra datos interesantes acerca de aspectos tales como agentes responsables del dopaje y razones para recurrir a esta práctica prohibida. Se observa la reconocida y cercana convivencia con el dopaje, especialmente, desde la perspectiva de los ex ciclistas profesionales. Estos resultados potencian la idea de que, además de mantener controles antidopaje y hacerlos más eficientes, son necesarios programas de educación desde edades más tempranas.

Palabras clave:
Dopaje. Ciclismo. Técnicos. Prevención.

Spanish cycling team managers' opinion and experience regarding doping

Summary

The aim of this study was to determine and compare the opinions and experiences regarding doping of a sample of Spanish cycling team managers considering his previous experience as cyclists and their academic level of training. A total of 87 cycling team managers (the highest level) participated in the study. Regarding his previous cycling experience, 40 subjects were cyclists "professionals", 29 had been cycling to category "Amateur" while 18 had no experience as cyclists. In relation to their previous academic level of training, 15 subjects had a degree in Sport Sciences, 36 had prior federal certification and 36 had no prior technical or academic training, but had previously been professional cyclists. Cross-sectional descriptive design was carried out by means of a specific questionnaire comprised of seven open-ended questions. Although there were differences between analyzed and compared groups, in general, the most mentioned word associated with doping was "cheating", the most often mentioned doping agents were "managers" and "laboratories", the highlighted difference between cycling and other sports was "discriminatory treatment" and the main reason for using doping practices was the search for "athletic success". Most participants recognized that they have been suggested to dope and also know similar cases. The main proposals of solution to erradicte doping were "prevention since early ages " and "increase the number of controls". This study shows that Spanish cycling team managers recognize the existence of the phenomenon of doping. The comparison among analized groups shows interesting data about different issues such as responsible agents of doping and reasons for initiation in doping. It was observed a recognized and close coexistence with doping for the total sample, especially from the perspective of former professional cyclists. These results support the idea that, apart from maintaining doping controls and make them more efficient, educational programs since earlier ages are needed.

Key words:
Doping. Cycling. Managers. Prevention.

Correspondencia: Mikel Zabala Díaz
E-mail: mikelz@ugr.es

Introducción

El uso de sustancias prohibidas para la mejora del rendimiento, desafortunadamente, no es un acontecimiento novedoso en el mundo del deporte competitivo[1,2]. Ciertos autores consideran que existen indicios de práctica dopante en ciclismo desde finales del siglo XIX cuando los ciclistas era suplementados con cafeína, efedrina, e incluso cocaína, para mejorar su rendimiento[3]. Más recientemente, el Tour de Francia de 1998 puso en evidencia la existencia de un programa organizado de dopaje sistemático en este deporte[4,5]. Después de este escándalo nació la Agencia Mundial Antidopaje (AMA), siendo la encargada de unificar criterios a la hora de luchar contra el fenómeno del dopaje[6]. En este sentido, en 2004, la AMA elaboró el Código Mundial Antidopaje el cual rige el comportamiento en materia de dopaje de las distintas agencias estatales y federaciones deportivas siendo actualizado anualmente. Así, dos de los siguientes tres criterios deben cumplirse para que una sustancia o método sea incluido en la lista prohibida de la AMA: (a) mejora o tiene el potencial de mejorar el rendimiento, (b) amenaza la salud o tiene el potencial para hacerlo; y (c) viola el espíritu del deporte descrito en la introducción del código[7].

Con el fin de obtener una visión generalizada de cómo de expandido está el dopaje en el deporte, estimar la prevalencia de uso de sustancias y métodos prohibidos es uno de los principales objetivos de los distintos organismos responsables[8]. Sin embargo, el número de deportistas que obtienen un resultado positivo en un control antidopaje, frecuentemente es más pequeño que el que la literatura científica muestra[9]. Para la AMA, un 2% de los deportistas de elite obtienen al año un resultado analítico adverso[7]. Por el contrario, las prevalencias mostradas en los distintos estudios científicos existentes en la literatura oscilan en un rango más amplio que va desde el 1,2% y el 26%[1,2,10-16].

De acuerdo con Petróczi y Aidman[8], en ausencia de información objetiva sobre el uso de sustancias prohibidas para la mejora del rendimiento, la actitudes hacia el dopaje se utilizan como un predictor de comportamiento dopante asumiendo que aquellos sujetos que recurren al uso de sustancias prohibidas serán más permisivos que aquellos que no recurren a dicha práctica[1].

Hay una importante falta de estudios relacionados con las actitudes hacia el dopaje en entrenadores deportivos[2,17,18]. Backhouse *et al.*[2], desarrollaron una revisión bibliográfica sobre conocimiento y actitudes hacia el dopaje recurriendo para ello al análisis de lo que se había escrito sobre este tema desde distintos grupos poblacionales tales como deportistas de élite, estudiantes, usuarios de salas de fitness, niños, médicos y entrenadores, siendo esta última la menos estudiada. Esa falta de información en la literatura científica se agudiza si nos referimos a técnicos deportivos de la especialidad ciclista. Del mismo modo, aunque en los últimos años han proliferado estudios acerca de actitudes hacia el dopaje en el deportista[1], la investigación al respecto sigue siendo limitada. La mayoría de los estudios relacionados tiende a utilizar muestras compuestas por una mezcla de deportistas de diferentes disciplinas, existiendo una escasa de investigación científica en relación con nuestro objeto de estudio: ciclismo, probablemente el deporte más asociado al dopaje[1]. De acuerdo con uno de los pocos estudios que ataja el binomio "ciclismo-actitudes hacia el dopaje", Lentillon Kaestner *et al.*[5], consideran que en el ciclismo de alto rendimiento el uso de sustancias prohibidas era una práctica endémica entre los equipos ciclistas hasta el punto de estar institucionalizado y casi tolerado por la comunidad ciclista profesional[19] antes del denominado "escándalo Festina" en el Tour de 1998. Estos autores consideran que ese momento supuso un antes y un después, concluyendo que el uso de sustancias prohibidas en la actualidad es menos extendido que por aquel entonces. No obstante, el reciente "Caso Armstrong" a finales de 2012[1], y la consiguiente desposesión de todo cuanto ganó este ciclista como deportista en activo, pone en duda que dicha fecha supusiera tal punto de inflexión[1]. En España, también ha habido sonados escándalos relacionados con la problemática que nos atañe tales como la "Operación Puerto" en 2006 o la "Operación Galgo" en 2010. Tanto en una como en otra, se vieron implicados técnicos relacionados con el mundo del ciclismo. Desde la literatura científica, se ha sugerido que estudios centrados en el fenómeno del dopaje tratados desde la perspectiva del entrenador, son necesarios[1]. Valorando la opinión internacional sobre la problemática del dopaje en el ciclismo español, y teniendo en cuenta las debilidades de la literatura científica en este ámbito, consideramos oportuno realizar este estudio para conocer las actitudes hacia el dopaje de los directores nacionales de ciclismo españoles como agente de relevancia en este fenómeno.

Todos los condicionantes anteriormente expuestos nos hacen hipotetizar que el técnico ciclista español puede ser excesivamente permisivo en relación con el binomio dopaje-deporte. Por lo tanto, el objetivo del presente estudio fue comparar los resultados respecto al dopaje de una muestra de directores nacionales de ciclismo en función del nivel de formación, o de la experiencia como ciclista profesional.

Material y métodos

Participantes

En el estudio participaron un total de 87 sujetos (100% hombres; 33,2±7,16 años) que obtuvieron el título de director nacional de ciclismo (más alto nivel nacional e internacional) durante los cursos 2009 y 2010 (todos ellos obtuvieron la licencia). Para su posterior análisis, la muestra fue segmentada atendiendo a dos criterios: 1) experiencia como ciclista y 2) formación académica. Atendiendo a su experiencia previa como ciclista previa, 40 sujetos habían sido ciclistas "profesionales", 29 habían sido ciclistas hasta categoría "Aficionado" y 18 no habían tenido experiencia como ciclistas. En relación a su formación académica, hemos de puntualizar que se puede acceder a la realización del curso director nacional de ciclismo por tres vías: a) ser licenciado en Ciencias de deporte, b) poseer los niveles de formación federativa previos (nivel 1 y nivel 2) o c) haber sido ciclista con licencia profesional. En esta segunda clasificación, 15 sujetos eran Licenciados en Ciencias del Deporte (CCD), 36 poseían una certificación federativa previa (Formación Federativa previa -FFP-), y 36 no tenían ninguna formación técnica o académica previa, pero habían sido previamente ciclistas profesionales (sin formación previa -SFP-). Cuatro ex ciclistas profesionales eran Licenciados en Ciencias del Deporte y fueron considerados como tales. El estudio, realizado en colaboración con la Real Federación Española de ciclismo, fue aprobado por el Comité de Ética de la Universidad de Granada (España).

Diseño

Se llevó a cabo un diseño transversal descriptivo mediante un cuestionario específico consistente en 7 preguntas de respuesta libre: 1) palabras asociadas a dopaje, 2) agentes responsables, 3) diferencias entre ciclismo y otros deportes, 4) razones para recurrir al dopaje, 5) ¿te han instado/sugerido doparte?, 6) ¿has visto a alguien ser instado o sugerido? y, por último, 7) propuesta de soluciones para erradicar dopaje. Los datos obtenidos se expresan como el porcentaje de participantes que dieron una respuesta concreta (% n), así como en el porcentaje de veces que se mencionó dicha respuesta concreta respecto al número de respuestas totales (% de respuestas totales) ya que el cuestionario era de respuesta libre y el número de respuestas por pregunta carecía de límite.

La participación fue totalmente voluntaria y el principio de anonimidad fue garantizado.

Procedimiento

Los participantes completaron el cuestionario durante el curso de técnico deportivo en ciclismo (Director Nacional). Concretamente, los sujetos pertenecen a las promociones de 2009 y 2010. Tras ser informados del objeto del estudio, los participantes fueron distribuidos, en cuanto a colocación espacial, como si de un examen de oposiciones se tratase. Todos los sujetos completaron el cuestionario de forma voluntaria y anónima. El cuestionario no tenía límite de tiempo para su realización. Una vez completado el mismo, se introducía en una caja donde se almacenaban sin poder reconocer su autoría.

Análisis estadístico

Los análisis estadísticos desarrollados para este trabajo fueron en forma de datos nominales o cualitativos mediante análisis de frecuencias y porcentajes aplicados en tablas de contingencia. Las variables fueron categorizadas manualmente por dos investigadores hasta alcanzar el 100% de consenso y las distintas respuestas fueron codificadas en una hoja de cálculo. Para el tratamiento de los datos se recurrió al software *Statistical Package for the Social Sciences* (IBM-SPSS 20.0). Los resultados se presentan como porcentajes (%) de respuesta tanto en base a la muestra total encuestada (% n) como en base al número total de respuestas obtenidas para cada pregunta (% total de respuestas).

Resultados

Profesionales *vs.* Aficionado

Los datos obtenidos se expresan en términos de porcentaje de participantes que presenten una declaración específica (% n) y en términos de porcentaje de veces que la declaración específica se menciona respecto a las respuestas dadas en total (% total de respuestas), porque los participantes no tienen límite en su número de posibles respuestas. Se compararon los diferentes grupos (profesionales *vs*. aficionados), respectivamente (Tabla 1):

- Palabras relacionadas con el dopaje: las tres expresiones más mencionadas fueron "hacer trampa" (profesionales, % n: 45; % total de respuestas: 15,93) *vs.* (aficionados, % n: 78.86; % total de respuestas: 24,44), "dinero" (profesionales, % n: 45; % total de respuestas: 15,93) vs. (aficionados, % n: 34,48; % total de respuestas: 11,11), y por último, "rendimiento" (profesionales, % n: 30; % total de respuestas: 30) vs. (aficionados, % n: 22,22; % total de respuestas: 8,33).
- Los agentes encargados de dopaje: los tres agentes más mencionadas fueron "entrenador/manager" (profesionales, % n: 52,5; % total de respuestas: 14,38) *vs*. (aficionados, % n: 86,21; % total de respuestas: 24,04), "laboratorios" (profesionales, % n: 67,5; % total de respuestas: 18,49) *vs*. (aficionados, % n: 62,07; % total de respuestas: 17,31), y por último, "deportistas/ciclistas" (profesionales, % n: 42,5; % total de respuestas: 11,64) *vs*. (aficionados, % n: 37,93; % total de respuestas: 10,58).
- Diferencias entre ciclismo y otros deportes: las tres diferencias más mencionadas fueron "tratamiento discriminatorio" (profesionales, % n: 67,5; % total de respuestas: 36,99) *vs*. (aficionados, % n: 79,31; % total de respuestas: 39,66), "numero de controles" (profesionales, % n: 20; % total de respuestas: 10,96) *vs*. (aficionados, % n: 27,29; % total de respuestas: 13,79), y por último, "repercusión mediática" (profesionales, % n: 30; % total de respuestas: 16,44) *vs*. (aficionados, % n: 62,07; % total de respuestas: 31,03).
- Razones para la incoación del dopaje: las tres razones más mencionadas fueron "éxito deportivo" (profesionales, % n: 37,5; % total de respuestas: 19,23) *vs*. (aficionados, % n: 58,62; % total de respuestas: 23,61), "presiones externas" (profesionales, % n: 47,5; % total de respuestas: 24,36) *vs.* (aficionados, % n: 44,83; % total de respuestas: 18.06), y por último, "contrato/dinero" (profesionales, % n: 35; % total de respuestas: 17,95) *vs.* (aficionados, % n: 65,52; % total de respuestas: 26,39).
- ¿Alguna vez te han sugerido doparte: % total de la muestra que han indicado "sí" (profesionales, % n: 67,5) *vs*. (aficionados, % n: 62,1).
- ¿Alguna vez has visto a otras personas incitar a otros o siendo incitados: % total de la muestra que han indicado "sí" (profesionales, % n: 70) *vs*. (aficionados, % n: 62,1).
- Soluciones propuestas: las tres sugerencia más mencionadas para erradicar el dopaje en el deporte eran "más controles" (profesionales, % n: 27,5; % total de respuestas: 17,74) *vs*. (aficionados, % n: 44,83; % total de respuestas: 29,82), "prevención edades tempranas" (profesionales, % n: 30; % total de respuestas: 19,35) *vs*. (aficionados, % n: 58.62; % total de respuestas: 28,82), y por último, "concienciación" (profesionales, % n: 27,5; % total de respuestas: 17,74) *vs.* (aficionados, % n: 24,14; % total de respuestas: 12,28).

En la Tabla 1 se muestran las respuestas de los distintos participantes agrupados atendiendo a su experiencia como ciclista previa: aficionado *vs* profesional (Figura 1).

CCD vs. FFP vs. SFP

Los datos obtenidos se expresan en términos de porcentaje de participantes que presenten una declaración específica (% n) y en términos de porcentaje de veces que la declaración específica se menciona respecto a las respuestas dadas en total (% total de respuestas), porque los participantes no tienen límite en su número de posibles respuestas. Se compararon los diferentes grupos (CDD *vs*. FFP y *vs*. SFP), respectivamente (Tabla 2):

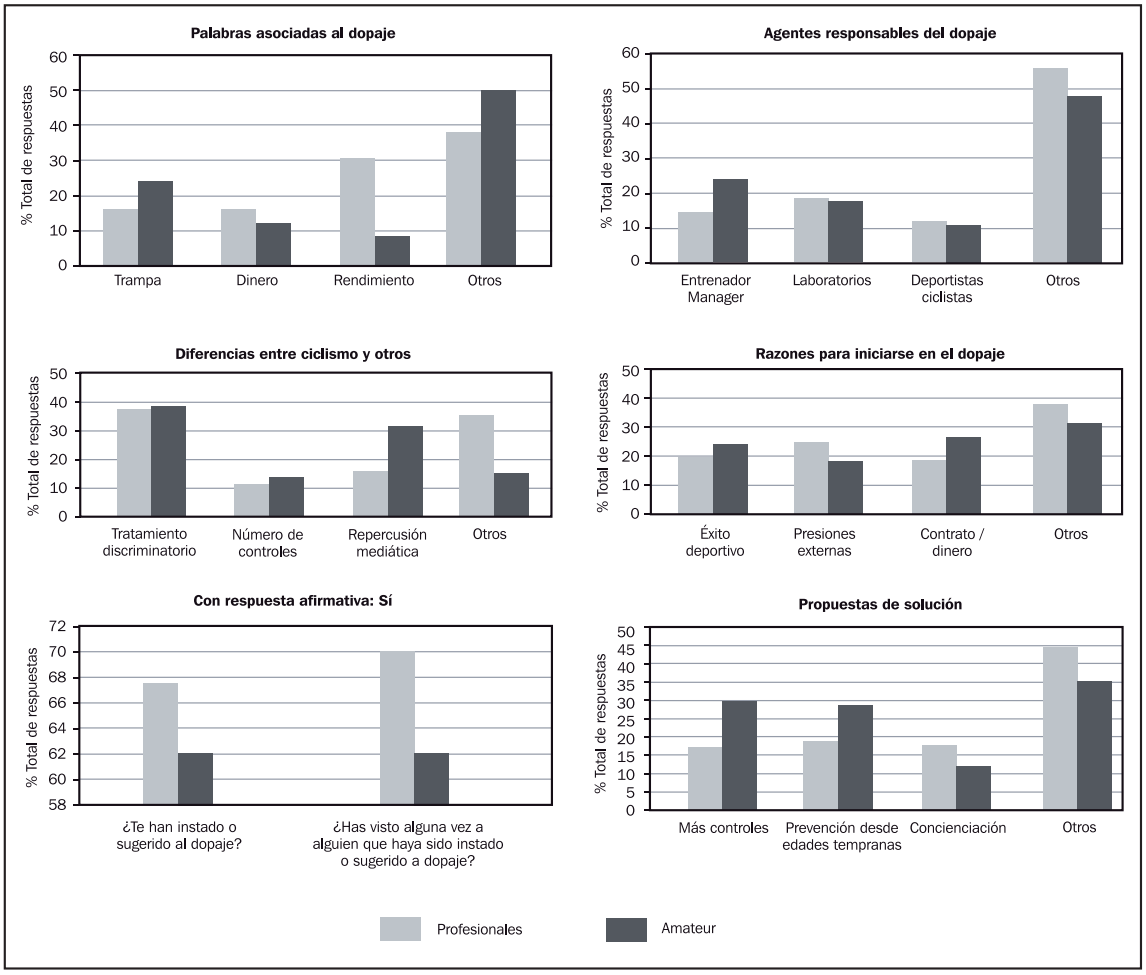
Tabla 1. Estadística descriptiva y comparación entre grupos atendiendo a experiencia ciclista previa (Profesional vs Aficionado).

	Profesionales (n=40)		Aficionado (n=29)	
	% n	% Total de respuestas	% n	% Total de respuestas
1. Palabras asociadas a dopaje				
Trampa	45,00	15,93	78,86	24,44
Dinero	45,00	15,93	34,48	11,11
Rendimiento	30,00	30,00	22,22	8,33
Otros		38,14		50,01
2. Agentes responsable de dopaje				
Entrenador/manager	52,5	14,38	86,21	24,04
Laboratorios	67,5	18,49	62,07	17,31
Deportistas/ciclistas	42,5	11,64	37,93	10,58
Otros		55,49		48,07
3. Diferencias entre ciclismo respecto a otros deportes				
Tratamiento discriminatorio	67,5	36,99	79,31	39,66
Número de controles	20,00	10,96	27,29	13,79
Repercusión mediática	30,00	16,44	62,07	31,03
Otros		35,61		15,52
4. Razones para recurrir a la práctica dopante				
Éxito deportivo	37,5	19,23	58,62	23,61
Presiones externas	47,5	24,36	44,83	18,06
Contrato/dinero	35,00	17,95	65,52	26,39
Otros		38,46		31,94
5. ¿Te han instado o sugerido al dopaje?				
Si	67,5 (27/40)		62,1 (18/29)	
6. ¿Has visto alguna vez a alguien que haya sido instado o sugerido al dopaje?				
Si	70,0 (28/40)		62,1 (18/29)	
7. Propuestas de soluciones para erradicar el dopaje				
Más controles	27,5	17,74	44,83	29,82
Prevención desde edades tempranas	30,00	19,35	58,62	28,82
Concienciación	27,5	17,74	24,14	12,28
Otros		45,17		35,09

% n: porcentaje de participantes que dieron una respuesta concreta en cada grupo.
% total de respuestas: porcentaje de veces que se mencionó dicha respuesta concreta respecto al número de respuestas totales 100%.

- Palabras relacionadas con el dopaje: las tres expresiones más mencionadas fueron "hacer trampa" (CDD, % n: 60; % total de respuestas: 17,31) *vs.* (FFP, % n: 63,89; % total de respuestas: 23,33) *vs.* (SFP, % n: 35,29; % total de respuestas: 14,52), "dinero" (CDD, % n: 33,33; % total de respuestas: 9,62) *vs.* (FFP, % n: 36,11; % total de respuestas: 12,62) *vs.* (SFP, % n: 31,37; % total de respuestas: 12,90), y por último, "rendimiento" (CDD, % n: 53,33; % total de respuestas: 15,38) *vs.* (FFP, % n: 30,56; % total de respuestas: 10,68) *vs.* (SFP, % n: 27,45; % total de respuestas: 11,29).
- Los agentes encargados de dopaje: los tres agentes más mencionadas fueron "entrenador/manager" (CDD, % n: 60; % total de respuestas: 17,31) *vs.* (FFP, % n: 77,68; % total de respuestas: 20) *vs.* (SFP, % n: 43,14; % total de respuestas: 18,49), "laboratorios" (CDD, % n: 13,33; % total de respuestas: 3,85) *vs.* (FFP, % n: 63,89; % total de respuestas: 16,43) *vs.* (SFP, % n: 54,9; % total de respuestas: 23,53), y por último, "deportistas/ciclistas" (CDD, % n: 20; % total de respuestas: 5,77) *vs.* (FFP, % n: 30,56; % total de respuestas: 7,86) *vs.* (SFP, % n: 29,41; % total de respuestas: 12,61).
- Diferencias entre ciclismo y otros deportes: las tres diferencias más mencionadas fueron "tratamiento discriminatorio" (CDD, % n: 77,33; % total de respuestas: 37,93) *vs.* (FFP, % n: 75; % total de respuestas: 30,68) *vs.* (SFP, % n: 47,06; % total de respuestas: 35,82), "numero de controles" (CDD, % n: 26,67; % total de respuestas: 13,79) *vs.* (FFP, % n: 30,56; % total de respuestas: 12,5) *vs.* (SFP, % n: 9,8; % total de respuestas: 7,46), y por último, "repercusión mediática" (CDD, % n: 46,67; % total de respuestas: 21,14) *vs.* (FFP, % n: 47,22; % total de respuestas: 19,32) *vs.* (SFP, % n: 27,45; % total de respuestas: 20,9).
- Razones para la incoación del dopaje: las tres razones más mencionadas fueron "éxito deportivo" (CDD, % n: 60; % total de respuestas: 17,31) *vs.* (FFP, % n: 66,67; % total de respuestas: 21,05) *vs.* (SFP, % n: 37,25; % total de respuestas: 16,81), "presiones externas" (CDD, % n: 33,33; % total de respuestas: 9,62) *vs.* (FFP, % n: 47,22; % total de respuestas: 14,91) *vs.* (SFP, % n: 47,06; % total de respuestas: 14,91), y por último, "contrato/dinero" (CDD, % n: 60; % total de respuestas: 17,31) *vs.* (FFP, % n: 19,44; % total de respuestas: 6,14) *vs.* (SFP, % n: 25,49; % total de respuestas: 11,5).

Figura 1.



– ¿Alguna vez ha sugerido doparte: % total de la muestra que han indicado "sí" (CDD, % n: 46,7) *vs*. (FFP, % n: 50) *vs*. (SFP, % n: 72,2).
– ¿Alguna vez has visto a otras personas incitar a otros o siendo incitados: % total de la muestra que han indicado "sí" (CDD, % n: 53,3) *vs.* (FFP, % n: 52,8) *vs*. (SFP, % n: 75).
– Soluciones propuestas: las tres sugerencia más mencionadas para erradicar el dopaje en el deporte eran "más controles" (CDD, % n: 13.33; % total de respuestas: 7,41) vs. (FFP, % n: 25; % total de respuestas: 14,75) *vs.* (SFP, % n: 25,49; % total de respuestas: 22,41), "prevención edades tempranas" (CDD, % n: 40; % total de respuestas: 22,22) *vs*. (FFP, % n: 52,78; % total de respuestas: 31,15) *vs.* (SFP, % n: 25,49; % total de respuestas: 22,41), y por último, "concienciación" (CDD, % n: 33,33; % total de respuestas: 18,52) *vs.* (FFP, % n: 25; % total de respuestas: 14,75) *vs*. (SFP, % n: 19,61; % total de respuestas: 17,24).

En la Tabla 2 se muestran las respuestas de los distintos participantes agrupados atendiendo a su formación académica previa: Licenciados en Ciencias del Deporte (Ciencias del Deporte -CCD-), Formación Federativa previa (FFP) y sin formación técnica ni/o académica previa, pero habían sido previamente ciclistas profesionales (sin formación previa-SFP-) (Figura 2).

Discusión

Este estudio muestra que los directores nacionales de ciclismo analizados reconocen el fenómeno del dopaje. La comparación in-

Tabla 2. Estadística descriptiva y comparación entre grupos atendiendo a formación académica previa (Ciencias del Deporte *vs* Formación técnica *vs* Sin formación previa).

	Ciencias del deporte (n=15)		Formación técnica previa (n=36)		Sin formación previa (n=36)	
	% n	% Total de respuestas	% n	% Total de respuestas	% n	% Total de respuestas
1. Palabras asociadas a dopaje						
Trampa	60,0	17,31	63,89	22,33	35,29	14,52
Dinero	33,33	9,62	36,11	12,62	31,37	12,90
Rendimiento	53,33	15,38	30,56	10,68	27,45	11,29
Otros		57,69		54,47		61,29
2. Agentes responsable de dopaje						
Entrenador/manager	60,0	17,31	77,68	20,0	43,14	18,49
Laboratorios	13,33	3,85	63,89	16,43	54,9	23,53
Deportistas/ciclistas	20,0	5,77	30,56	7,86	29,41	12,61
Otros		45,37		55,71		45,37
3. Diferencias entre ciclismo respecto a otros deportes						
Tratamiento discriminatorio	77,33	37,93	75,0	30,68	47,06	35,82
Número de controles	26,67	13,79	30,56	12,5	9,8	7,46
Repercusión mediatica	46,67	21,14	47,22	19,32	27,45	20,9
Otros		27,14		37,50		35,82
4. Razones para recurrir a la práctica dopante						
Éxito deportivo	60,0	17,31	66,67	21,05	37,25	16,81
Presiones externas	33,33	9,62	47,22	14,91	47,06	21,24
Contrato/dinero	60,0	17,31	19,44	6,14	25,49	11,5
Otros		55,76		57,9		50,45
5. ¿Te han instado o sugerido al dopaje?						
Si	46,7 (7/15)		50,0 (18/36)		72,2 (26/36)	
6. ¿Has visto alguna vez a alguien que haya sido instado o sugerido al dopaje?						
Si	53,3 (8/15)		52,8 (19/36)		75,0 (27/36)	
7. Propuestas de soluciones para erradicar el dopaje						
Más controles	13,33	7,41	25,0	14,75	25,49	22,41
Prevención desde edades tempranas	40,00	22,22	52,78	31,15	23,53	20,69
Concienciación	33,33	18,52	25,0	14,75	19,61	17,24
Otros		51,85		60,65		39,66

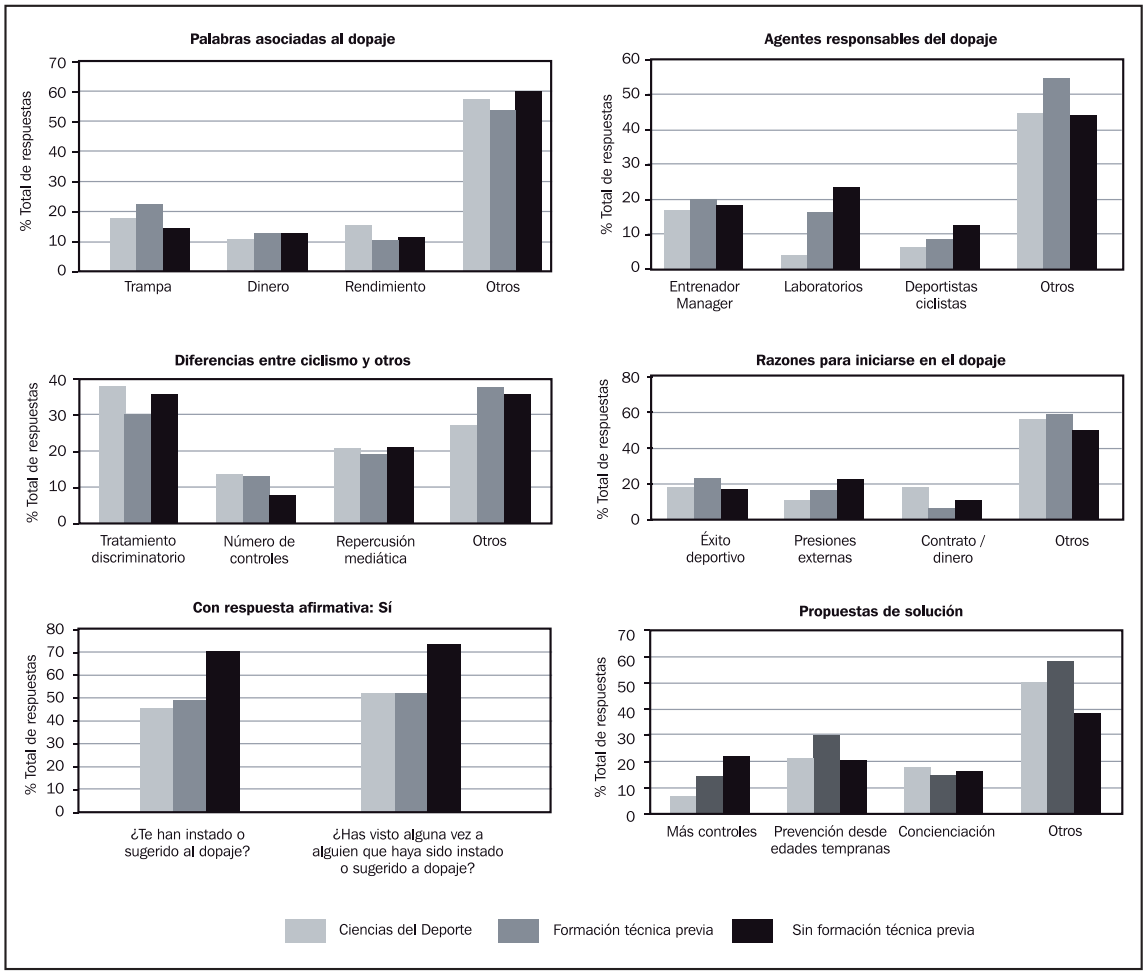
% n: porcentaje de participantes que dieron una respuesta concreta en cada grupo.
% total de respuestas: porcentaje de veces que se mencionó dicha respuesta concreta respecto al número de respuestas totales 100%.

tergrupal muestra datos interesantes acerca de aspectos tales como agentes responsables del dopaje y razones para recurrir a esta práctica prohibida. Se observa la reconocida y cercana convivencia con el dopaje, especialmente de los entrenadores que fueron ciclistas profesionales. Estos resultados refuerzan la idea de que, además de mantener controles antidopaje y hacerlos más eficientes, sería interesante introducir programas preventivos y formativos desde edades tempranas, así como programas de reeducación o actualización de los técnicos actuales.

Cuando los directores nacionales de ciclismo fueron preguntados acerca de qué palabras asociarían a la conducta dopante, hubo cierto consenso entre los dos análisis comparativos realizados. Tanto en la comparación en base a la experiencia ciclista, como en relación a la formación académica previa, las palabra más mencionada para todos los grupos fue "trampa", con una importante diferencia entre los grupos CCD y FPP (aproximadamente 60% de la n) respecto de SFP (con un % n: 35,29), lo cual denota que la educación previa puede ser un mediador importante. No obstante, en los dos grupos formados por ex-ciclistas profesionales, es decir, "profesionales" y "SFP" la palabra "dinero" fue mencionada de manera muy similar, lo cual denota esa necesidad de conseguir alcanzar el éxito para poder mantener ese carácter profesional del contrato en términos económicos.

Por otro lado, cuando se les preguntó a los participantes quienes consideraban que eran los agentes responsables del dopaje los datos obtenidos muestran información interesante puesto que los propios entrenadores ciclistas se consideraban a sí mismos como uno de los agentes responsables más importantes de esta lacra. Entre los grupos creados en relación a la formación académica previa, se pudo observar cómo sólo el grupo compuesto por ex-profesionales, es decir, el grupo sin formación previa ni técnica, ni académica (SFP), consideró una agente más importante que el "entrenador" como tal, siendo el agente más mencionado para ellos "laboratorios". En la comparación en base a la experiencia ciclista previa ocurrió algo semejante puesto que los participantes que habían llegado hasta categoría profesional se decantaron por el ítem "laboratorios" en detrimento de "entrenador/

Figura 2.



manager", mientras que aquellos participantes que habían competido hasta categoría aficionado consideraron el orden inverso. Estos datos sugieren que los técnicos deportivos analizados en el presente estudio, en un ejercicio de honestidad, reconocen su responsabilidad en relación al fenómeno del dopaje. Los ex-profesionales anteponen "laboratorios" a su propia figura quizá porque han tenido la oportunidad de experimentarlos, algo que posiblemente un ciclista aficionado jamás haya hecho. Merece mención especial el hecho de que en todos los grupos analizados desde las diferentes perspectivas tenidas en cuenta, el agente más mencionado en tercer lugar fue "ciclistas". Este dato puede dar sentido al hecho de que en última instancia el ciclista es el responsable último de lo que entra en su cuerpo y como tal debe ser considerado. En un estudio que analizó una muestra de 620 técnicos deportivos alemanes[17], se pone de manifiesto que el 52% de los entrenadores mantiene diariamente conversaciones con sus deportistas donde aparece el término "dopaje". En este mismo estudio, el 27,8% consideran que están bastante bien formados al respecto, mientras que el 33,9 reconocen justamente los contrario demandando un 66,4% del total una información más detallada.

Otros estudios con muestras compuestas por deportistas profesionales obtuvieron resultados similares. Por ejemplo, Nieper[20] en un estudio con 34 deportistas del equipo nacional británico observó que

los entrenadores eran la principal influencia para el 65% de los participantes, seguido de nutricionistas deportivos (30%) y médicos (25%). Por su parte, Somerville *et al.*[21], en un estudio similar, manifestaron que el médico era considerado como el principal responsable (62%; 46/74). Por su parte, Lentillon-Kaestner *et al.*[22], con una muestra compuesta por ciclistas y ex-ciclistas profesionales, concluyeron que el propio ciclista también se considera responsable de esta práctica ilícita. Por tanto, parece esencial que deba elevarse el grado de concienciación tanto de ciclistas como de las partes componentes de su entorno cercano e inmediato pues queda manifiesta la enorme influencia que pueden generar en su comportamiento.

Atendiendo a la tercera pregunta del cuestionario la opinión generalizada de los distintos grupos tenía un denominador común, la existencia de cierta discriminación entre el tratamiento recibido por el ciclismo en comparación con otros deportes en relación al fenómeno del dopaje. En este sentido, el tipo de tratamiento recibido entre los diferentes tipos de deportes en relación con el dopaje ha sido estudiado en investigaciones previas. Por ejemplo, Waddington *et al.*[23], observaron que los futbolistas ingleses de élite se sometieron durante una temporada a un menor número de controles que el resto de deportes como sólo el 33% de los deportistas de élite, sólo un 1 de cada 3 deportistas era analizado por temporada. Por tanto, consideramos que debería de haber una concordancia en relación a la persecución del dopaje en los distintos deportes si queremos que éste sea limpio en todos y no discriminatoriamente considerado, de lo contrario, la lucha contra el dopaje puede acabar convirtiéndose en una persecución en deportes concretos (mayor seguimiento y control) como el ciclismo. El número de controles y el uso del "pasaporte biológico" son elementos diferenciadores evidentes y objetivos entre el ciclismo y el resto de deportes. Además, en este deporte la ayuda ergogénica administrada por vía parental ha quedado prohibida. Mientras que en tenis, fútbol y otros deportes, se usen lícitamente tratamiento de plasma enriquecido y el mismo procedimiento en ciclismo sea considerado "método prohibido" y, por consiguiente, dopaje.

Por otro lado, cuando se les interrogó acerca de las posibles razones que pueden mover al ciclista a recurrir al uso de sustancias y métodos prohibidos en el deporte, la comparación entre las respuestas ofrece información relevante. Aunque las razones "contrato/dinero", "presiones externas" y "éxito deportivo" presentan porcentajes similares en cuanto al número de menciones recibidas por los distintos grupos analizados, resulta interesante que en los grupos compuestos por ex-ciclistas profesionales toma protagonismo la segunda de ellas. Los participantes con formación académica y/o técnica previa se decantaron por la tercera mientras que los aficionados mencionaron más la primera, aspecto que nos puede llevar a pensar que el grado de educación condiciona la capacidad de decisión de los sujetos. Por su parte, el ciclista aficionado, quizá por su inexperiencia en el mundo profesional, considera que la firma de un contrato o poder renovar el mismo para la siguiente temporada es la razón principal. En la literatura científica al respecto no hay demasiada información, aunque uno de los estudios que trata la temática relacionada con las razones para recurrir al dopaje en el ciclismo es el desarrollado por Lentillon-Kaestner & Carstairs[24] quienes entrevistaron a 8 ciclistas de élite jóvenes, quienes admitieron que recurrirían al dopaje si fuera la llave que les abriera la puerta del ciclismo profesional. En la misma línea, Striegel *et al.* [25], en un estudio con cerca de 958 deportistas de élite alemanes concluyeron que las razones más repetidas que pueden mover al deportista a usar sustancias prohibidas eran con un 86% el éxito deportivoy con un 74% el dinero.

En la preguntas de respuesta dicotómica, volvemos a observar como aquellos grupos compuestos por ex-ciclistas profesionales, vuelven a ofrecer respuestas diferentes respecto al resto de grupos analizados. En este sentido, los participantes con experiencia en el ciclismo profesional, ponían de manifiesto que habían sido instados/sugeridos a doparse en más ocasiones que el resto de participantes del estudio; siendo del mismo modo, en un porcentaje mayor que el resto, habían visto a otras personas instadas/sugeridas para el mismo fin. Cuando se comparan las respuestas en función de su nivel de educación destaca de nuevo que los sujetos que más han sido instados al dopaje son los que menor educación tenían (SFP; cuestión 5 = 72,2% y cuestión 6 = 75%). Estos datos sugieren que a nivel profesional, el dopaje está presente en mayor medida que a nivel aficionado. No obstante, hay estudios que demuestran que en competiciones cicloturistas también existe una alta tasa de deportistas (8,11%; 164/2022), en este caso aficionado, que recurren al uso de sustancias no permitidas por la AMA[26]. Peters *et al.*[17], en un estudio que analizó una muestra de 620 técnicos deportivos alemanes, encontraron 21 casos de sujetos que habían sido tentados al uso de sustancias y métodos prohibidos en su etapa como deportistas, lo cual vuelve a demostrar que a pesar de ser un tema tabú, el fenómeno del dopaje está presente. Revisando la literatura científica al respecto, resulta interesante considerar la emergencia de un nuevo concepto denominado "efecto del falso consenso"[9,27], que viene a decir que aquellos deportistas que tienen antecedentes de dopaje suelen sobreestimar la prevalencia de usuarios de sustancias y métodos prohibidos, es decir, creer que el dopaje está más extendido y su uso es más habitual de lo que realmente es. Del mismo modo, Tangen & Breivik[28] consideraron que la decisión unilateral que puede mover a un sujeto a tomar sustancias dopantes puede estar edificada sobre la creencia de que "otros" también lo hacen[29]. Por tanto, parece evidente que cuando un deportista cree que otros compañeros/rivales están tomando sustancias dopantes, las posibilidades de caer en comportamiento dopante se multiplica, aspecto que precedería a un círculo vicioso de una cultura pro-dopaje.

Por último, en relación a la propuesta de soluciones para erradicar el fenómeno del dopaje en el deporte, el porcentaje de respuestas para las más mencionadas fue similar, aunque como sucediera en la pregunta relacionada con las razones para recurrir al dopaje, existían ciertas diferencias. La prevención desde edades tempranas fue la opción más mencionada para luchar contra esta lacra para los distintos grupos a excepción de aquellos compuestos por ex-ciclistas profesionales, en los cuales, paradójicamente la frecuencia más elevada fue para la respuesta "más controles". Por un lado, se puede considerar que el resto de grupos quizás puedan ofrecer una valoración de las distintas posibilidades con un perspectiva más integradora que los ex ciclistas profesionales ya que en el mundo del alto rendimiento, como se ha podido observar a lo largo del estudio, es un mundo lleno de presiones e intereses varios donde sólo vale ganar. En este sentido, los profesionales probablemente se decanten por la opción "más controles" porque pueden considerarla más eficaz a corto plazo o porque quizás la posibilidad de una intervención

en edades tempranas para actuar a nivel de actitudes ni tan siquiera la han valorado por considerarla utópica al haber vivido en un mundo donde este tipo de enfoques hubieran sido considerados ineficaces. De acuerdo con los datos obtenidos en el presente estudio, otros autores como Alaranta *et al*.[30], consideran que "controlar el dopaje solo a través de tests no es suficiente, un profundo cambio a nivel de actitudes, el cual debe ser repetido y monitorizado, es necesario". En esta misma línea, Lentillon-Kaestner *et al*.[22] afirman que se necesita fomentar la inclusión de programas preventivos desde edades tempranas así como fortalecer los ya existentes. En un estudio que analizó una muestra de 620 técnicos deportivos alemanes[17], el 40,2% consideró que la intervención a nivel preventivo debe empezar entre los 10-15 años. De hecho, se ha demostrado que el hecho de hacer más controles no necesareamente es más eficaz, aspecto que se pone de manifiesto en el caso de Lance Armstrong, quien pese a pasar cientos de controles su resultado nunca fue positivo. Menos controles fuera de competición pero más certeros significarían menos gasto y mayor eficiencia. En España, la única federación deportiva que ha dado el paso en materia de prevención del dopaje, ha sido la Real Federación Española de Ciclismo que en 2009 lanzó el proyecto "Prevenir para ganar"[31]. En este sentido, animamos a las instituciones a invertir más dinero en este tipo de propuestas para erradicar el dopaje, ya que bastaría con destinar una pequeña parte de los enormes presupuestos destinados a optimizar los controles antidopaje para poder llevarse a cabo[1].

Por último, focalizando la atención en la problemática derivada del binomio ciclismo-dopaje y, más aún, tras los escándalos producidos en nuestro país en este contexto tales como "Operación Puerto" entre otros casos particulares, consideramos que puede que sea el momento ideal para que se produzca una actuación sinérgica y colaborativa entre las distintas organizaciones y/o estructuras, cuya actuación coordinada puede permitir acotar el espacio de acción de los tramposos. En este sentido, la Agencia Mundial Antidopaje, la Agencia estatal, las federaciones, los organizadores de los eventos deportivos, así como el gremio constituido por los profesionales de Ciencias del Deporte, entre otros, deberían actuar de forma coordinada analizando la situación actual para actuar en consecuencia planificando y desarrollando programas de intervención para formar, informar y reeducar a los distintas agentes implicados tales como deportistas, técnicos, formadores y entorno en general.

Conclusiones

Este estudio muestra que los directores nacionales de ciclismo analizados reconocen el fenómeno del dopaje. Aunque se observan diferencias porcentuales entre los distintos grupos analizados y comparados, en general, la palabra más mencionada asociada al dopaje fue "trampa", los agentes responsables más mencionados fueron "técnicos" y "laboratorios", la diferencia entre ciclismo y otros deportes más destacados fue "trato discriminatorio" y la razón para recurrir al dopaje fue la búsqueda del "éxito deportivo". La mayoría de los participantes reconocen en alguna ocasión se les ha sugerido doparse y declaran ser conocedores de casos similares. Las soluciones propuestas son "prevención temprana" y "aumentar el número de controles". Se observa la reconocida y cercana convivencia con el dopaje, especialmente, desde la perspectiva de los ex ciclistas profesionales. Estos resultados apoyan la idea de que, además de mantener los controles antidopaje, se hace necesario hacerlos más eficaces, y que son necesarios programas educativos-formativos de prevención desde edades más tempranas, así como de actualización-reeducación de técnicos.

Limitaciones

Este estudio no está exento de limitaciones ya que el hecho de utilizar un instrumento de medida como el cuestionario conlleva la posibilidad de que los participantes, en este caso entrenadores nacionales de ciclismo, mientan deliberadamente en sus respuestas a pesar de que el carácter anónimo y voluntario a la hora de completar los cuestionarios estaba garantizado. Una muestra mayor hubiera permitido una mayor representatividad, sin embargo, se debe tener en cuenta la calidad de la muestra, y la dificultad para acceder a técnicos deportivos con la máxima titulación y la posibilidad tratar este tema "tabú" en el ciclismo.

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SPANISH CYCLING AND ATTITUDES TOWARDS DOPING OF DIFFERENT STAKEHOLDERS INVOLVED.

Morente-Sánchez, J., & Zabala, M.

Department of Physical Education and Sport.

Faculty of Sport Sciences (University of Granada)

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ATTITUDES DOPING STAKEHOLDERS SPANISH CYCLING

Spanish cycling and attitudes towards doping of different stakeholders involved

Morente-Sánchez, J[1]

[1] Faculty of Sport Sciences, University of Granada (Spain)

Zabala, M.[1]

[1] Faculty of Sport Sciences, University of Granada (Spain)

Author correspondence:

Jaime Morente Sánchez

Faculty of Sport Sciences, (University of Granada). Department of Physical Education and Sport. Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +34 651 775 666; Fax: +34 958244369

Mail: jaimemorente@ugr.es

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Spanish cycling and attitudes towards doping of different stakeholders involved

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Abstract

The aim of this study was to know and compare the attitudes towards doping in different groups involved in Spanish cycling. The sample was composed of 492 participants (23.48±7.5 years) from different cycling contexts: university student of Sport Sciences degree -SS- (n = 271; 22.04±3.3 years), Elite Ciclists -EC- (n = 65; 18.43±2.9 years), Young Cyclists -YC- (n = 44; 13.0±0.82 years) and Cycling Team Manager -CTM- (n = 112; 33.65±7.17 years). A cross-sectional descriptive design was carried out using the Spanish version of the Performance Enhancement Attitude Scale (PEAS). Significant differences were observed between SS and CTM (p=0.000) and between EC and CTM (p=0.006). It could be suggested, "something is changing" in relation to attitudes towards doping in Spain, being the youngest the most sensible.

Keywords: banned substances, attitudes, cyclists, coaches, prevention

Spanish cycling and attitudes towards doping of different stakeholders involved

"Controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed" (Alaranta et al., 2006); this statement synthesized the current situation in relation to doping in sport in accordance with most of the studies reviewed (Morente-Sánchez & Zabala, 2013) . One example is Lance Armstrong, the seven-time Tour de France winner, who was investigated, found guilty, and, consequently sanctioned, despite of not having been ever tested positive during his career. Following this line, Petróczi and Aidman (2009) stated that, in the absence of more objective information on performance enhancing drugs (PED) use, attitudes are often used as an alternative to predict doping behaviour, assuming that doping users are more permissive towards doping than non-users (Morente-Sánchez, Freire, Ramírez-Lechuga, & Zabala, 2012; Uvacsek et al., 2011).

A recent systematic review about attitudes towards doping in sport (Morente-Sánchez & Zabala, 2013) showed that there were no previous specific studies that assessed and compared attitudes towards doping in different contexts involved in cycling by means of a validated tool. Furthermore, following Petróczi and Aidman (2009), demonstrated reliability and validity were poor and inferences could not be made in the majority of the studies in this field. In a study in which young elite cyclists were interviewed (Lentillon-Kaestner, Hagger, & Hardcastle, 2012) it was suggested that in top-performing cycling the use of PED was endemic among the cycling teams to the extent that it became institutionalized (Bassons, 2000; Kimmage, 1998; Voet, 1999) and was quasi-tolerated by the professional cycling community (Schneider, 2006) before the "Festina scandal" in 1998. They stated that this date is considered like a turning point since the use of banned substances is less widespread since then. In Spain, after so famous and unfortunate scandals like "Puerto" in 2006, it was

suggested that this type of studies about doping in sport, and more concretely focused on cycling were necessary (Morente-Sánchez & Zabala, 2013).

Taking into account the international view about the phenomenon of doping in Spanish cycling, we have focused on researching about several contexts that play and will play an important role in the current Spanish cycling. So, the aim of this study was to know and compare the attitudes towards doping in different groups involved in Spanish cycling: future physical trainers, elite cyclists, young cyclists, and cycling team managers.

Methods

Sample

The sample was composed of 492 participants (23.48±7.5 years) from different cycling contexts: university students of Sport Sciences degree -SS- (n = 271; 22.04±3.3 years), Elite Cyclists -EC- (n = 65; 18.43±2.9 years), Young Cyclists -YC- (n = 44; 13.0±0.82 years) and Cycling Team Managers -CTM- (n = 112; 33.65±7.17 years). Sport sciences group, potentially physical trainers in the next future, was composed of students undertaking the Sport Sciences degree at the Faculty of Sport Sciences in University of Granada (Spain). Elite cyclists group and YC group were comprised, respectively, by Spanish national team riders and cyclists within the National Program of Cycling Schools of the Spanish Cycling Federation. The members of CTM group were subjects with the licence of cycling team director (Level III, the highest technical level recognized by the International Cycling Union: IUC). The study was approved by the Ethics Committee.

Measures

A cross-sectional descriptive design was carried out by means of a validated questionnaire: Performance Enhancement Attitude Scale (PEAS) (Petróczi & Aidman, 2009).

The PEAS is a 17-question 6-point Likert-type scale, with points anchored from strongly disagree (1) disagree (2), slightly disagree (3), slightly agree (4), agree (5) to strongly agree (6). No neutral response if offered and all 17 items are scored in the same direction. The overall scores range from 17 to 102 points, with higher scores representing a more lenient attitude toward doping. This scale has been used in previous studies and has shown good psychometric properties (Petróczi & Aidman, 2009). We found Cronbach Alpha values ranging from 0.71 to 0.81 among all the groups studied. Participation was completely voluntary. To provide the participants with a sense of security, and thus to obtain reliable data, the principle of anonymity was secured.

Along the study, similar terms such as "doping", "drugs" or "banned substances" were considered those substances that are prohibited by the World Antidoping Agency (WADA) and ICU, and so it was explained to subjects before answering.

Data collection

Participants from different groups were recruited in different way. The SS group completed voluntarily the PEAS by means of a personal online link having received a detailed explanation of the purpose and implications of the research before. In the other three groups, after agreeing to written informed consent, the anonymous questionnaires were handed to each participant. Elite cyclists were engaged in their national team training camps previous to London 2012 Olympics Games. Young cyclists were assessed in a camp belonging to the program of Cycling Schools of the Spanish Cycling Federation and cycling team managers were suggested to complete the PEAS once they finished the last course of cycling team director (the highest technical level) in which they were involved. It was obtained written informed consent from parents, or guardians on the behalf of the minors/children participants involved in the study. There was no time limit for completing the PEAS. A regular coding system was used and the data were submitted in Excel files.

Analyses

Data characteristics are shown as mean and standard deviation (SD). The Kolmogorov-Smirnov test was applied to ensure a Gaussian distribution of the results. Noting that the results follow a non-normal distribution, a non-parametric analysis was conducted. The Mann Whitney-U test for PEAS variables, and Bonferroni post-hoc correction was carried out. Statistical analyses were performed with the Statistical Package for Social Sciences software version 19.0 for Windows (SPSS, Chicago, Illinois) and the level of significance was set to 0.008.

Results

PEAS - Performance Enhancement Attitude Scale

In general, the overall score (17-102) was 36.27±10.09. The lowest score was observed for the statement "Doping is not cheating because everybody does it" with 1.20±0.72, and the highest for "Athletes are pressured to take performance-enhancing drugs" with 3.58±1.44 (1= Strongly Disagree; 6= Strongly Agree).

Regarding different groups, overall scores were, respectively: SS: 34.69±9.31; EC: 35.14±8.63; YC: 37.62±11.30; CTM: 40.12±11.27. Significant differences were observed between SS and CTM (; p=0.000) and between EC and CTM (p=0.006). Results are shown in table I.

Discussion

The results of the present study show that Spanish cycling, in general, is not permissive in relation to doping. Cycling team managers, the oldest group, are significantly more lenient towards doping than EC and future physical trainers. It could be suggested "something is changing" in relation to attitudes towards doping in Spain being the youngest

the most sensible. So, the effect could be seen in the medium-long term, not immediately. It would be interesting to analyse these groups more exhaustively looking for the causes of that certain permissiveness in order to operate consequently. Data from young cyclists, more permissive than SS and EC, support the idea that anti-doping education programmes are needed since earliest ages.

Regarding attitudes towards doping one of the few studies that have used PEAS (the higher score, the more permissive attitude towards doping you show) was developed by Uvacsek et al. (2011). In this study, among 82 Hungarian competitive athletes, confessed doping users (12%) scored, as expected, significantly higher score ($p<0.05$) when compared with those who reported no use of banned drugs (46.8±13.32 and 34.43±8.74, respectively). Likewise, in other study (Morente-Sánchez, Freire, Ramírez-Lechuga, & Zabala, 2012) with 2022 amateur cyclists as sample (confessed users = 164; non users = 1858), overall scores were, respectively: 48.87±15.98 and 40.98±11.95. Morente-Sánchez, Mateo-March, and Zabala (2013) assessed attitudes towards doping in Spanish National Cycling Teams taking into account the Olympic discipline; regarding four different groups, data were: Mountain Bike: 30.28±6.92; Bicycle Motocross: 42.46±10.74; Track: 43.22±12.00; Road: 34.91±6.62. Petróczi & Aidman (2009) analysed several samples such as elite athletes from Hungary (n=102; confessed users = 5; non-user = 97) obtaining the following scores respectively (39.20±17.54 vs. 35.85±10.12). In the present study, overall scores of the cyclists were, respectively: elite cyclists (35.14±8.63), and young cyclists (37.62±11.30). Hence, in general, Spanish cyclists of the national teams seem to be against doping. It is specially risky the case of the youngest cyclists who showed a higher score more lenient than elite athletes group, which means that a deep analysis and monitoring of this sample appears necessary. If we educate athletes since early ages, they could be made more and more aware of doping, and although the effect is difficult to be seen immediately, it should appear sooner than later. In

this sense, we suggest that it is important to instruct not only athletes but their social environment (doctors, coaches, team-mates, friends, etc.) as they have a significant influence on their intention to use banned substances (Lentillon-Kaestner & Carstairs, 2010). We consider that people who induce and/or support the use of doping substances by athletes should also be punished giving a clean example and message for all the stakeholders involved.

Regarding future physical trainers, Spanish SS students showed a score lower (34.69±9.31) than UK Sports Sciences students (36.23±13.00, age: 21.5±5.5), Canadian Sports Sciences students (37.94 ± 11.25, age: 20.9±2.0), USA Sports Sciences students (37.57 ±12.60, age: 20.1±2.1) (Petróczi & Aidman, 2009). We consider that this study provides interesting information on attitudes towards doping from the view of sport professionals of the future whose awareness in relation to this topic is evident. Sport Science students are likely to become physical trainers, physical education teachers and, even, coaches or managers, so they will probably work closely with athletes and hopefully introduce an appropriate culture in relation to doping.

Finally, CTM group showed a high, and, consequently worrying PEAS score, being significantly more lenient towards doping than other groups such as EC and SS. This could be associated to the fact that cycling team managers, the oldest group, belonged to a cycling generation previous to the turning point related to doping in this sport in 1998: “Festina scandal”. In words of Lentillon-Kaestner et al., (2012) it has been often made the distinction between two generations in cycling: the actual cyclists of “the new generation” and the cyclists of “the old school” or “the former generation” who had commenced their cycling career before the 1998 so-called “Festina scandal”. According to them, doping use has declined among cyclists from the professional peloton since then. In this study it is pointed out that today most cyclists decide not to use banned substances. In the past, those cyclists

that chose not to take banned PED were marginalized (Lentillon-Kaestner et al., 2012). According to others studies (Lentillon-Kaestner et al., 2012; Peters, Schulz, Oberhoffer, & Michna, 2009), in the fight against doping, preventive measures are necessary to establish and fortify attitudes towards doping in different contexts. So, we encourage institutions to invest more money by balancing the costs of controls and prevention programmes from early ages as it was suggested by Morente-Sánchez & Zabala (2013). Better controls (planned and reinforced) are obviously needed, as well as more effective educational programmes that do not mean great investments. Indeed, the Spanish Cycling Federation has been conducting an intervention project called "Preventing to Win" since 2009 with the aim of educating the cyclists and coaches of the future (Zabala, Sanz, Durán, & Morente-Sánchez, 2009).

This study is not extent of limitations since work based on questionnaires covering a banned practise has limits because answers may be deliberately false, as the subjects questioned may not wish to reveal that they or their teammates use PED, even if the researchers guarantee anonymity and confidentiality.

Taking everything into account and focusing in cycling particularly, we consider, that nowadays is the ideal moment to work together against doping to win this battle. Sport science researchers should help applying researching methods to analyse the current situation deeply to design, consequently, specific programs and other activities for doping prevention. Besides, whereas medical and physiology researchers should keep on focusing on improving methods for detecting use and deterring athletes from engaging in doping activities (Gucciardi, Jalleh, & Donovan, 2011), social science researchers ought to strive to better understand psycho-social variables (e.g. attitudes, beliefs, knowledge…) that may be salient in educational programmes directed towards the prevention of such behavior (Vangrunderbeek & Tolleneer, 2011). Due to "attitudes" were the strongest predictors of intention to use banned substances (Lucidi, Grano, Leone, Lombardo, and Pesce, 2004),

PEAS could be used as a standard measurement instrument to assess attitudes towards doping so that data were more reliable and valid, and practical applications could be developed efficiently, but also being able to be complemented with other tools such as interviews (Lentillon-Kaestner, Hagger, & Hardcastle, 2012), implicit associations tests (James, Naughton, & Petroczi, 2010; Petroczi et al., 2010; Petroczi et al., 2011) or ideally biomedical tests (Morente-Sanchez & Zabala, 2013). In addition, following this line of research, different populations (sedentary, amateur, or professional) and different type of sports (single vs. team sport) should be investigated in the future to ascertain more trends in attitudes towards doping in sport, in relation to the specific sport practiced, frequency of practice or gender.

We suggest that this paper provides so interesting information in different perspectives. Mainly, it must be emphasized that this is the first study focused on knowing and comparing attitudes towards doping of different stakeholders involved in Spanish cycling, not only cyclists. In addition, the assessment was carried out by means of a validated instrument for all groups, so, apart from data were more reliable, more permissive groups could be detected. Moreover, practical applications such as design specific intervention programmes could be developed efficiently for risky groups. Secondly, this study was necessary in this country and specifically in this sport because after the scandal of Puerto case (2006-2013), which involved an important number of cyclists, the image of Spanish cycling could have been damage. Thirdly, the sample composed of high quality groups (elite athletes or coaches) should be taken into account since to access to the population is extremely difficult. Another reason is the difficulty in getting athletes or coaches to open up to discussion with researchers on such a taboo topic. Definitively, this study let reader obtain a general view of the phenomenon of doping Spanish Cycling.

Conclusion

Spanish cycling, in general, is not permissive in relation to doping. Cycling team managers, the oldest group, are significantly more lenient towards doping than elite cyclists and future physical trainers. It could be suggested, "something is changing" in relation to attitudes towards doping in Spain being the youngest ones the most sensible. It would be interesting to analyse these groups more exhaustively looking for the causes of that certain permissiveness in order to operate consequently. Data from young cyclists, more permissive than SS and EC, support the idea that anti-doping education programmes are needed since earliest ages.

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Table 1. Descriptive statistics and comparison among different groups: university students of Sport Sciences degree (SS), Elite Cyclists (EC), young cyclists (YC) and Cycling Team Managers (CTM)

	Total sample (n=492)		*SS (n=271)*		*EC (n=65)*		*YC (n=44)*		*CTM (n=112)*		
PEAS (Performance Enhancement Attitude Scale)	*Mean*	*SD*	*Mean*	*SD*	*Mea*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*p*
Age	*23.48*	*7.50*	*22.04*	*3.3*	*18.43*	*2.96*	*13.01*	*0.82*	*33.65*	*7.17*	$0.000^{1-4;\ 2-4;\ 3-4}$;
Overall Score	*36.27*	*10.09*	*34.69*	*9.31*	*35.14*	*8.63*	*37.82*	*11.30*	*41.59*	*10.85*	0.0001^{1-4}; 0.026^{2-4}

SD: Standard deviation
SS vs. CTM: 1-4;
EC vs. CTM: 2-4;
YC vs CTM: 3-4

ATTITUDES, BELIEFS AND KNOWLEDGE RELATED TO DOPING IN SPANISH FOOTBALL PLAYERS ACCORDING TO DIFFERENT CATEGORIES

Morente-Sánchez, J. & Zabala, M.

Department of Physical Education and Sport.

Faculty of Sport Sciences (University of Granada)

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Short Title:	DOPING SPANISH FOOTBALLERS DIFFERENT CATEGORIES
Corresponding Author:	Jaime Morente-Sánchez, M.D. Faculty of Sport Sciences, University of Granada GRANADA, SPAIN
Keywords:	football; elite; amateur; doping; prevention
Abstract:	There is no previous research focused on the phenomenon of doping in Spanish football. The aims of this study were to know and compare attitudes, beliefs and knowledge about doping in Spanish footballers from elite to under-eighteen categories. The sample was comprised of 1324 football players (22.56±5.62 years), from the different categories: Elite -ELI- (n = 304), non-elite Professional -PRO- (n = 308), top Amateur -AMA- (n = 330), Elite Under 18 -U18- (n = 334) and elite Female -FEM- (n = 48). Descriptive design was carried out using a questionnaire composed of a validated scale (PEAS) and specific qualitative open-ended questions. Overall mean score from PEAS (17-102) was 34.02±11.08. Taking the different analyzed groups into account, overall scores were, respectively: FEM: 33.75±14.73; ELI: 30.61±9.91; PRO: 34.23±11.13; AMA: 35.05±10.35; U18: 35.93±11.50; significant differences were observed between ELI and PRO (p=0.000), ELI and AMA (p=0.000), and between ELI and U18 (p=0.000). Regarding knowledge, 94.5% of total sample did not know the meaning of WADA neither the 97.4% the prohibited list. Supplements were used by 31.7% of total sample being especially high in ELI and PRO groups (49% and 43.6%, respectively). Almost five percent of participants (4.5%) recognized having used banned substances and 23.7% knew dopers. The most mentioned responsible agent of doping the word "doctor" (29.60%), and the major proposed solution was doing more doping controls (15.60%). Moreover, 73.5% stated that regarding doping there was "a different treatment among sports", being cycling the most persecuted (44%) and team sports the less one (27.8%). The present study showed that the Spanish football players, in general, are not tolerant in relation to doping, however; a risky lack of knowledge about this phenomenon was showed highlighting anti-doping prevention and education programs in football are needed in adults as well as since early ages.
Order of Authors:	Jaime Morente-Sánchez, M.D.
	Mikel Zabala
Suggested Reviewers:	Vanessa Lentillon-Kaestner Political Sciences (SSP), University of Lausanne, Lausanne, Switzerland vanessa.lentillon-kaestner@hepl.ch Expert in this field
	Andrea Petroczi School of Life Science FACULTY OF SCIENCE, ENGINEERING & COMPUTING Kingston University London A.Petroczi@kingston.ac.uk Expert in this field
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ATTITUDES, BELIEFS AND KNOWLEDGE RELATED TO DOPING IN SPANISH FOOTBALL PLAYERS ACCORDING TO DIFFERENT CATEGORIES

Authors: Jaime Morente-Sánchez, Mikel Zabala

Faculty of Sport Sciences, University of Granada, Spain.

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Keywords: football**,** elite, amateur, doping, prevention

Address for correspondence:

Jaime Morente Sánchez

Faculty of Sport Sciences, (University of Granada). Department of Physical Education and Sport. Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +34 651775666; Fax: +34 958244369

Mail: jaimemorente@ugr.es

Abstract

There is no previous research focused on the phenomenon of doping in Spanish football. The aims of this study were to know and compare attitudes, beliefs and knowledge about doping in Spanish footballers from elite to under-eighteen categories. The sample was comprised of 1324 football players (22.56±5.62 years), from the different categories: Elite -ELI- (n = 304), non-elite Professional -PRO- (n = 308), top Amateur -AMA- (n = 330), Elite Under 18 -U18- (n = 334) and elite Female -FEM- (n = 48). Descriptive design was carried out using a questionnaire composed of a validated scale (PEAS) and specific qualitative open-ended questions. Overall mean score from PEAS (17–102) was 34.02±11.08. Taking the different analyzed groups into account, overall scores were, respectively: FEM: 33.75±14.73; ELI: 30.61±9.91; PRO: 34.23±11.13; AMA: 35.05±10.35; U18: 35.93±11.50; significant differences were observed between ELI and PRO (p=0.000), ELI and AMA (p=0.000), and between ELI and U18 (p=0.000). Regarding knowledge, 94.5% of total sample did not know the meaning of WADA neither the 97.4% the prohibited list. Supplements were used by 31.7% of total sample being especially high in ELI and PRO groups (49% and 43.6%, respectively). Almost five percent of participants (4.5%) recognized having used banned substances and 23.7% knew dopers. The most mentioned responsible agent of doping the word "doctor" (29.60%), and the major proposed solution was doing more doping controls (15.60%). Moreover, 73.5% stated that regarding doping there was "a different treatment among sports", being cycling the most persecuted (44%) and team sports the less one (27.8%). The present study showed that the Spanish football players, in general, are not tolerant in relation to doping, however; a risky lack of knowledge about this phenomenon was showed highlighting anti-doping prevention and education programs in football are needed in adults as well as since early ages.

Introduction

Dietary supplementation is a common practice in athletes with a desire to enhance performance, training, exercise recovery, and health [1] in spite of being considered a risky habit due to the lack of knowledge or the possibility to be contaminated with banned substances [2]. Regarding the phenomenon of doping in football, Waddington et al [3], showed specific cases of former Premier League players recognizing the use of "pep pills" before matches and, on the other hand, it was emphasized that the use of doping could be highly organized in Italian football in 1990s. Apart from this, there have been famous footballers' doping cases such as Diego Armando Maradona in 1994 (ephedrine), Jaap Stam in 2003 (nandrolone) or Adrian Mutu in 2010 (cocaine). Hence, unfortunately, doping in football is not a new phenomenon and, consequently, it should be studied exhaustively to intervene efficiently on those potentially risky groups.

In the recent scientific literature it could be found studies about doping in sport in general, and regarding different sports such tennis [4], sailing [5], judo [6], cycling [7], weightlifting [8] or swimming [9] but research is lacking of studies focused on team sports and, especially on football. According to a systematic review developed by Morente-Sánchez and Zabala [2], there were a few specific studies that assessed attitudes, beliefs and knowledge regarding doping in football players, and of course none in Spain. Waddington et al. [3] carried out a study in English professional footballers focused on their use of supplements and sources of information, their experience of and attitudes towards drug testing, their views of banned PES and recreational drugs and their personal knowledge of players who used such drugs. On the other hand, Ama et al. [10] decided to investigate use and awareness of lawful and unlawful substances by amateur footballers in Cameroon, but results from this study should be interpreted carefully due to the different sociocultural context (i.e. 7% participants admitted using cocaine before matches and 16% did the same with alcohol drinks).

In general, doping in sport has been studied by medical, physiological, and social science researchers in recent years [11]. In the absence of more objective information on banned performance enhancing substances use, researches have been looking for predictors of doping behaviour for years. According to Backhouse, Whitaker and Petròczi [12], those athletes who engage in legal performance enhancement practices appear to embody an "at risk" group for transition toward doping.

For Lucidi et al. [13,14], "attitudes" were the strongest predictors of intention to use banned substances. Concerning the type of tools employed to assess attitudes towards doping in sport in the scientific literature, just a few used validated tools but not in elite athletes [2]. Although past evidence used *ad-hoc* instruments, these were based on well-established theories and got very specific information by using direct questions in different perspectives. The benefit of using a standard validated questionnaire is mainly that different contexts (sports, countries, gender or age) could be better compared. By the way, it has been suggested the use of both non-validated and validated tools (qualitative and quantitative) and, ideally including less-invasive biomedical tests [7].

The vast majority of research related to doping in sport is focused on the study of prevalence of use, attitudes or knowledge in a separate way and, it is often used big samples composed of athletes from different sports together. We have carried out a study focused on Spanish footballers using a questionnaire composed of a validated scale to assess attitudes towards doping (Performance Enhancement Attitude Scale: PEAS) [11] and specific qualitative open-ended questions to assess other aspects such as use of supplements, beliefs, and knowledge to intervene efficiently on those potentially risky groups.

The reasons why we consider this study as very important are: 1) Spanish football is considered the first world reference being the current world champion (2010) and the winner

of the last two editions of the European championships for national teams (2008-2012); 2) the high quality of the sample: near 700 professional football players (304 elite) and balanced groups from different categories of Spanish football; and, 3) the scandal of Puerto case (2006-2013) in Spain involved an important number of athletes from different sports and consequently, also the image of Spanish football could have been damage. So, the aims of this study were to know and to compare attitudes, beliefs and knowledge related to doping in Spanish footballers from elite to under-eighteen categories.

Methods

Sample

The characteristics of the sample are shown in table 1. All of the participants of this study were under-licensed football players. In Spain there are 8 male categories but we only took the four first ones into account: 1st and 2nd division (elite, ELI-, n = 304), 2nd division "B" (non-elite professional, PRO, n = 308) and 3rd division (top amateur, AMA, n = 330). The sample of female footballers was totally composed of players from 1st division (FEM, n = 48). The U18 group was composed for elite players from U16 and U18 top categories (U18, n = 334) who would be potentially professional even elite football players in the near future. The testing protocol and data handling were approved by the Ethics Committee of the University of Granada (Spain).

Measures

Descriptive design was carried out using a questionnaire composed of a validated scale to assess attitudes towards doping (Performance Enhancement Attitude Scale: PEAS) [11] and specific qualitative open-ended questions to know other aspects such as use of supplements, beliefs and knowledge. The PEAS is a 17-questions 6-point Likert-type scale, with points anchored from strongly disagree (1) through disagree (2), slightly disagree (3), slightly agree

(4), agree (5) to strongly agree (6). No neutral response if offered and all 17 items are scored in the same direction. The overall scores range from 17 to 102 points (giving a theoretical middle-point of 59.5), with higher scores representing a more lenient attitude toward doping. This scale has been used in previous studies and has shown good psychometric properties [7,11,15]. Cronbach's α values were calculated as a measure of internal consistency, considering the cut-off value of 0.7 to determine acceptable scale reliability [16]. We found Cronbach Alpha values ranging from 0.73 to 0.82 among all the groups studied.

Regarding qualitative open-ended questionnaire about the footballers' own experience, knowledge and beliefs was used. A similar version of this questionnaire was used in other previous studies summarized in Morente-Sánchez et al. [7]. Football players were asked to respond to several questions related to different topics: 1) use of supplements; and what; 2) knowledge: self-assessment, meaning of WADA, categories of prohibited list, what type of substance Clenbuterol is and inclusion criteria in prohibited list; 3) words associated with doping; 4) reasons for initiation into doping; 5) agents responsible for doping; 6) differences between among sports regarding doping and more/less persecuted sports; 7) questions about others: have you seen another person inciting or being incited to dope?; do you know somebody that has used banned substances?; which percentage of footballers do you think that use doping? (% Projected use); 8) questions about yourself: has doping been suggested to you?; have you ever used doping?; 9) hypothetical magic drug scenarios, modified from Bloodworth et al. [17,18]; 10) how do you feel about your corporal image?; and, finally 11) proposed solutions.

Data collection

Data were collected during season 2012-2013. First, we looked for a first contact by email to present the study and the collaboration proposal. If we did not receive a negative answer we requested a technical staff member's email or phone contact to explain the procedure and send

the material (formal presentation letter of the study, 25 anonymous and voluntary questionnaires and a empty, prepaid-sealed and redirected envelope). All the material was introduced in another envelope and sent to the football club office. A total of 88 football teams accepted to collaborate in the study, considering a mean of 22 players per team, the potential total sample would have been of 1936 participants. However, 1324 questionnaires, and their respective informed consent form, were returned (response rate 68.39%, mean: 15.05 players per team). Similar studies got different results: Waddington et al., [3] in professional English footballers (n=706; response rate: <25%) and, Ama et al., [10] in amateur football players from Cameroon (n=1116; response rate: 74.4%).

After the participants gave written informed consent, the anonymous questionnaires were self-administered. Written informed consent was obtained from parents or guardians on the behalf of minors involved in the study. We recommended completing the questionnaire before a training session or in a pre-match trip. There was no time limit for completing it. Once all the interested players' questionnaires were completed, they were picked up and sent back to first author address by means of the sealed and prepaid envelope. Participation was completely voluntary. To provide the participants with a sense of security, and thus to obtain reliable data, the principle of anonymity was secured.

Analyses

It was used a regular coding system and the data was registered in Excel files. Data characteristics are shown as frequencies, percentages, means, and standard deviations. For the PEAS, the Kolmogorov-Smirnov Test was applied to ensure a Gaussian distribution of the results. Due to the results followed a non-normal distribution, a non-parametric analysis was conducted. The Mann-Whitney U-test, using Bonferroni post-hoc correction, was carried out. Spearman's correlation coefficient was also used to assess the relationships between PEAS

and other analysed variables. Statistical analyses were performed using IBM-SPSS 20.0 software.

Results

PEAS - Performance Enhancement Attitude Scale

In general, the mean overall score (17–102) was 34.02±11.08. Taking the different analyzed groups into account, overall scores were, respectively: FEM: 33.75±14.73; ELI: 30.61±9.91; PRO: 34.23±11.13; AMA: 35.05±10.35; U18: 35.93±11.50. Regarding overall scores (Table 1), significant differences were observed between ELI and PRO (p=0.000), ELI and AMA (p=0.000) and between ELI and U18 (p=0.000).

Open-ended qualitative questionnaire

The data obtained were expressed in terms of percentage of participants who made a specific statement (%). Different groups (Total sample, ELI, PRO, AMA, U18 and FEM) were compared. A summarize of results from yes-no qualitative questions are shown in table 2. Below, we show results from different variables analyzed:

1. Use of supplements: in general, 416 of 1313 (31.68%) responders recognized having used supplements. Taking different groups into account supplements users' percentage was: ELI (49.00%), PRO (43.60%), AMA (24.50%), U18 (11.50%) and FEM (35.40%). The most mentioned supplements were recovery substances (4.40%), amino acids (4.00%), proteins (% n: 3.60%) and vitamins (% n: 3.60%) although 71.50% gave a no answer.

2. Knowledge: percentages of correct (figure 1) and incorrect answers, which were bigger than correct ones, are shown in

3. Taking into account the percentage of correct answers a coefficient of knowledge was calculated (%). Regarding self-assessment of knowledge there were significant differences among different analyzed groups (table 1).

3. Words associated with doping: the three most mentioned words were “cheating” (21.10%), “lie” (8.50%), and “performance” (4.20%). In the group comparison, the most repeated word was “cheating”: ELI (25.70%), PRO (20.80%), AMA (22.10%), U18 (15.90%) and FEM (%22.90%).

4. Reasons for the initiation of doping: the three most mentioned reasons were “performance” (35.30%), “sport achievements” (19.40%) and “external pressures” (4.40%). Taking into account the different groups, the most repeated reason was “performance”: ELI (32.10%), PRO (41.90%), AMA (33.30%), U18 (35.70%) and FEM (25.0%).

5. Agents responsible for doping: the three most mentioned agents were “doctor” (29.60%), “players” (18.60%), and “coach” (8.60%). Except for AMA group (“players”; 22.20%), in relation to different analyzed groups, the most suggested agents responsible of doping was “doctors”: ELI (33.70%), PRO (33.30%), U18 (21.00%) and FEM (42.30%).

6. Differences among sports regarding doping and more/less persecuted sports: in general, most of footballers stated that there are differences (“yes”; 73.50%), respectively ELI (77.20%), PRO (78.00%), AMA (77.30%), U18 (61.80%) and FEM (76.10%). The most persecuted sport was “cycling” (44.0%) and the less one “football” (10.40%), basketball (9.30%), “team sports” (8.10%), no-answer (51.50%).

7. Questions about others: “Have you ever seen other people inciting others or being incited?”: one hundred and seventeen of 1281 responders stated “yes” (9.10%). In relation to different groups, respectively: ELI (7.70%), PRO (7.80%), AMA (16.80%), U18 (3.40%) and FEM (14.60%). “Do you know somebody that has used banned substances? (“yes”; 23.70%),

respectively ELI (20.60%), PRO (24.10%), AMA (29.40%), U18 (18.50%) and FEM (37.50%). About "which percentage of footballers do you think that use doping?" (% projected use). In general, the mean percentage obtained was 16.79±16.99, and in relation to different groups, respectively: ELI, 11.03±14.15%; PRO, 16.04±16.22 %; AMA, 20.63±18.51%; U18, 18.4±16.77%; and FEM 21.00±20.07%. Regarding this variable, projected use, significant differences were found among different analyzed groups (table 1).

8. Questions about yourself: "Has doping been suggested to you?": seventy-nine of 1284 responders stated "yes" (6.20%). In relation to different groups, respectively: ELI (6.00%), PRO (6.10%), AMA (10.40%), U18 (1.50%) and FEM (10.40%). About "Have you ever used doping?": fifty-eight of 1282 responders stated "yes" (4.50%); in relation to different groups, respectively: ELI (4.00%), PRO (5.10%), AMA (6.30%), U18 (1.50%) and FEM (12.50%).

9. Hypothetical magic drug scenarios: following Bloodworth et al. [17,18], in questions when hypothetical situations regarding using prohibited substances or methods were presented, athletes were asked to indicate their own willingness to take the substance or method, and estimate the likelihood of other athletes doing the same. The scenario was presented as this: "Imagine that there is a prohibited (banned) substance or method that would significantly enhance your performance but was completely undetectable (magic drug). How many of your fellow competitors do you think would take it? (all of them; probably most of them; probably some of them; definitely none of them; don't know). Would you take it? (yes definitely; probably; probably not; no, definitely not; don't know). The two conditions were: (a) not having serious health consequences and (b) involving a shortened lifespan. Results are shown in table 4.

10. Corporal image: most of football players indicated that they were happy (54.70%) or very happy (33.90%). Results are shown in table 4.

11. Proposed solutions: taking into account that most of the sample replied NS/NC (% n: 75.20), the most mentioned suggestion to eradicate doping in sport was “more controls” (% n: 15.60); in relation to different groups, respectively: ELI (14.80%), PRO (15.30%), AMA (18.80%), U18 (14.40%) and FEM (8.30%).

If we consider the variable sex to divide the total sample (women: 48; men: 1276), significant differences were found for variables related to “others”: “do you know doping users?” ($p=0.043$) and “% projected use in your sport” ($p=0.03$) or the amount of users you think there are in your sport.

Taking into account the question “have you ever used doping substances?”, we divided the total sample in users (n=58) and non-users (n=1253). In this sense, we found significant differences for several variables: PEAS overall score ($p=0.006$), “has doping been suggested to you?” ($p=0.000$), “have you ever seen other people inciting others or being incited?” ($p=0.000$), “do you know doping users?” ($p=0.000$), % projected use in your sport ($p=0.000$), all the scenario questions ($p<0.05$), self-assessment of knowledge ($p=0.026$), and “body image” ($p=0.026$).

Regarding relationships between PEAS and other analysed variables Spearman’ correlation coefficients are shown in table 5.

General Discussion

The present study showed that the Spanish football players analyzed, in general, are not tolerant in relation to doping. However, AMA and U18 groups were a little more permissive towards the use of banned substances than other samples analyzed being ELI groups the less lenient one. High levels of use of supplements and very low levels of knowledge regarding doping were found. Moreover, results from the open-ended qualitative questionnaire have

shown interesting and specific data (e.g., self-assessment of knowledge, projected use, reasons for use or responsible agents), which should be analyzed more exhaustively to intervene more effectively on those potentially risky groups. These results highlight that anti-doping prevention and education programs are needed in adults as well as since early ages.

Following Petróczi and Aidman [11] and Morente-Sánchez and Zabala [2], regarding assessment of attitudes towards doping in sport there are few studies that have used a validated scale such as PEAS, hence, the majority of the studies in this field demonstrated poor reliability and validity and strong inferences could not be made. Uvacsek et al. [15](n = 82 Hungarian competitive athletes) confessed doping users (12%) scored, as expected, significantly higher score ($p<0.05$) when compared with those who reported no use of banned drugs (46.8±13.32 and 34.43±8.74, respectively). Petróczi & Aidman [11] analysed several samples such as elite athletes from Hungary (n=102; confessed users = 5; non-user = 97) obtaining the following scores respectively (39.20±17.54 vs. 35.85±10.12). Morente-Sánchez, Mateo-March and Zabala [7] assessed attitudes towards doping in Spanish National Cycling Teams taking into account the Olympic discipline; regarding four different groups, being especially at risk bicycle motocross and track, data were: total sample 36.12±9.39; Mountain Bike: 30.28±6.92; Bicycle Motocross: 42.46±10.74; Track: 43.22±12.00; Road: 34.91±6.62. Concerning the present study, taking the scientific literature into account, we suggest that the Spanish football players are not permissive being even the less tolerant ones. Among samples analysed, it is interesting to observe that elite players were very aware of the phenomenon of doping. In contrast, it was especially risky that the highest score was obtained by the youngest sample. According to different studies [2,12,19], if we educate athletes since early ages they could be made more and more aware of doping, and although the effect is difficult to be seen immediately, it should appear sooner than later. As a practical application, a deep analysis and monitoring of this sample appears necessary.

Although the rest of the questionnaire was *ad-hoc*, we consider that it provides us more specific information by using direct questions in different perspectives. About use of supplements we observed that almost one third of the sample used them, being this value higher in professional categories (i.e. ELI: 49.00% and PRO 43.60%), and lower in U18 (11.5%), probably because the competitiveness was higher in those previous ones. In English professional football [3], 58% of 706 players reported using vitamin pills, 37% creatine and 24% protein. In this study the relative percentage to specific used supplements were lower probably because after saying "yes, I use supplements", 71.50% did not write the specific substance. Due to the lack of studies focused on football players in this field, we suggest to establish comparisons with other type of sports. Kim et al [20] reported that 79% of male and 82% of female Korean Olympians took more than one supplement during the training period for Beijing 2008 Summer Olimpic Games. Lun et al. [1], observed that 87% of 440 Canadian athletes from 34 different sports used dietary supplementation. Recently, Kondric et al. [4] stated that the use of supplements was widespread (80%) in female high-level tennis players (n=43). In a study with high level sailing athletes (n=44), more than 77% of them recognized using supplements [5]. Kim et al. [6], observed similar prevalence in Japanese (n=71) and Korean (n=101) judo athletes (61% and 59%, respectively). Therefore, in comparison with these results the use of supplements in our study is not very high. Anyway, according to Backhouse, Whitetaker and Petròczi [12] (n=212 competitive athletes), doping use is 3.5 times more prevalent in supplements users compared with non-users and emphasized that this finding is accompanied by significant differences in doping attitudes, norms and beliefs.

Regarding knowledge about doping we observed an important problem since the vast majority of footballers did not know the prohibited list (97.4% of total sample) or even the meaning of WADA (94.5%), providing themselves a low self-assessment knowledge mark (3.0/10). No significant differences were found among groups regarding knowledge, and this could be

dangerous for different professional samples analyzed (ELI, PRO and FEM) since their sport career could depend on not failing a drug test and the lack knowledge could imply consuming a non-permitted substance because of ignorance. Waddington et al [3], observed that 68% of 706 English professional footballers were aware of UK sport's guidelines and the remaining 32% were not; moreover 20% of this sample reported an use of supplements on their own without taking advice. Following these authors, we recommend all the stakeholders involved in Spanish professional football that take steps to ensure that all players are provided with appropriate advice on the use of supplements.

Bespoke questions allow getting more specific information by using direct questions in different perspectives related to this topic like "words associated to doping", "reasons for use", or "agent responsible". In this order, it has been shown that the words most associated were "cheating" (% n: 21.10), "performance" and "doctor", respectively. Similar results were found in study carried out with the Spanish Olympic national cycling teams [7] where a similar open-ended questionnaire was used (n=72). Respectively, "cheating" (49%), "sport achievement" (46%) and "doctor" (53%) were the most mentioned. In the same way, Striegel et al. [21], studying the prevalence of doping in 978 German elite athletes, reported that the most repeated reasons for drug use were to achieve athletic success (86%) and for financial gain (74%). In addition, in another study (n=40), various factors were acknowledged as potential reasons for use, most notably injury recovery and the economic pressures of elite sport [18]. Regarding agents responsible for doping, similar open-ended questionnaire was used with a sample of 87 Spanish cycling team managers who recognized themselves like the main responsible [22,23]. In a similar study, Zabala et al. [24] stated that for professional cyclists the main responsible agents that evoke doping were 1) Team Managers, 2) Doctors, and 3) the cyclists, while for the team managers the responsible were the 1) pressure of sponsors, 2) cyclists,3) team managers, and 4) doctors. Nieper [25] in a survey of 34 British

junior team athletes noted that coaches provided the greatest influence (65%), followed by sports dieticians (30%) and doctors (25%). Remarkably, Waddington et al [3] stated that for English professional footballers (n=706), the club doctor was the least used source of advice (15%), while the main one was the physiotherapist (28%) or fitness trainer (21%). We suggest that it is important to raise awareness and re-educate both professional groups (doctors and coaches) in addition to football players, because of their recognized and important influence on athletes[26].

Regarding doping treatment among sports, in general, Spanish football players strongly highlighted (73.5%) the existence of "different treatment". In addition, it was interesting to observe that they considered cycling like the most persecuted and themselves like the least one honestly. In this sense, different treatments among different types of sports in relation to doping have been studied in several investigations. Spanish footballers' opinions are in accordance with other studies that also consider that there is a different treatment in the quantity and quality of doping treatment among sports [27]. In fact, English professional footballers were tested for drugs less often than many other elite athletes, only about 33% per year, and 60% felt that they were unlikely to be tested in the next year [3]. We suggest that eradicating such differences is a necessary starting point to begin carrying out equity and justice among sports in relation to the fight against doping.

Focusing on the direct questions about others and self, we consider that this study provides very interesting information. In general, almost 5% of footballers recognized having used doping substances while for 6.5% doping has ever been suggested. Moreover, results from both questions showed a positive and significant correlation with PEAS ($p<0.001$). In relation to cited data, Lazuras et al. [28] analyzed a sample of 750 Greek elite athletes and 4.3% recognized that they used doping substances. Hence, Uvacsek et al. [15] observed that 14.6% athletes participating in this study (n=82) admitted using banned PES. On the other hand,

Pistch et al. [29] using other assessment instrument such as an interview reported a higher prevelance about their current use of doping practices and 25.8% admitted having taken banned substances (n=448 German top athletes).

Doping is a taboo topic in sport and it was checked in this study, above all, in risky questions about the own doping behaviour; however, when it is focused on other people the prevalence is often higher. Alaranta et al. [19] reported that 30% of 446 Finnish elite athletes from different sport knew another athlete using banned drugs to boost performance, 14% in team sport group (n=152). In professional English football, 34% of 706 players assessed stated that banned PES were being used by some players, and 6% also indicated that they knew personally doping users [3]. Similarly, when Spanish football players were asked about other people's doping behaviour, frequencies were higher (23.7% of total sample knew personally doping users) and revealed a positive and significant correlation with attitudes towards doping ($p<0.001$). In this study, the mean percentage of projected use was 16.7%, the highest result was found in AMA group (21%) and the lowest in ELI group (11%), which means that 1 of 5 elite amateur male footballers are under suspect while elite players trust on their sport mates' honesty. We suggest that this situation is synonym of the level of doping monitoring and surveillance on each category, and because of the awareness of doping as a problem that is in the media that could be felt more as a taboo topic than in the lower categories. Analyzing the results, we suggest paying attention on female elite footballers because the percentage of women that knew dopers and the projected use in her sport were higher ($p<0.05$) in comparison to male footballers. On the contrary, Alaranta et al. [19] reported that men knew doping users significantly more often than women (35.2% vs. 22.7%; $p = 0.0044$).

Dividing the total sample in users (n=58) and non-users (n=1253), we found significant differences for certain variables. It drew attention participants that recognized having used doping also knew more banned substances users ($p=0.000$) and reported a higher projected

used (p=0.000), apart from showing more permissive attitudes towards doping (p=0.006). Tangen and Breivik [30] revealed that an individual's decision to take banned substances is influenced by the assumption that his or her competitors are also taking drugs. Regarding this phenomenon, in reviewing the latest scientific literature in this field on attitudes towards doping in sport, it is interesting to observe the emergence of the so-called "false consensus effect" concept (FCE) [15,31], which suggests that athletes who have a history of PED use overestimate the prevalence of drug use among other athletes. Therefore, it seems clear that if an athlete believes that others are taking doping substances, this could push some of them to start using banned PES as well, and this could be like a vicious circle that feeds the pro-doping culture.

Regarding hypothetical magic drug scenario questions [17,18], interesting data were reported. The 19.6% would take the substance that would significantly enhance performance if it would be completely undetectable. The 92.2% believed that at least some other athletes would take the magic drug. According to FCE, significant differences were found for both questions between users and nonusers ($p<0.001$). Spanish footballers were very concerned about side effects or any reduction in lifespan arising from doping, and positive answers for those questions were lower. Our results are similar to findings from Bloodworth et al. [17,18] but in contrast to Goldman et al. [32], who reported that 103 of 198 world class athletes (52%) would take a "magic drug" that would guarantee success for the next five years, but would cause death immediately thereafter. Similarly, in other study [33] it was observed that 25 of 212 north-American elite athletes assessed indicated that they would take the substance (no death condition). Moreover, legality also changes the acceptance rate to 13/212 even with death as a consequence. Focusing on football studies, Waddington et al. [3] observed that 5% of English footballers evaluated (n=706; response rate: <25%) would take banned PES if it could guarantee them selection for the national team in the next world cup.

About body image, the vast majority of football players indicated that they were happy or very happy in general, however, we detected a negative and significant correlation ($p<0.05$) between this variable and attitudes towards doping in ELI group. Similar results were found in a study with amateur cyclists (n=2022) between PEAS and self-Esteem [34] so that the higher score in PEAS, the lower self-esteem. Therefore, we suggest that it would be interesting to analyze this relationship in further studies.

Finally, regarding proposed solutions when footballers analyzed were asked about what they would do to eradicate the phenomenon of doping in sport, the vast majority (>75%) gave no answer, and this could mean high and worrying indifference among participants. From all those that answered, the proposed option was "more controls" (% n: 15.16). This proposal also was the most mentioned for Spanish national cyclists but in a higher percentage (43.05%) followed by “prevention at early ages” [7], although this proposal was not considered in this study because (% n: 0.1- 4.9). We should consider that increasing drug testing in sport is not synonymous of success due to the high rate of drug testing hidden or non-detected in the past [2]. Hence, according to Alaranta et al. [27], “controlling doping only by tests is not sufficient, a profound change in the attitudes, which should be monitored repeatedly, is needed”. This statement synopsizes the current situation in relation to doping in sport in accordance with most of the recent studies reviewed [4,12,35]. According to Peters et al. [36] and Lentillon-Kaestner et al. [37], in the fight against doping, preventive measures are necessary to establish and fortify attitudes towards doping at an early stage.

This study is not free of limitations since work based on questionnaires covering a banned practice has limits: answers may be deliberately false as the participants questioned may not wish to reveal that they or their teammates use banned PES, even if anonymity and confidentiality are guaranteed by the researchers.

Finally, we suggest that descriptive studies to design effective intervention programs should be carried out by means of the same or similar tools in every sport so that comparisons could be made, data could be more reliable and practical applications could be developed efficiently. Focusing on football in particular, it has been demonstrated, apart from a more permissive treatment than other sports', the existence of an important lack of knowledge about doping, which clearly reinforces the idea to include a wide educational program on doping prevention. In addition, depending on the necessities of each group analyzed, education should be appropriately targeted [12]. We suggest institutions to invest more money by balancing the costs of controls and prevention programs from early ages as suggested by Morente-Sánchez and Zabala [2]. Controls are obviously needed, but also more effective educational programs that do not require large investments. If stakeholders play their different roles in the same direction, we could clearly improve in the battle against doping, because in words of Lentillon-Kaestner [35] the "fight against doping is not over".

Conclusions

The present study showed that the Spanish football players analyzed, in general, are not tolerant in relation to doping. However, AMA and U18 groups were a little more lenient towards the use of banned substances than other samples analyzed being ELI groups the less lenient one. High levels of use of supplements and very low levels of knowledge concerning doping were found. Spanish football players strongly highlighted the existence of a different treatment regarding doping, being considered cycling like the most persecuted and team sports like the least one. Moreover, results from the open-ended qualitative questionnaire have shown interesting and specific data (e.g., self-assessment of knowledge, projected use, reasons for use or responsible agents), which should be analyzed more exhaustively to intervene more effectively on those potentially risky groups. These results highlight that anti-doping prevention and education programs are needed in football since early ages to adults.

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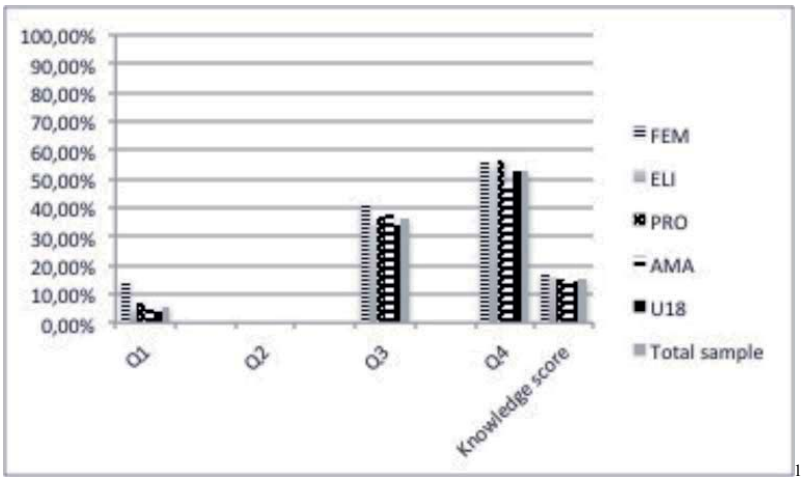

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Figure 1. Percentage of correct answers for questions (1-4) and knowledge score and comparisons between different categories (elite Female, Elite, non-elite Professional, top Amateur; Elite Under 18 and Total sample).

ELI: Elite; PRO: non-elite Professional; AMA: top Amateur; U18: Elite Under 18; FEM: elite Female

Q1: "Do you know the meaning of acronym "WADA"? yes/no question. If "yes", write it; Q2: "Do you know the prohibited list? Yes/no question. If "yes" write it; Q3: "Clenbuterol is…" (4 answer multiple choice question); Q4: WADA's criteria of inclusion in prohibited list (4 answer multiple choice question).

Table 1. Descriptive statistics and comparisons between different categories (elite Female, Elite, non-elite Professional, top Amateur; Elite Under 18 and Total sample) for several variables analyzed.

	FEM[0*] (n=48)		ELI[1] (n=304)		PRO[2] (n=308)		AMA[3] (n=330)		U18[4] (n=334)		Total sample (n=1324)		p
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	
Age (years)	24.73	6.39	25.00	4.86	24.23	5.53	24.28	4.78	16.73	1.30	22,56	5.62	$p=0.000^{0-4,\ 1-4,\ 2-4,3-4}$
Practice experience (years)	15.35	5.89	14.85	5.08	15.75	4.71	15.22	4.4	10.59	2.35	14.11	4.77	$p=0.000^{0-4,\ 1-4,\ 2-4,3-4}$
Training hours	7.29	2.79	12.57	4.44	11.58	3.33	8.77	3.12	7.46	2.25	9.91	3.93	$p=0.000^{0-1,\ 0-2,\ 0-3,1-2,1-3,1-4,2-3,2-4,3-4}$
Self-assessment of knowledge (0-10)	2.98	2.67	3.09	2.58	3.24	2.25	2.98	2.36	2.73	2.48	3.00	2.43	$p=0.003^{2-4}$
Overall Score (17-102)	33.75	14.73	30.61	9.91	34.23	11.13	35.05	10.35	35.93	11.50	34.02	11.08	$p=0.003^{1-2,1-3,1-4}$
Projected use (%)	21.00	20.07	11.03	14.15	16.04	16.22	20.63	18.51	18.40	16.76	16.79	16.99	$p=0.000^{0-1,\ 0-2,1-2,1-3,1-4,2-3,2-4}$
Knowledge score (0-100)	16.88	18.81	15.75	15.15	15.00	15.43	14.29	15.39	14.66	13.81	14.98	15.09	NS

ELI: Elite; PRO: non-elite Professional; AMA: top Amateur; U18: Elite Under 18; FEM: elite Female
Differences between specific groups taking into account supraindexed numbers
NS: no significant differences were found

Table 2. Summarize of results from yes-no qualitative questions.

Dou you use supplements or ergogenic aids?	FEM (n=48)	ELI (n=302)	PRO (n=305)	AMA (n=327)	U18 (n=331)	Total sample (n=1313)
No	64.60%	51.00%	56.40%	75.50%	88.50%	68.30%
Yes	35.40%	49.00%	43.60%	24.50%	11.50%	31.70%
Do you know the meaning of acronym WADA?	FEM (n=48)	ELI (n=297)	PRO (n=303)	AMA (n=323)	U18 (n=323)	Total sample (n=1294)
No	87.50%	89.20%	91.40%	92.90%	95.40%	92.10%
Yes	12.50%	10.80%	8.60%	7.10%	4.60%	7.90%
Do you know the prohibited list of WADA?	FEM (n=48)	ELI (n=300)	PRO (n=305)	AMA (n=328)	U18 (n=330)	Total sample (n=1311)
No	87.50%	96.30%	99.00%	97.90%	97.90%	97.40%
Yes	12.50%	3.70%	1.00%	2.10%	2.10%	2.60%
Regarding doping, are there difference among sports?	FEM (n=46)	ELI (n=290)	PRO (n=286)	AMA (n=299)	U18 (n=309)	Total sample (n=1230)
No	23.90%	22.80%	22.00%	22.70%	38.20%	26.50%
Yes	76.10%	77.20%	78.00%	77.30%	61.80%	73.50%
Have you ever use banned substances?	FEM (n=48)	ELI (n=300)	PRO (n=295)	AMA (n=316)	U18 (n=323)	Total sample (n=1282)
No	87.50%	96.00%	94.90%	93.70%	98.10%	95.40%
Yes	12.50%	4.00%	5.10%	6.30%	1.50%	4.50%
Do you know somebody that has used banned substances?	FEM (n=48)	ELI (n=301)	PRO (n=295)	AMA (n=316)	U18 (n=325)	Total sample (n=1285)
No	62.50%	79.40%	75.90%	70.60%	81.50%	76.30%
Yes	37.50%	20.60%	24.10%	29.40%	18.50%	23.70%
Have you been suggested to dope?	FEM (n=48)	ELI (n=300)	PRO (n=296)	AMA (n=316)	U18 (n=324)	Total sample (n=1284)
No	89.60%	94.00%	93.90%	89.60%	98.50%	93.80%
Yes	10.40%	6.00%	6.10%	10.40%	1.50%	6.20%
Have you seen other people inciting others or being incited?	FEM (n=48)	ELI (n=300)	PRO (n=295)	AMA (n=316)	U18 (n=322)	Total sample (n=1281)
No	85.40%	92.30%	92.20%	83.20%	96.60%	90.90%
Yes	14.60%	7.70%	7.80%	16.80%	3.40%	9.10%

ELI: Elite; PRO: non-elite Professional; AMA: top Amateur; U18: Elite Under 18; FEM: elite Female

Table 3. Percentage of correct/incorrect answers for questions (1-4) about knowledge and comparisons between different categories (elite Female, Elite, non-elite Professional, top Amateur; Elite Under 18 and Total sample).

Q1	FEM (n=48)	ELI (n=304)	PRO (n=308)	AMA (n=330)	U18 (n=334)	Total sample (n=1324)
Incorrect (%)	85.40	95.70	92.90	94.20	96.40	94.50
Correct (%)	14.60	4.30	7.10	5.80	3.60	5.50
Q2	FEM (n=48)	ELI (n=304)	PRO (n=308)	AMA (n=330)	U18 (n=334)	Total sample (n=1324)
Incorrect (%)	100	100	100	100.00	100.00	100.00
Correct (%)	0	0	0	0	0	0
Q3	FEM (n=48)	ELI (n=304)	PRO (n=308)	AMA (n=330)	U18 (n=334)	Total sample (n=1324)
Incorrect (%)	58.30	65.80	63.30	62.10	65.90	64.00
Correct (%)	41.70	33.90	36.70	37.90	34.10	35.90
Q4	FEM (n=48)	ELI (n=304)	PRO (n=308)	AMA (n=330)	U18 (n=334)	Total sample (n=1324)
Incorrect (%)	43.80	47.00	43.50%	52.10%	47.30	47.40
Correct (%)	56.20	53.00	56.50%	47.90%	52.70	52.60
knowledge score (%)	**16.88**	**15.75**	**15.00**	**14.29**	**14.66**	**14.98**

ELI: Elite; PRO: non-elite Professional; AMA: top Amateur; U18: Elite Under 18; FEM: elite Female

Q1: "Do you know the meaning of acronym "WADA"? yes/no question. If "yes", write it; Q2: "Do you know the prohibited list? Yes/no question. If "yes" write it; Q3: "Clenbuterol is…" (4 answer multiple choice question); Q4: WADA's criteria of inclusion in prohibited list (4 answer multiple choice question).

Table 4. Percentage of selected answers for Hypothetical magic drug scenarios and comparisons between different categories (elite Female, Elite, non-elite Professional, top Amateur; Elite Under 18 and Total sample).

Undetetable PES. Would other athletes use it?	FEM (n=46)	ELI (n=291)	PRO (n=294)	AMA (n=310)	U18 (n=318)	Total sample (n=1259)
Yes. all of them	10.90	6.90	7.80	7.70	7.50	7.60
Yes. probably most of them	39.10	27.80	39.50	43.50	36.80	37.10
Yes. probably some of them	26.10	53.60	46.90	43.20	45.60	46.50
No. none of them	8.70	4.10	1.40	1.00	3.10	2.60
I do not know	15.20	7.60	4.40	4.50	6.90	6.20
Undetectable PES. Would you use it?	FEM (n=48)	ELI (n=290)	PRO (n=293)	AMA (n=316)	U18 (n=322)	Total sample (n=1269)
Yes. definitely	2.10	3.10	5.80	4.10	2.80	3.90
Yes. probably	14.60	13.40	16.40	21.80	11.20	15.70
Probably not	29.20	22.10	24.20	28.50	25.20	25.20
Definitely not	41.70	54.50	48.10	41.10	55.30	49.40
I do not know	12.50	6.90	5.50	4.40	5.60	5.80
Undetectable PES with no side effects. Would other athletes use it?	FEM (n=45)	ELI (n=290)	PRO (n=292)	AMA (n=314)	U18 (n=319)	Total sample (n=1263)
Yes. definitely	2.10	3.40	11.30	7.30	5.00	6.60
Yes. probably	18.80	18.30	15.40	17.80	10.30	15.50
Probably not	27.10	20.00	16.40	20.70	17.90	19.10
Definitely not	43.80	54.10	49.30	50.60	61.10	53.50
I do not know	8.30	4.10	7.50	3.50	5.30	5.20
Undetectacble PES but shortened lifespan. Would other athletes use it?	FEM (n=48)	ELI (n=291)	PRO (n=295)	AMA (n=316)	U18 (n=318)	Total sample (n=1268)
Yes. definitely	0.00	1.00	2.00	0.60	0.60	1.00
Yes. probably	6.20	3.10	2.40	2.80	4.70	3.40
Probably not	10.40	7.90	11.50	8.90	7.90	9.10
Definitely not	77.10	85.20	82.00	84.80	84.60	83.90
I do not know	6.20	2.70	2.00	2.80	2.20	2.60
Are you happy with your body image?	FEM (n=48)	ELI (n=292)	PRO (n=293)	AMA (n=316)	U18 (n=319)	Total sample (n=1268)
Very unhappy	0.00	1.40	0.70	0.30	0.30	0.60
Unhappy	2.10	0.70	1.00	2.80	3.40	2.10
Indifferent	10.40	7.20	7.80	4.40	8.50	7.10
Happy	60.40	50.30	58.00	56.30	53.30	54.70
Very happy	18.80	38.40	32.10	34.80	32.90	33.90
I do not know	8.30	2.10	0.30	1.30	1.60	1.60

ELI: Elite; PRO: non-elite Professional; AMA: top Amateur; U18: Elite Under 18; FEM: elite Female

Table 5. Spearman's correlation coefficients between PEAS and other analyzed variables.

	PEAS					
	FEM (n=48)	ELI (n=304)	PRO (n=308)	AMA (n=330)	U18 (n=334)	Total sample (n=1324)
Others						
have you seen another person inciting or being incited to dope?	0.271	-0.019	0.159**	0.096	0.011	0.087**
do you know doping users?	0.048	0.094	0.104	0.114*	0.083	0.095**
% projected use in your sport	0.179	0.255**	0.305**	0.121*	0.073	0.247**
Self						
do you use supplements?	0.173	0.095	0.009	0.188**	0.036	0.035
Differences among sports regarding doping	0.306*	0.120*	0.061	0.038	0.164**	0.086**
has doping been suggested to you?	0.286*	-0.007	0.115*	0.088	0.128*	0.108**
have you ever used doping?;	0.13	-0.002	0.065	0.146**	0.149**	0.095**
body image	0.004	-0.133*	-0.014	-0.017	-0.075	-0.052
Self-assessment of knowledge	0.075	0.026	-0.08	0.162**	0.141*	0.071*
Knowledge overall score	0.296*	0.003	-0.117*	-0.001	0.072	-0.03

ELI: Elite; PRO: non-elite Professional; AMA: top Amateur; U18: Elite Under 18; FEM: elite Female
*p<0.05;
**p<0.001

SITUATION OF DOPING IN TECHNICAL STAFF MEMBERS OF SPANISH FOOTBALL TEAMS

Morente-Sánchez, J. & Zabala, M.

Department of Physical Education and Sport.

Faculty of Sport Sciences (University of Granada)

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Situation of doping in technical staff members of Spanish football teams

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Situation of doping in technical staff members of Spanish football teams.

Authors: Jaime Morente-Sánchez, Mikel Zabala

Faculty of Sport Sciences, University of Granada, Spain.

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Address for correspondence:

Jaime Morente Sánchez

Faculty of Sport Sciences, (University of Granada). Department of Physical Education and Sport. Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +34 651775666; Fax: +34 958244369

Mail: jaimemorente@ugr.es

Abstract

The aim of this study was to know the situation of doping in relation to attitudes, beliefs and knowledge in technical staff members of Spanish football teams. The sample was comprised of 237 participants (34.45±8.59 years), from the different stakeholders of 88 football teams from elite to under-eighteen categories: Coaches -COA- (n=101), Physical trainers -PT- (n=68) and Environment (others members) -ENV- (n=68). Descriptive design was carried out using a questionnaire composed of a validated questionnaire (Performance Enhancement Attitude Scale: PEAS) and specific qualitative open-ended questions. Overall mean score from PEAS (17–102) was 31.64±10.77, respectively: COA: 31.91±11.42; PT: 31.28±9.44; ENV: 31.58±11.18; no significant differences were observed among groups. From the total sample, 57.6% did not knew the meaning of WADA; neither 84.9% knew the prohibited list; 39.2% used/recommended supplements; 5.6% recognized having used doping; 33.5% knew dopers; 87.2% stated that "a different doping treatment among sports" existed, considering "cycling" as the most persecuted (62.6 %) and "team sports" the less (27.2%; while "football" was 15%). A difference regarding treatment among sports was emphasized and a dangerous lack of knowledge was showed highlighting anti-doping educational programs to prevent are desirable in all football stakeholders, not just athletes.

Introduction

The presence of doping in football is a taboo topic but not a new phenomenon. Waddington, Malcolm, Roderick, and Naik (2005), showed specific cases of former Premier League players recognizing the use of "pep pills" before matches and, on the other hand, it was emphasized that the use of doping could be highly organized in Italian football in 1990s. Habitually sport news focused on doping cases is related to athletes, but often other stakeholders are also implied. In 1998 (same year as Festina Case in cycling) a famous Italian coach, Zdenëk Zeman accused Juventus football club physicians of doping their players from 1993 until 1998, a period of great success for the team (Hamil, Morrow, Idle, Rossi, & Faccendini, 2010). A Turin judge launched an investigation and found 281 different medicines on their training ground the normal stock of a small-sized hospital (Hamil et al., 2010). In 2001-2002 Edgar Davids, Dutch international football player, tested positive for the use of the banned substance, Nandrolone. Davids was ultimately banned from the game for four months, though as he served most of the ban over the summer period and the real impact of the ban was almost none (Hamil et al., 2010). After this case, the Davids' football club doctor was found guilty of supplying and administering illegal substances, though the football club escaped punishment (Hamil et al., 2010). Hence, unfortunately, doping in football should be studied exhaustively in different stakeholders to intervene efficiently on those potentially risky groups.

To fight against doping in sport it has been studied by medical, physiological and social science researchers in recent years (Petróczi & Aidman, 2009). Due to the absence of more objective information on use of banned performance enhancing substances (PES), researches have been looking for predictors of doping behaviour for years. Some researches have related doping behavior and supplement use, concluding that doping use is three and a half times more prevalent in supplements users compared with non-users and emphasized that that

finding is accompanied by significant differences in doping attitudes, norms and beliefs (Backhouse, Whitaker, & Petróczi, 2013). In the same way, others studies have showed that attitudes towards doping could be a predictor of doping practices Lucidi et al., (2008).

Most of recent research regarding doping in sport is focused on the study of prevalence of use, attitudes or knowledge in a separate way using big and non-specific samples composed of high-level athletes from different sports such as sailing (Rodek, Sekulic, & Kondric, 2012), judo (Kim et al., 2012), swimming (Sajber, Rodek, Escalante, Olujić, & Sekulić, 2013), tennis (Kondric, Sekulic, Uljevic, Gabrilo, & Zvan, 2013), weightlifting (Rodek, Idrizović, Zenić, Perasović, & Kondrič, 2013) or cycling (Morente-Sánchez, Mateo-March, & Zabala, 2013), but there were a few specific studies that reviewed attitudes, beliefs and knowledge regarding doping in football players (Morente-Sánchez & Zabala, 2013). Ama, Betnga, Moor, and Kamga, (2003) assessed 1116 amateur footballers from Cameroon. Nevertheless results should be analyzed carefully due to the different sociocultural context (i.e. 16% consumed alcohol drinks before matches and 7% footballers assessed also confessed using cocaine). On the other hand, Waddington et al. (2005) developed a research in English professional footballers focused on their use of supplements and sources of information, their experience of and attitudes towards drug testing, their views of banned PES and recreational drugs and their personal knowledge of players who used such drugs. Scientific research about doping is focused on athletes, in these previous cases on footballers, but there is an important lack of information about other implied stakeholders such as football teams' technical staff members.

We have carried out a study focused on Spanish football teams' technical staff members using a questionnaire composed of a validated scale to assess attitudes towards doping (Performance Enhancement Attitude Scale: PEAS) (Petróczi & Aidman, 2009) and also specific qualitative open-ended questions to assess other aspects such as use of supplements,

beliefs, and knowledge to analyze the current situation efficiently and detecting those potentially risky groups.

There are multiple reasons why we consider this study as very important. Firstly, the high quality of the sample with more than 2000 technical staff members of Spanish football teams from different categories including elite (n=68). Secondly, the scandal of Puerto case in Spain (2006-2013) involved an important number of athletes, but also figures such as doctors, coaches and other stakeholders in connection with different types of sports (as football), therefore, the image of Spanish football on the whole was also damaged. Therefore, the aim of this study was to know the situation of doping in relation to attitudes, beliefs and knowledge in technical staff members of Spanish football teams**.**

Methods

Sample

All of 237 participants of this study (34.45±8.59 years) were under-licensed members of Spanish football teams' technical staff. A total of 88 football teams from different categories accepted to participate in this study. In Spain there are 8 male categories but we only took the four first ones into account: 1st and 2nd division (elite), 2nd division "B" (non-elite professional) and 3rd division (top amateur). The sample of female football teams was from 1st division. The U18 teams were from U16 and U18 top categories. The characteristics of the sample are shown in table 1. The total sample was divided into three groups: Coaches -COA- (n=101), Physical trainers -PT- (n=68) and Environment (others members) -ENV- (n=68). We consider not creating more groups not to disseminate the sample. Football clubs were advised that ENV should be composed of those members who belonged to technical staff but they were not coaches neither physical trainers (i.e. physiotherapist, doctor, or psychologist). Ethics Committee approved the testing protocol and data handling.

table 1 near here

Measures

Descriptive design was carried out using a validated questionnaire to assess attitudes towards doping (Performance Enhancement Attitude Scale: PEAS) (Petróczi & Aidman, 2009) and also specific qualitative open-ended questions to get complementary information. The PEAS is composed of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that support the use of banned substances in sport. So, the mean scores range from 1 to 6 and overall score from 17 to 102, with higher scores representing a more permissive attitude toward doping. This scale has been used in previous studies and has shown good psychometric properties (Morente-Sánchez et al., 2013; Petróczi & Aidman, 2009; Uvacsek et al., 2011). Cronbach's α values were calculated as a measure of internal consistency; it was found Cronbach Alpha values ranging from 0.70 to 0.74 among all the groups assessed. According to Nunnally (2010) the cut-off value of 0.7 was considered to determine acceptable scale reliability.

Concerning technical staff members' own experience, knowledge and beliefs an "ad-hoc" qualitative open-ended questionnaire was used. A similar version of this questionnaire was used in other previous studies summarized in Morente-Sánchez et al. (2013). Participants were asked to answer to several questions related to different topics: 1) use of supplements; and which; 2) knowledge: self-assessment, meaning of WADA, categories of prohibited list, what type of substance Clenbuterol is and inclusion criteria in prohibited list; 3) words associated with doping; 4) reasons for initiation into doping; 5) agents responsible for doping; 6) differences between among sports regarding doping and more/less persecuted sports; 7) questions about "others": Have you seen another person inciting or being incited to dope?; do you know somebody that has used banned substances?; which percentage of footballers do you think that use doping? (% Projected use); 8) questions about "yourself": has doping been

suggested to you?; have you ever used doping?; 9) hypothetical magic drug scenarios (modified from Bloodworth, Petróczi, Bailey, Pearce, and McNamee, 2012); 10) how do you feel about your corporal image?; and, finally 11) proposed solutions.

Data collection

Data were collected during season 2012-2013. First, we looked for a first contact by email to present the study and the collaboration proposal. If we did not receive a negative answer we requested a technical staff member's email or phone contact to explain the procedure and send the material (formal presentation letter of the study, anonymous and voluntary questionnaires and a empty, prepaid-sealed and redirected envelope). All the material was introduced in another envelope and sent to the football club office. A total of 88 football teams accepted to collaborate in the study, considering for the entire sample a mean of 1-2 coaches (COA), 1 physical trainer (PT) and 1 other technical staff member (ENV) per team, the potential total sample would have been of 308 participants. However, 237 questionnaires, and their respective informed consent form, were returned (total response rate 76.9%; relative response rate was: 76.5% in COA and 77.2% in PT and ENV, respectively).

Participation was completely voluntary and, after the participants gave written informed consent, the anonymous questionnaires were self-administered. To provide the participants with a sense of security, and thus to obtain reliable data, the principle of anonymity was secured. We recommended completing the questionnaire before a training session or in a pre-match trip. There was no time limit for completing it. Once all the interested players' questionnaires were completed, they were picked up and sent back to first author address by means of the sealed and prepaid envelope.

Analyses

Data characteristics are shown as frequencies, percentages, means, and standard deviations. For the PEAS, the Kolmogorov-Smirnov Test was applied to ensure a Gaussian distribution of the results. Data followed a non-normal distribution; furthermore a non-parametric analysis was conducted. The Mann-Whitney U-test, using Bonferroni post-hoc correction, was carried out. Spearman's correlation coefficient was also used to assess the relationships between PEAS and other analysed variables. Statistical analyses were performed using IBM-SPSS 20.0 software.

Results

PEAS - Performance Enhancement Attitude Scale

In general, the mean overall score (17–102) was 31.64±10.77. Taking the different analyzed groups into account, overall scores were, respectively: COA: 31.91±11.42; PT: 31.28±9.44; ENV: 31.58±11.18; no significant differences were observed among groups.

Open-ended qualitative questionnaire

The data obtained were expressed in terms of percentage of participants who made a specific statement (%). Different groups (COA, PT, ENV and Total sample) were compared. A summarize of results from yes-no qualitative questions are shown in 43. Below, we show results from different variables analyzed:

Regarding the use of supplements relative percentages of use are shown in table 3. Although 66.8% of supplements users did not specify what substance they took, the most mentioned supplements were vitamins (9.5%) amino acids (7.3%), and recovery substances (5.6%).

table 2 near here

Concerning knowledge about doping percentages of correct (figure 1) and incorrect answers, which were bigger than correct ones, are shown in table 4. Taking into account the percentage of correct answers a coefficient of knowledge was calculated (%). Regarding self-assessment of knowledge there were significant differences among different analyzed groups (table 2).

The three most mentioned words is association with doping were “cheating” (28.20%), “health” (11.5%), and “lie” (9.8%). In the group comparison, the most repeated word was “cheating”: COA (23.8%), PT (42.4%), and ENV (20.9%). The three most mentioned reasons pointed out were “performance” (34.3%), “sport achievements” (19.5%) and “money” (10.2%). Taking into account the different groups, the most repeated reason was “performance: COA (34.7%), PT (31.3%), and ENV (36.8%). And, the three most mentioned responsible agents involved were “doctor” (33%), “players” (11%), and “coach” (10%). In relation to different analyzed groups, the most suggested agent responsible of doping was “doctor”: COA (34.3%), PT (22.9%), and ENV (43%). About differences among sports regarding doping treatment, the vast majority (87.2%) stated that regarding doping there was “a different treatment among sports” (table 3), being cycling the most persecuted (62.60%) and “team sports” the less one (27.2%; specially “football”, 15%).

table 3 near here

For the question, “which percentage of footballers do you think that use doping?” (% Projected use), significant differences were found among different analyzed groups (table 2). On the other hand, participants also were asked about others and about themselves; results are shown in table 3.

figure 1 near here

table 4 near here

Concerning hypothetical magic drug scenarios according to previous studies (Bloodworth et al., 2012), in questions when hypothetical situations regarding using prohibited substances or methods were presented, athletes were asked to indicate their own willingness to take the substance or method, and estimate the likelihood of other athletes doing the same. Also, They were asked about their self-perceived own body image (table 5).

table 5 near here

Finally, and taking into account that a half of the sample did not give a specific response (51.7%), the three most mentioned suggestion to eradicate doping in sport was "more controls" (24.20), "prevention since earliest ages" (6.4%), and "education-awareness" (6.4%); in relation to different groups, the most mentioned one was "more control", being respectively: COA (25%), PT (23.5%), and ENV (23.5%). Regarding relationships between PEAS and other analysed variables Spearman' correlation coefficients are shown in table 6.

table 6 near here

General Discussion

Results from this research emphasized that Spanish football teams' technical staff members are aware of the phenomenon of doping. They recognized themselves like the main doping responsible agents and one of three knew somebody that used doping. They strongly highlighted the existence of a different treatment regarding doping, being considered cycling like the most persecuted and team sports like the less, specially their own sport: football, as the less one. Moreover, results from the open-ended qualitative questionnaire have shown interesting and specific data (e.g., self-assessment of knowledge, reasons for use or percentage projected use). A worrying lack of knowledge was showed accentuating, as

consequence, that anti-doping education programs to prevent are necessary not only in players, also in all football stakeholders.

Several studies shown and compared PEAS overall scores between confessed doping users and non-users. One of them (Uvacsek et al., 2011), among 82 Hungarian competitive (non-elite) athletes assessed, confessed doping users (12%) scored, as expected, significantly higher on the PEAS ($p<0.05$) when compared with those who reported no use of banned drugs (46.8±13.32 and 34.43±8.74, respectively). Morente-Sánchez, Freire, Ramírez-Lechuga and Zabala (2012a) analysed a big sample of amateur cyclists (n=2022; confessed users = 164; non-user = 1858) obtaining the following scores respectively (48.87±15.85 and 40.98±11.95; $p<0.05$). Other study (Morente-Sánchez et al., 2013) assessed attitudes towards doping in Spanish National Cycling Teams (n=72) taking into account the Olympic discipline obtaining the following results: total sample 36.12±9.39; Mountain Bike: 30.28±6.92; Bicycle Motocross: 42.46±10.74; Track: 43.22±12.00; Road: 34.91±6.62. Concerning the present study it is suggested that Spanish football teams' technical staff members are possibly the less permissive ones. We consider that it is an important finding because they are considered like a very important influence in athletes (Mazanov, Backhouse, Connor, Hemphill, & Quirk, 2013).

Regarding use of supplements we observed that almost 40% of the sample had been used or recommended them, being this value higher in physical trainers (50.7%); probably because they were who had most education related to this topic. Moreover, results from this question showed a small positive and significant correlation with PEAS ($rs=0.188$; $p<0.001$). Anyway, we emphasize these findings since there is studies that stated that doping use is 3.5 times more prevalent in supplements users compared with non-users (Backhouse et al., 2013).

Football coaches were significantly ($p<0.05$) the least educated (36.14% of correct answers) regarding the sum of correct answers related to doping knowledge questions (knowledge

score); while ENV group (mainly comprised of doctors and physiotherapist), obtained the highest correct answers score (51.84) while coaches, often former players, showed a lack of knowledge. Despite of this fact we observed an important knowledge problem since only 15% of the total sample knew the prohibited list while almost 60% did not know the meaning of WADA. Similarly, in other studies just 25% of doctors assessed (n=123) knew the prohibited list (Panagiotis, Ourania, Christos, & Jannis, 2006). In general, participants of our study provided themselves a low self-assessment knowledge mark (3.8/10) what we consider a dangerous data since the sport career of their players, above all professionals, could depend on not failing a drug test and the lack knowledge could imply consuming a non-permitted substance because of ignorance. Waddington et al (2005), observed that 20% of this professional footballers from UK assessed reported an use of supplements on their own without taking advice. Similar data were highlighted by Backhouse and Mckenna (2011) in a review about doping in sport from perspective of medical practitioners. These authors concluded that an insufficient education, leading to a lack of awareness and understanding, could render this professional group at risk of doping. Following these authors, we recommend all the stakeholders involved in Spanish professional football that take steps to ensure that all members of a football team, not only players, are provided with appropriate advice on the use of supplements.

More specific information was obtained by means of *ad-hoc* open-ended qualitative questions related to "words associated to doping", "reasons for use", or "agent responsible". In this order, it has been shown that the words most mentioned for those ones were "cheating", "performance" and "doctor", respectively. Similar results were found in study carried out with the Spanish Olympic national cycling teams (Morente-Sánchez et al., 2013): "cheating" (49%), "sport achievement" (46%) and "doctor" (53%) were the most mentioned. There were no many studies that assessed sample comprised of football technical staff members neither

footballers, but a few in others sports. Regarding agents responsible for doping, similar open-ended questionnaire was used with a sample of 87 Spanish cycling team managers who recognized themselves like the main responsible (Morente-Sánchez, Mateo-March, Freire, & Zabala, 2014). In addition, Zabala, Sanz, Durán, & Morente-Sánchez, 2009) stated that for professional cyclists the main responsible agents that suggest doping were in this order, team managers, doctors, and cyclists, while for the team managers the responsibles were the pressure of sponsors, cyclists and team managers, and finally, doctors. Curiously, Waddington et al. (2005) stated that for English professional footballers, the club doctor was the least used source of advice (15%), while the main one was the physiotherapist (28%) or physical trainer (21%). Due to the fact that samples assessed recognized themselves like responsible agents, we suggest again that it is important supporting awareness and permanent education in all professional groups assessed in addition to football players, because of their recognized and important influence on athletes (Lentillon-Kaestner & Carstairs, 2010).

The vast majority of Spanish football teams' technical staff members emphasized the existence of "different treatment among sports". In addition, it was interesting to observe that they considered honestly "team sports" and especially "football" like the least persecuted and "cycling" like the most one. These opinions are in accordance with other studies (Alaranta et al., 2006). In fact, Waddington et al., (2005) detected a minor number of antidoping controls in English professional football by means of players assessed's statements who recognized to be tested, only about 33% per year. In addition 60% felt that they were unlikely to be tested in the next year. We consider although it is very difficult to eliminate these differences among sports while privileges exist in specific sports, equity and justice in different treatment among sports should be empowered to eradicate this situation.

Focused on direct questions about others and self, we consider that this study provides very useful and remarkable information. In general, almost 5% of Spanish football teams' technical staff members recognized having been suggested to dope in past, being "coaches" who showed higher values (9.1%). We suggest that it is due to that most of football coaches are former football players and consequently, they could have seen more doping practices than others. The prevalence of doping users has been assessed in other studies in samples comprised of athletes from different sports. Lazuras, Barkoukis, Rodafinos, and Tzorbatzoudis (2010) analyzed a sample of 750 Greek elite athletes and 4.3% recognized that they used doping substances. Hence, Uvacsek et al. (2011) observed that 14.6% athletes participating in this study (n=82) admitted using banned PES. On the other hand, Pitsch, Emrich, and Klein, (2007) using other assessment instrument such as an interview, reported a higher prevalence about their current use of doping practices, and 25.8% admitted having taken banned substances (n=448 German top athletes).

Doping is a non-comfortable topic for sporting world people and it was checked in this study. The prevalence was often higher when questions were related at "others" than questions focused on participants' own doping behaviour. So, when Spanish football teams' technical staff members were asked about other people's doping behaviour, frequencies were higher, in fact one third of the total sample knew personally doping users. Likewise, according to Waddington et al., (2005), thirty four percent of professional English football assessed (n= 706) stated that other players were using doping, and 6% also indicated that they knew personally doping users. Regarding projected use, Alaranta et al. (2006) also observed that thirty percent of Finnish elite athletes assessed from different sport (n=446), 14% in team sport group (n=152), knew banned performance enhancing substances users. In our study, the mean percentage of projected use was 10.49%, the highest result was found in PT group (12.42%) and the lowest in ENV group (7.9%). We found contradictory, as consequence,

suspicious results, above all in members of ENV group, comprised of medical staff mainly, since they were who knew the largest number of dopers, while their projected use was the lowest one. In addition, in the same group, also in general, only 3% had been suggested to doping practice but 16.4% of members of this group had seen other people inciting or being incited. Concerning doping in sport, the "false consensus effect" (Petróczi, Mazanov, Nepusz, Backhouse, & Naughton, 2008) seems to play a key role in legitimizing the use of banned substances. It means that an individual's decision to take banned substances is influenced by the assumption that his or her competitors are also taking drugs.

Regarding hypothetical "magic" drug scenario questions (Bloodworth et al., 2012; Bloodworth & McNamee, 2010), interesting data were reported. The 13.3% would use the substance that would significantly enhance performance if it would be completely undetectable, increasing this positive answer until 25.7% if this magic drug had no side effects. The vast majority (87.1%) believed that other athletes would take the magic drug. Spanish football teams' technical staff members were very aware of any reduction in lifespan arising from doping, and positive answers for that questions were lower. Our results are similar to findings from previous mentioned studies but in contrast to Goldman, Bush, and Klatz (1984), who reported that 103 of 198 world class athletes (52%) would take a "magic drug" that would guarantee success for the next five years, it could cause cause death immediately thereafter. Similarly, in other study (Connor, Woolf, & Mazanov, 2013) it was observed that 25 of 212 north-American elite athletes assessed indicated that they would take the substance (no death condition). Focusing on football studies, Waddington et al. (2005) observed that 5% of English footballers evaluated would take banned PES if it could guarantee them selection for the national team in the next world cup. About corporal image, we detected a significant negative correlation ($rs=-0.152;p<0.05$) between this variable and attitudes towards doping for Spanish football teams' technical staff members. In a study with

2022 amateur cyclists (Morente-Sánchez, Freire, Ramírez-Lechuga, & Zabala, 2012b) it was also observed a similar negative correlation between PEAS and self-Esteem so that the higher score in PEAS, the lower self-esteem. Consequently, we propose that it would be noteworthy to analyze this relationship in further studies, specially in those contexts as body building in which aesthetic component is considered as very important.

Concerning proposal of solution, almost half of the sample assessed (51.7%) did not answer this question, when they were asked about what they would do to eradicate the phenomenon of doping in sport, what could mean a worrying indifference toward doping among participants. From all those that answered, the proposed option was "more controls" (24.2%). This proposal also was the most mentioned for Spanish national cyclists but in a higher percentage (43.05%), followed by “prevention at early ages” (Morente-Sánchez et al., 2013), being this one latest the third most mentioned in this study (6.4%). According to different studies (Alaranta et al., 2006; Backhouse et al., 2011; Morente-Sánchez & Zabala, 2013), if we educate athletes since early ages they could be made more and more aware of doping, and although the effect is difficult to be seen immediately, it should appear sooner than later with a potential benefit in attitudes towards doping. Anyway, increasing drug testing in sport is not synonymous of success due to the high rate of positive drug testing hidden or non-detected in the past such as Lance Armstrong’s case (Morente-Sánchez & Zabala, 2013; Backhouse et al., 2013; Kondric et al., 2013). In terms of Lentillon-Kaestner (2013) the fight against doping is not over and according to Peters, Schulz, Oberhoffer, and Michna, (2009) and Lentillon-Kaestner, Hagger, and Hardcastle (2012), in this fight against doping, preventive measures are necessary to create and reinforce non-permissive attitudes towards doping at an early stage.

Finally, focusing on football in particular, according to previous studies (Mazanov et al., 2013) results of this research confirm gaps regarding knowledge about doping rules, not only in football players, also in Spanish football teams’ technical staff members. Results

emphasized the idea of reinforcing the education focused on doping in different sporting contexts (Backhouse et al., 2013) with the aim of that all technical staff members of a football team are highly qualified in this field and consequently, footballers could be properly advised. We consider that descriptive studies to design effective intervention programs should be carried out by means of the same or similar tools in every sport or area so that better comparisons could be made, data could be more reliable and practical applications could be developed more efficiently. It is suggested that if stakeholders fight together in this battle against doping we will have real possibilities to make sport competitions healthier and cleaner minimizing the doping culture.

Conclusions

Spanish football teams' technical staff members are not permissive concerning banned substances use. One third of participants knew somebody that used doping and they recognized themselves like the main doping responsible agents. They strongly highlighted the existence of a different treatment regarding doping, being considered cycling like the most persecuted and team sports like the least one, specially their own sport: football. A worrying lack of knowledge was showed underlining as consequence that anti-doping education programs to prevent are desirable not only in players, also in all football stakeholders that play an important role in relation to their influence on athletes' decisions and behaviour.

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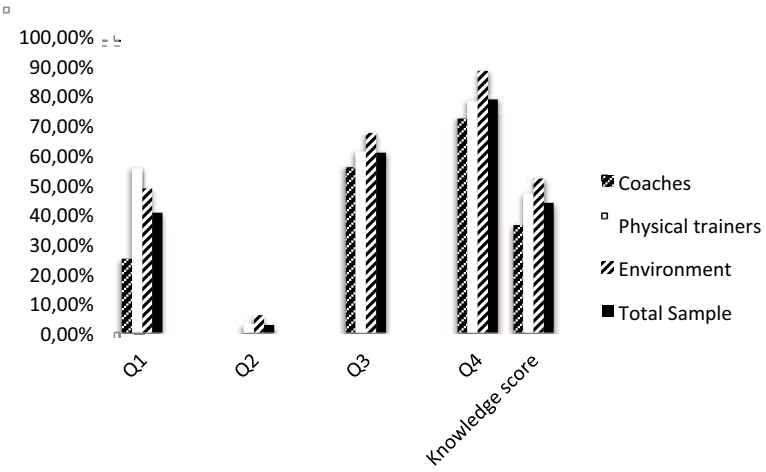

Q1: "Do you know the meaning of acronym "WADA"? yes/no question. If "yes", write it; Q2: "Do you know the prohibited list? Yes/no question. If "yes" write it; Q3: "Clenbuterol is…" (4 answer multiple choice question); Q4: WADA's criteria of inclusion in prohibited list (4 answer multiple choice question).

Figure 1. Percentage of correct answers for questions (1-4), knowledge score and, comparisons between members of Spanish football teams' technical staff (Coaches, physical trainers and other technical staff members –environment-).

Table 1. Characteristics of different groups that composed the sample

Category*	COA (n=101)	PT (n=68)	ENV (n=68)	Total sample (n=237)
FEM	0	2	6	8
ELI	25	16	27	68
PRO	28	15	20	63
AMA	28	21	7	56
U18	20	14	8	42

*ELI: Elite; PRO: non-elite Professional; AMA: top Amateur; U18: Elite Under 18; FEM: elite Female
**COA: Coaches; PT: Physical trainer; ENV: Environment (other technical staff members, no COA, neither PT)

Table 2. Descriptive statistics and comparisons between members of Spanish football team technical staff (Coaches, physical trainers and others technical staff members –environment-) for the different variables analyzed.

	COA (n=101)		PT (n=68)		ENV (n=68)		Total sample (n=237)		p
	mean	SD	mean	SD	mean	SD	mean	SD	
Age (years)	36.83	9.21	30.48	5.92	34.83	8.60	34.45	8.59	p=0.000 (1-2); p=0.004 (2-3)
Self-assessment of knowledge (0-10)	3.13	2.45	4.11	2.09	4.39	3.06	3.78	2.61	p=0.007 (1-2;) p=0.012 (1-3)
Overall Score (17-102)	31.91	11.42	31.28	9.44	31.58	11.18	31.64	10.77	ns
Projected use (%)	11.09	13.76	12.42	13.32	7.9	15.16	10.49	14.13	p=0.001 (1-2); p=0.000 (2-3)
Knowledge score (0-100)	36.14	24.10	46.69	26.59	51.84	26.74	43.67	26.38	p=0.008 (1-2); p=0.000 (1-3)

COA: Coaches; PT: Physical trainer; ENV: Environment (otherstechnical staff members, no COA, neither PT)
Differences between specific groups taking into account supraindexed numbers
NS: no significant differences were found

Table 3. Summarize of results from yes-no qualitative questions (%).

Dou you use supplements or ergogenic aids?	COA (n=98)	PT (n=67)	ENV (n=67)	Total Sample (n=232)
No	72.40	49.30	55.20	60.80
Yes	27.60	50.70	44.80	39.20
Do you know the meaning of acronym WADA?	COA (n=99)	PT (n=64)	ENV (n=68)	Total Sample (n=231)
No	74.70	39.10	50.00	57.60
Yes	25.30	60.90	50.00	42.40
Do you know the prohibited list of WADA?	COA (n=99)	PT (n=66)	ENV (n=67)	Total Sample (n=232)
No	93.90	80.30	76.10	84.90
Yes	6.10	19.70	23.90	15.10
Regarding doping, are there difference among sports?	COA (n=94)	PT (n=65)	ENV (n=67)	Total Sample (n=226)
No	14.90	9.20	13.40	12.80
Yes	85.10	90.80	86.60	87.20
Have you ever use banned substances?	COA (n=99)	PT (n=67)	ENV (n=67)	Total Sample (n=233)
No	91.90	94.00	98.50	94.40
Yes	8.10	6.00	1.50	5.60
Do you know somebody that has used banned substances?	COA (n=99)	PT (n=67)	ENV (n=67)	Total Sample (n=233)
No	65.70	68.70	65.0	66.50
Yes	34.30	31.30	34.30	33.50
Have you been suggested to dope?	COA (n=99)	PT (n=67)	ENV (n=67)	Total Sample (n=233)
No	90.90	97.00	97.00	94,40
Yes	9.10	3.00	3.00	5.60
Have you seen other people inciting others or being incited?	COA (n=98)	PT (n=67)	ENV (n=67)	Total Sample (n=232)
No	85.0	85.10	83.60	84.90
Yes	14.30	14.90	16.40	15.10

COA: Coaches; PT: Physical trainer; ENV: Environment (other technical staff members, no COA, neither PT)

Table 4. Percentage of correct/incorrect answers for questions (1-4) about knowledge and comparisons between members of Spanish football team technical staff (Coaches, physical trainers, others technical staff members – environment- and Total sample).

Q1	COA (n=101)	PT (n=67)	ENV (n=68)	Total Sample (n=236)
Incorrect (%)	75.2%	44.8%	51.5%	59.7%
Correct (%)	24.8%	55.2%	48.5%	40.3%
Q2	**COA (n=101)**	**PT (n=68)**	**ENV (n=68)**	**Total Sample (n=237)**
Incorrect (%)	100,00%	97.1%	94.1%	97.5%
Correct (%)	0,00%	2.9%	5.9%	2.5%
Q3	**COA (n=97)**	**PT (n=64)**	**ENV (n=67)**	**Total Sample (n=228)**
Incorrect (%)	44.3%	39.1%	32.8%	39.5%
Correct (%)	55.7%	60.9%	67.2%	60.5%
Q4	**COA (n=93)**	**PT (n=63)**	**ENV (n=67)**	**Total Sample (n=223)**
Incorrect (%)	28,00%	22.2%	11.9%	21.5%
Correct (%)	72,00%	77.8%	88.1%	78.5%
knowledge score (%)±SD	36.14±24.10	46.69±25.53	51.84±26.737	43.67±26.382

COA: Coaches; PT: Physical trainer; ENV: Environment (others technical staff members, no COA, neither PT)
Q1: "Do you know the meaning of acronym "WADA"? yes/no question. If "yes", write it; Q2: "Do you know the prohibited list? Yes/no question. If "yes" write it; Q3: "Clenbuterol is…" (4 answer multiple choice question); Q4: WADA's criteria of inclusion in prohibited list (4 answer multiple choice question).

Table 5. Percentage of selected answers for Hypothetical magic drug scenarios and comparisons between members of Spanish football team technical staff (Coaches, physical trainers, others technical staff members – environment- and Total sample).

Undetetable PES. Would other athletes use it?	COA (n=99)	PT (n=67)	ENV (n=66)	Total Sample (n=232)
Yes. all of them	5.1%	4.5%	6.1%	5.2%
Yes. probably most of them	38.4%	46.3%	24.2%	36.6%
Yes. probably some of them	44.4%	44.8%	47,00%	45.3%
No. none of them	4,00%	1.5%	7.6%	4.3%
I do not know	8.1%	3,00%	15.2%	8.6%
Undetectable PES. Would you use it?	COA (n=97)	PT (n=66)	ENV (n=68)	Total Sample (n=231)
Yes. definitely	2.1%	0,00%	2.9%	1.7%
Yes. probably	11.3%	12.1%	10.3%	11.3%
Probably not	21.6%	42.4%	19.1%	26.8%
Definitely not	59.8%	37.9%	58.8%	53.2%
I do not know	5.2%	7.6%	8.8%	6.9%
Undetectable PES with no side effects. Would other athletes use it?	COA (n=99)	PT (n=67)	ENV (n=68)	Total Sample (n=234)
Yes. definitely	9.1%	9,00%	2.9%	7.3%
Yes. probably	16.2%	20.9%	19.1%	18.4%
Probably not	18.2%	29.9%	19.1%	21.8%
Definitely not	51.5%	35.8%	51.5%	47,00%
I do not know	5.1%	4.5%	7.4%	5.6%
Undetectacble PES but shortened lifespan. Would other athletes use it?	COA (n=98)	PT (n=67)	ENV (n=67)	Total Sample (n=232)
Yes. definitely	0,00%	0,00%	0,00%	0,00%
Yes. probably	1,00%	1.5%	0,00%	0.9%
Probably not	4.1%	9,00%	9,00%	6.9%
Definitely not	93.9%	86.6%	86.6%	89.7%
I do not know	1,00%	3,00%	4.5%	2.6%
Are you happy with your body image?	COA (n=99)	PT (n=67)	ENV (n=66)	Total Sample (n=232)
Very unhappy	0,00%	0,00%	0,00%	0,00%
Unhappy	7.1%	3,00%	6,00%	5.6%
Indifferent	10.1%	12.1%	17.9%	12.9%
Happy	59.6%	59.1%	56.7%	58.6%
Very happy	23.2%	24.2%	19.4%	22.4%
I do not know	0,00%	1.5%	0,00%	0.4%

COA: Coaches; PT: Physical trainer; ENV: Environment (other technical staff members, no COA, neither PT)

Table 6. Spearman's correlation coefficients between PEAS and other analyzed variables.

	PEAS			
	COA (n=99)	PT (n=67)	ENV (n=66)	Total Sample (n=232)
Others				
have you seen another person inciting or being incited to dope?	0.128	0.366**	0.173	0.206**
do you know doping users?	0.153	0.313**	0.105	0.178**
% projected use in your sport	0.058	0.186	0.121	0.124
Self				
do you use supplements?	.225*	0.128	0.187	0.188**
Differences among sports regarding doping	-0.052	-0.007	0.092	0.004
has doping been suggested to you?	.239*	0.005	-0.063	0.118
have you ever used doping?	-0.123	-0.139	-0.305*	-0.191**
body image	-0.174	-0.143	-0.161	-0.152*
Self-assessment of knowledge	0.011	0.297*	-0.023	0.067
Knowledge overall score	-0.036	0.133	0.187	0.081

COA: Coaches; PT: Physical trainer; ENV: Environment (other technical staff members, no COA, neither PT)
*p<0.05;

ATTITUDE TOWARDS DOPING IN SPANISH SPORT SCIENCES UNIVERSITY STUDENTS ACCORDING TO THE TYPE OF SPORT PRACTICED: INDIVIDUAL VERSUS TEAM SPORT.

Morente-Sánchez, J.[1], Mateo-March, M.[2], Freire, C.[1], & Zabala, M[1].

[1]Department of Physical Education and Sport; Faculty of Sport Sciences (University of Granada)

[2]Faculty Miguel Hernández, University of Elche (Valencia; Spain)

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Corresponding Author: Mr. Jaime Morente-Sánchez, M.D.

Corresponding Author's Institution: Faculty of Sport Sciences

First Author: Jaime Morente-Sánchez, Msc

Order of Authors: Jaime Morente-Sánchez, Msc; Carmen Freire-SantaCruz, Msc; Manuel Mateo-March, Msc; Mikel Zabala,Dr

Abstract:
Introduction
The aim of this study was to understand the attitude towards performance-enhancing drugs (PED) in Spanish Sport Sciences university students and whether it varied according to the type of sport practised (individual, team, or both).
Synopsis of the facts
Descriptive design was carried out by means of a validated measurement instrument to assess attitudes towards doping (Performance Enhancement Attitudes Scale: PEAS) using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that support the use of doping in sport. In general, overall score (17-102) and mean score (1-6) of all the items was respectively 34.69±9.31; 2.04±0.55 (2=Disagree). Taking into account the type of sport practised, just for one item ("Athletes have no alternative career choices, but sport") significant differences were observed between individual sports (IS: 2.48) and the other groups team sports (TS: 2.07) and both types of sport (BS: 2.00) -p=0.015-.
Conclusions
Spanish Sport Sciences university students in general disagree with the use of performance enhancing drugs in competitive sport. For subjects who are not professionally involved in any sports, there are no differences in attitudes towards doping in relation to the type of sport practised (individual, team, or both).

Short note

Attitude towards doping in Spanish Sport Sciences university students according to the type of sport practised: individual versus team sports

Summary

Introduction

The aim of this study was to understand the attitude towards performance-enhancing drugs (PED) in Spanish Sport Sciences university students and whether it varied according to the type of sport practised (individual, team, or both).

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Descriptive design was carried out by means of a validated measurement instrument to assess attitudes towards doping (Performance Enhancement Attitudes Scale: PEAS) using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that support the use of doping in sport. In general, overall score (17-102) and mean score (1-6) of all the items was respectively 34.69±9.31; 2.04±0.55 (2=Disagree). Taking into account the type of sport practised, just for one item ("Athletes have no alternative career choices, but sport") significant differences were observed between individual sports (IS: 2.48) and the other groups team sports (TS: 2.07) and both types of sport (BS: 2.00) -p=0.015-.

Conclusions

Spanish Sport Sciences university students in general disagree with the use of performance enhancing drugs in competitive sport. For subjects who are not professionally involved in any sports, there are no differences in attitudes towards doping in relation to the type of sport practised (individual, team, or both).

Keywords: Doping, sport, attitudes, Sport Sciences, students.

Résumé

Introduction

L'objectif de cette étude était de comprendre le comportement à l'égard des produits dopants des étudiants universitaires espagnols en sciences du sport afin de savoir si cette attitude variait en fonction du type de sport pratiqué (individuel, collectif ou les deux).

Aperçu des faits

L'étude desriptive a été réalisée au moyen d'un instrument de mesure validé pour évaluer la posture face au dopage (Echelle des posture face à l'amélioration des

performances) en utilisant une échelle de Likert allant de 1 (fortement en désaccord) à 6 (fortement en accord) pour les différentes déclarations qui appuient le recours au dopage dans le sport. En général, le score global (17-102) et moyen (1-6) de tous les éléments était, respectivement (34.69±9.31; 2.04±0.55; 2 = désaccord). En tenant compte du type de sport pratiqué, seulement pour une question ("les athlètes n'ont pas d'autres choix de carrière, seulement sportive") nous avons observé des différences significatives entre les sports individuels (IS: 2.48) et les autres sports collectifs (TS: 2.07) et pour les deux types de sport (BS: 2.00) -*p*=0.015-.

Conclusion

En général, les étudiants universitaires espagnols en sciences du sport sont en désaccord avec l'usage de produits dopants améliorant la performance lors d'une compétition. Pour les sujets qui ne sont pas engagés professionnellement dans l'un de ces sports, il n'y a pas de différences d'attitudes à l'égard des produits dopants en fonction du sport pratiqué (individuel, collectif ou les deux).

Mots clés: Dopage, sport, attitudes, Sciences du sport, étudiants.

1. Introduction

The World Anti-Doping Code considers that two of the following three criteria must be met for a substance or method to be included on the prohibited list: that it (a) enhances or has the potential to enhance performance; (b) threatens health or has the potential to do so; and (c) is opposite to the spirit of sport [1]. Due to the absence of more objective information on banned substances, attitudes are often used as an alternative to predict doping behaviour, assuming that those who use Performance Enhancement Drugs (PED) show greater leniency towards doping than those who stay clear of doping [1]. In order to prevent the use of prohibited substances to improve performance in sport it is important to study the attitudes towards doping in athletes, coaches or sport managers as well as in other professionals involved. These attitudes can be mediated by culture, studies, social environment [2] or the type of sport practiced [3].

Most of the studies support the hypothesis that subjects involved in individual sports (IS) are more likely to support the use of PED [3,4]. Peretti-Watel et al. [4] observed that consuming banned drugs was significantly more common in IS than in team sports (TS). Similar results were obtained by Alaranta et al. [3]. Nevertheless these results, like the majority of studies, were found by means of methods such as ad-hoc or non-validated questionnaires [1,5,6], which seriously undermines their validity and reliability.

Taking everything into account, we hypothesized that the type of sport practiced could influence attitudes of Sport Science university students towards doping. This group makes an interesting sample for study, since they will be involved in a sport context in the near future. Hence, the aim of this study was to understand the attitudes towards doping in Spanish Sport Sciences students and whether it might vary according to the type of sport practised (individual, team, or both).

2. Subjects and methods

2.1. Subjects

The sample was composed of 271 students 22.0±3.3 years: 221 boys, (81.5%) 50 girls, (18.5%) undertaking the Sport Sciences degree at the Faculty of Sport Sciences, University of Granada (Spain). All of them completed (by means of a personal online link) the Performance Enhancement Attitude Scale (PEAS) [5]. Participation was completely voluntary and anonymous, and subjects received a detailed explanation of the purpose and implications of the research. The study was approved by the Ethics Committee of the University of Granada.

The randomized sample was representative of the Faculty of Sport Sciences of Granada (N=910 students). The faculty of Sport Sciences of Granada was selected as the most

representative of the country because it ranks first in Sport Sciences in Spain and was the first such faculty to be included in a University, in 1988.

2.2. Procedures

Data collection was carried out by means of a validated questionnaire [5] of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that support the use of PED in sport. So, the mean scores range from 1 to 6 and overall score from 17 to 102, with higher scores representing a more permissive attitude toward doping. Three groups were made according to the practised sport (n=27, team sports: TS; n=89, individual sports: IS; n=155, both sports: BS). This validated questionnaire has been used in previous studies showing good psychometric properties [4,5].

2.3. Data analysis

Results are expressed as mean and the standard deviation (SD) for mean and overall scores in each item. Statistical analysis was carried out using SPSS version 18.0 (Chicago, IL, USA). The Kolmogorov-Smirnov test was applied to ensure a Gaussian distribution of the results, followed by the Levene's test to verify the homogeneity of variance. As the results followed a non-normal distribution, a non-parametric analysis was conducted. The Mann Whitney-U test for PEAS variables, following Bonferroni post-hoc correction was carried out (critical statistical significance: $p<0.016$). Statistical analyses were performed using IBM-SPSS 20.0 software.

3. Results

Overall and mean score of all the items was respectively 34.69±9.31; 2.04±0.55 (2=Disagree). The lowest score was observed for the item "Doping is not cheating since everyone does it" with 1.14±0.58 (1=strongly disagree), and the highest for "Athletes are pressured to take PED" with 3.72±1.31 (3=Slightly Disagree; 4=Slightly Agree). Taking into account the type of sport practiced, significant differences were observed, for the item 10 "Athletes have no alternative career choices, but sport" between IS (2.48) and the other groups: TS (2.07) and BS (2.00) ($p=0.015$). For the rest of the items no significant differences between groups were observed, including both mean and overall scores. No significant differences in relation to age, gender or frequency of practice were found either, in the overall and mean score.

Insert Table 1 and Table 2

4. Discussion

It was suggest that Sport Sciences university students from Granada, in general, disagree with the use of PED in competitive sport (34.69±9.31; 2.04±0.55; 2=Disagree).

Moreover, in comparison to other studies that also used this assessment tool (PEAS) in similar kinds of samples, it could be suggested that Spanish Sports Sciences students showed a score a little lower (34.69±9.31) than UK Sports Sciences students (36.23±13.00, age: 21.5±5.5), Canadian Sports Sciences students (37.94±11.25, age: 20.9±2.0), USA Sports Sciences students (37.57±12.60, age: 20.1±2.1) [5]. Self-confessed doping users who have also been assessed by means of PEAS (46.8±13.32) [6] showed an attitude towards doping much more lenient than Spanish Sports Sciences students. These data define the current situation and should be taken into account when undertaking prevention measures adapted to the necessities of each country that could show different scores due to different contexts (e.g. education, culture, beliefs, ideals, etc.).

In this sense, Vangrunderbeek and Tolleneer [2] focused on opinions on doping in elite sports by Human Movement Sciences students covering a period from 1998–1999 to 2005–2006 (n=555). These authors observed and discussed a shift from the zero tolerance principle towards a more lenient attitude towards doping in elite sports.

On the other hand, different treatment among different types of sports in relation to doping has been previously studied in several investigations. In fact, the results obtained in this study do not corroborate the trends detected earlier in other studies [3,4], maybe because subjects in our study are not professionally involved in any of the sports. Our results showed that in 16 of 17 items, there were no significant differences between attitudes towards PED in relation to the type of sport practised (TS, IS, or BS). Peretti-Watel et al. [4] showed that 52.8% of 996 young athletes were prone to agree with a variety of statements dealing with benefits of doping. In addition, it was more prevalent among males, older responders, those practising an individual sport without contact (such as athletics or cycling) and those registered in a training centre depending on a professional club. Alaranta et al. [3] stated that risk of doping appears to be highest in speed and power sports and lowest in motor skills demanding and team sports.

Petroczi and Aidman's study [5] must be emphasized because a specific psychometric instrument was developed and validated: the Performance Enhancement Attitude Scale (PEAS). Following these authors, a repeated use of a scale must be encouraged because it provides researchers with empirical evidence regarding the test's validity and reliability. However, in spite of having used a validated tool, we are aware that working with questionnaires has limits because answers may be intentionally false as the subjects questioned may not wish to reveal that they or their team mates use drugs, even if anonymity and confidentiality are guaranteed by the investigators [1].

We consider that this study provides interesting information on attitudes about doping from the sport professionals of the future. If a physical education teacher's task is to educate children in a certain way in addition to the upbringing by the parents [2], this is an opportunity for the sports teacher to make it clear that doping is not an option in sports. Also, Sport Sciences students are likely to become coaches, managers or assume

other roles in a sport context, so they can work closely with athletes and introduce an appropriate culture in terms of doping prevention.

We suggest that different populations (sedentary, active, or professional) and different type of sports (cycling or athletics vs. soccer or basketball) should be investigated by means of validated tools like PEAS in the future to ascertain more trends in attitudes towards doping in sport, in relation to the specific sport practised, frequency of practice or gender. In this way, we will be able to establish the correct measures to prevent it in order to win our particular battle against this phenomenon. According to Alaranta et al. [3], controlling doping only by tests is not sufficient; a profound change in the attitudes is needed, which should be monitored constantly.

5. Conclusions

Spanish Sport Sciences university students in general disagree with the use of PED in competitive sport. Moreover there are no differences in attitudes towards PED due to the type of sport practised (individual, team, or both). Further studies using the same validated assessment tools among different countries are recommended to better understand the attitude towards doping, and also to promote effective intervention programs.

Conflict of interest statement

None.

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Table 1.Descriptive statistics of the Performance Enhancement Attitude Scale (PEAS) items and mean and overall scores*.

	Spanish Sport Sciences Students (n=271)	
Performance Enhancement Attitude Scale (PEAS)	**Mean**	**SD**
1. Legalizing performance enhancements would be beneficial for sports.	1.73	1.04
2. Doping is necessary to be competitive.	1.40	0.92
3. The risks related to doping are exaggerated.	1.92	1.17
4. Recreational drugs give the motivation to train and compete at the highest level.	1.74	1.15
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1.45	1.15
6. Athletes are pressured to take performance-enhancing drugs.	3.72	1.31
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2.66	1.43
8. The media blows the doping issue out of proportion.	2.34	1.31
9. Media should talk less about doping.	2.04	1.30
10. Athletes have no alternative career choices but sport.	2.17	1.31
11. Athletes who take recreational drugs, use them because they help them in sport situations.	2.57	1.41
12. Recreational drugs help to overcome boredom during training.	1.80	1.09
13. Doping is an unavoidable part of the competitive sport.	2.04	1.36
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2.80	1.43
15. Doping is not cheating since everyone does it.	1.14	0.58
16. Only the quality of performance should matter, not the way athletes achieve it.	1.35	0.82
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1.82	1.20
Mean Score	2.04	0.55
Overall Score	34.69	9.31

*Rated as follows: 1= Strongly Disagree; 2= Disagree; 3= Slightly disagree; 4=Slightly Agree; 5=Agree; 6= Strongly Agree. SD (Standard Deviation).

Table 2.Descriptive statistics and comparison between groups for each Performance Enhancement Attitude Scale (PEAS) item, and mean and overall scores*.

	Team Sport (n=27)	Individual Sport (n=89)	Both Sport (n=155)	
Performance Enhancement Attitude Scale (PEAS)	**Mean ±SD**	**Mean ±SD**	**Mean ±SD**	***p****
1. Legalizing performance enhancements would be beneficial for sports.	1.96±1.22	1.78±1.15	1.67±0.93	NS
2. Doping is necessary to be competitive.	1.56±1.31	1.49±1.03	1.32±0.76	NS
3. The risks related to doping are exaggerated.	1.89±1.05	1.80±1.02	2.00±1.26	NS
4. Recreational drugs give the motivation to train and compete at the highest level.	1.52±0.75	1.85±1.33	1.70±1.09	NS
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1.41±0.89	1.56±1.25	1.40±1.13	NS
6. Athletes are pressured to take performance-enhancing drugs.	4.00±1.27	3.73±1.33	3.66±1.31	NS
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2.56±1.69	2.69±1.43	2.67±1.38	NS
8. The media blows the doping issue out of proportion.	2.37±1.01	2.38±1.47	2.29±1.25	NS
9. Media should talk less about doping.	1.67±1.04	2.10±1.48	2.05±1.20	NS
10. Athletes have no alternative career choices but sport.	2.07±1.52	2.48±1.37	2.00±1.20	0.006 [1-2]; 0.005 [2-3]
11. Athletes who take recreational drugs, use them because they help them in sport situations.	2.96±1.65	2.51±1.42	2.54±1.36	NS
12. Recreational drugs help to overcome boredom during training.	1.96±1.02	1.83±1.13	1.76±1.08	NS
13. Doping is an unavoidable part of the competitive sport.	2.15±1.54	2.09±1.35	1.99±1.34	NS
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2.89±1.40	2.74±1.41	2.82±1.45	NS
15. Doping is not cheating since everyone does it.	1.15±0.36	1.12±0.50	1.16±0.65	NS
16. Only the quality of performance should matter, not the way athletes achieve it.	1.44±0.80	1.33±0.79	1.34±0.84	NS
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1.81±1.27	1.96±1.28	1.74±1.14	NS
Mean score	2.08 ±0.43	2.08 ±0.61	2.01 ±0.53	NS
Overall score	35.37 ±7.35	35.44 ±10.37	34.14 ±8.99	NS

*Rated as follows: 1= Strongly Disagree; 2= Disagree; 3= Slightly disagree; 4=Slightly Agree; 5=Agree; 6= Strongly Agree
SD: Standard Deviation
[1-2] Team sports vs. Individual sports.
[2-3] Individual sports vs. Both sports.
NS: Non significant

ACUTE EFFECT OF SNUS ON PHYSICAL PERFORMANCE AND PERCEIVED COGNITIVE LOAD ON AMATEUR FOOTBALLERS

Morente-Sánchez, J.[1], Zandonai, T.[2], Mateo-March, M.[3], Sanabria, D.[4,5], Chiamulera, C.[2], & Zabala, M.[1]

[1]Department of Physical Education and Sport; Faculty of Sport Sciences. University of Granada.

[2]Neuropsychopharmacology Lab., Dept. Public Health & Community Medicine, University of Verona (Italia)

[3]Faculty Miguel Hernández, University of Elche (Valencia; Spain)

[4]Mind, Brain, & Behavior Research Center, University of Granada, Spain

[5]Department of Experimental Psychology, University of Granada, Spain

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Acute effect of Snus on physical performance and perceived cognitive load on amateur footballers

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Keywords:	Smokeless tobacco, Snus, nicotine, ergogenic aids, fitness, performance, soccer

Acute effect of Snus on physical performance and perceived cognitive load on amateur footballers

Authors: Jaime Morente-Sánchez[1], Thomas Zandonai[2], Manuel Mateo-March[3], Daniel Sanabria[4,5], Cristiano Chiamulera[2], Mikel Zabala[1]

[1]*Faculty of Sport Sciences, University of Granada, Spain.*

[2]*Neuropsychopharmacology Lab., Dept. Public Health & Community Medicine, University of Verona (Italy)*

[3] *University Miguel Hernández, Elche, Spain.*

[4]*Mind, Brain, & Behavior Research Center, University of Granada, Spain*

[5]*Department of Experimental Psychology, University of Granada, Spain*

Running head: Snus Effect Amateur Footballers' Performance

Address for correspondence:

Jaime Morente Sánchez

Faculty of Sport Sciences (University of Granada). Department of Physical Education and Sport. Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +34 651775666; Fax: +34 958244369

Mail: jaimemorente@ugr.es

Abstract

Smokeless tobacco (Snus) is a product that contains nicotine, which has been placed on World Antidoping Agency's 2013 Monitoring Program. A proliferation of nicotine use in sport has been observed in recent years but little is known regarding the actual effects of this product, especially on football players' performance. Therefore, the aim of this study was to assess the effect of Snus on physical performance, heart rate variability, subjective arousal, and mental workload in non-smokers non-snus user amateur football players. Participants were administered either Snus or Placebo forty minutes prior to a fitness test battery. Hearth rate values, global ratings of perceived exertion, perceived arousal and, perceived mental workload were collected after the Snus or Placebo administration. The fitness test battery consisted of 4 tests: Handgrip Test, Counter-movement Jump, Agility test and Yo-yo intermittent recovery test. Significant differences were observed in agility test performance (18.82±0.81 vs. 18.47±0.62 seconds), level of mental fatigue before the experimental session (4.17±2.38 vs. 2.94±1.89 points), and perceived mental load after the overall experimental session (6.37±2.16 vs. 5.44±1.83 points) (Snus vs. Placebo conditions, respectively). The outcome of the present study suggests that Snus, due to its detrimental effects on performance, is counter-indicated as an ergogenic aid.

Keywords: Smokeless Tobacco, Snus, nicotine, ergogenic aids, fitness, performance, soccer

Introduction

A recent review by Heishman et al. (2010) points to significant effects of nicotine on fine motor abilities and high-order cognitive functions such as attention and memory. Together with changes in cognitive functioning, nicotine administration has been related to significant physiological effects. For instance, Turner and McNicol (1993) observed that nicotine administration during light physical activity was related to increases in heart rate and blood pressure without effects on pulmonary function. In this study, participants were subject to treadmill exercise at an intensity corresponding to the 60% and 85% of their maximal oxygen uptake (VO_{2max}) under the effects of oral smokeless tobacco (OST). Tobacco (in comparison to a placebo condition) resulted in significant increases in heart rate, a decrease in stroke volume, and an increase in blood lactate at rest. Furthermore, due to OST-induced increase in plasma nicotine concentrations (boosting anaerobic energy production), a nicotine-induced sympathetic stimulation of the heart was suggested in other research (e.g., Van Duser and Raven, 1992). Several studies have analysed smoked tobacco effects on heart functions showing that nicotine was able to produce heart rate modulations and decreased heart rate variability (HRV) (e.g., Karakaya et al. 2007). However, a study by Mundel and Jones (2006) has shown that nicotine (administrated by patch) improved exercise endurance in the absence of peripheral changes (ventilation, heart rate, and blood metabolites) concluding that physical enhancement was attained through a central nervous system mechanism.

On 2011, nicotine was included on WADA's Monitoring Program (WADA, 2011) after some analytic chemical studies showed a proliferation of nicotine use in the sport environment (e.g., Marclay et al. 2011), presumably due to its beneficial influence on physical performance. One easy and inexpensive way of consuming nicotine is through the use of smokeless tobacco products, like Snus. In Sweden, the increasing trend of Snus' use continues in all age groups especially among those that were both smokers and Snus users (Norberg et al. 2011). Sweden

is the only nation in the European Union (EU) that granted special exemption to manufacture and sell this substance (e.g., Ahlbom et al. 2007) although there is recent evidence of Snus consumption in Switzerland (Fischer et al. 2013) and in northern Italy (Zandonai et al. 2013). Snus is of growing popularity in the sport environment due to absence of adverse effects on the respiratory system. Snus use has been associated to high intensity sports in which athletes report lower cigarette consumption than people not engaged in sport practices (Mattila et al. 2012). Some sociological studies showed that the use of Snus was more common among team sport athletes than athletes in individual sports (Martinsen and Borgen, 2012) and in males than in females (Rolandsson et al. 2014). However, there are no previous studies that have assessed the effects of this product in football players. What's more, there are no previous studies that have investigated the effect of Snus on physical performance, the subjective perceptions of effort, and mental workload in the same experiment.

In the present study, we investigated the effect of Snus acute consumption on a group of non-smokers non-snus users amateur football players using a test battery developed to assess different capacities related to physical demands in football (Reilly et al. 2009). In addition, HRV was used to check the parasympathetic and sympathetic functioning during the experimental session. Crucially, perceived physical effort, subjective felt arousal, and perceived mental workload were also assessed. The reasons why we consider this study pertinent are: 1) there are no studies assessing the effects of Snus on physical performance, perceived physical effort, and perceived mental workload in the same experiment; 2) nicotine (the major component of Snus) has been included on WADA's Monitoring Program recently; 3) Snus is a substance with growing popularity in sport; 4) No previous study has investigated the effect of Snus on football players. Therefore, the aim of this study was to assess the effect of Snus on physical performance, heart rate variability, and subjective arousal and mental workload in non-smokers non-snus users amateur football players.

Materials and Methods

Participants

A total of 18 male amateur football players (age: 22.5±1.5 years old; height 1.80±0.056 meters; weight: 75.6±7.37 kilograms; body mass index: 23.30±1.44; mean ± standard deviation) non-smokers and non-Snus users took part in this study. All participants were recruited from the Faculty of Sport Sciences, University of Granada (Spain). The study was approved by the Ethics Committee of the University of Granada and conformed to the 1964 Declaration of Helsinki.

General Design

The study was a double-blind randomly assigned crossover design, comparing the effect of Snus vs. Placebo on physical performance -measured using a Fitness test battery-, and perceived effort -measured by the rating of perceived exertion (RPE)-, felt arousal, and mental workload -measured using visual analogue scales-. The Fitness test battery consisted of 4 tests: Handgrip Dynamometric Test, Counter-movement Jump, 5 x 10 meters Agility test, and Yo-yo intermittent recovery test. The protocol consisted of two sessions (EXP1 and EXP2) with 5 days of recovery and substance wash-out between each other. A training session was carried out a week before EXP1 to ensure participants' familiarization with the tests. Half of the participants blindly received Snus on EXP1 day and Placebo on EXP2 day, and the remaining half of the participants received Placebo on EXP1 day and Snus on EXP2 day. Participants were randomly assigned to one of the two counterbalanced conditions. Each experimental session lasted for about 90 minutes. Before and after the Fitness test battery, participant's subjective arousal and mental workload was assessed (Figure 1).

Protocol

Familiarization session: Participants arrived at the Faculty of Sport Sciences of the University of Granada, by 08.00 a.m. They were informed about the study, its procedure and risks, and

then signed an informed consent before to start the experiment. Then participants performed the Fitness test battery. The experimenter supervised the correct performance of this test.

EXP1: Participants arrived at 08:00 a.m. to the laboratory. Before the start of the experimental session, they were asked the following control questions: "How many hours did you sleep last night?", and "Have you had any stimulant such as tea or coffee this morning before coming to the lab?". The use of the visual analogue scales, the perceived readiness (PR) and perceived exertion (RPE) scales was subsequently explained to the participants. Then, measurement of exhaled carbon monoxide (CO) level was performed using the EC50 Micro Smokerlyzer† (Bedfont Scientific Ltd.). After this test, participants laid down for 10 minutes in a supine position to record their basal HRV which was recorded during the entire session with a Polar RS 800 (see HRV measurement for further details). Subsequently, participants took the sachet of either Snus or Placebo from the box (for further details see Snus and Placebo in Materials section). They were instructed to place the Snus or the placebo substance in the anterior part of the mouth within the upper gingiva (Time zero = T0) and to keep it in their mouth until performance of the Yo-Yo Test. After taking the Snus or placebo, participants were invited to remain lying on a mat during 35 minutes in a supine position to record their HRV. Thirty-five minutes after intake (T0), psychological parameters (subjective arousal and mental workload) were recorded by means of a visual analogue scale. After 40 minutes from T0, participants stood up and started the Hand Dynamometric Test. Next, after a brief warm-up, participants performed a vertical jump test as indicator of instantaneous power production. The vertical jump test involved two countermovement jumps (Ergojump, Rome, Italy) interspersed by 1 min rest. Only the best jump from each subject was used in data analysis. Next, agility was assessed by means of a 10 x 5m Agility test. After 70 minutes from T0 they spat out the corresponding substances (Snus or Placebo) and started the Yo-Yo Test (Figure 2). At the end of the Yo-Yo Test subjective arousal and mental workload were recorded by means of the

visual analogue scale, and immediately after participants were interviewed by researchers about nicotine adverse effects (if yes: mild / moderate/ serious) (Table 3). Global RPE and readiness perception were recorded several times during the Fitness test battery. EXP2 was performed exactly following the same procedure and timetable of EXP1 for each participant, and took place 5 days later.

Materials

Snus and Placebo

Swedish Snus is a low-nitrosamine, moist oral tobacco product with water content of approximately 45%–55% and a pH of approximately 8.5. For Snus and Placebo delivery and uptake we followed Lunell and Lunell (2005) methodology. The mean time to maximum nicotine plasma concentration (Tmax) is 37.1±10.2 (SD) min (range: 24–60 min) for 1 g Swedish portion Snus (Lunell and Curvall, 2011). The placebo was almost identical to the Snus in physical appearance, mouth feel, pH, flavouring, and other sensory characteristics, but it did not contain tobacco or nicotine. In this study, we administrated a commercial Catch White Eucalyptus Portion Snus (Swedish Match) 1.0 g - nicotine: 8 mg/portion - for Snus and Onico Pepparmint (Swedish Match) 1.0 g for Placebo respectively.

Smoking status

The measurement of exhaled CO concentration, a non-invasive method of assessing smoking status, was measured using the EC50 Smokerlyser (Bedfont Instruments; Kent, UK). The Smokerlyser measures breath CO levels in parts per million (ppm) based on the conversion of CO to carbon dioxide (CO2) over a catalytically active electrode. Exhaled CO concentrations are reported to closely correlate with blood carboxyhaemoglobin concentration in smokers and in non-smokers.

Arousal and mental workload

Before Snus or Placebo ingestion and immediately after finishing the Fitness test battery participants were asked to rate their perceived arousal and perceived mental and physical fatigue using a visual analogue scale from 0 (nothing) to 10 (top) in response to the following questions:

1) "What is your activation level now?"; 2) "What is your physical fatigue level now?"; 3) "What is your mental fatigue level now?".

At the end of the session, participants were asked to use the visual analogue scale again according to the following questions:

1) "Finally, how would you rate the overall mental load for this experimental session?"; 2) "how do you feel now, once the session has finished?"

Rating of Perceived Exertion

Rating of perceived exertion was measured with the Borg 15 point scale (RPE 6-20) (Borg et al. 1985) and with a 10-point category-ratio (RPE CR10) (Noble et al. 1983). Participants were given verbal encouragement during the fitness tests. Immediately after the handgrip test, Counter-movement Jump, and Yo-Yo Test RPE were asked.

Perceived readiness

The value for perceived readiness (1-5 scale) (Nurmekivi et al. 2001) was also taken prior to the handgrip and Yo-Yo tests. This scale determines the grade of recovery that subjects perceived from 1-point ("not recovered at all") to 5-points ("completely recovered"). Before beginning the handgrip and Yo-Yo Test ratings of perceived readiness were asked.

HRV measurement

Recordings were performed using a Polar RS800 HR monitor set to RR interval mode (Polar Electro, Kempele, Finland) together with an electrode transmitter belt (Polar Wearlink Wind, Polar Electro, Kempele, Finland), after application of conductive gel as recommended by the manufacturer. Data were transferred to Polar Pro Trainer 5 software (Polar Electro, Kempele,

Finland) and afterwards analysed by means of Kubios HRV Analysis Software 2.1 (The Biomedical Signal and Medical Imaging Analysis Group, Department of Applied Physics, University of Kuopio, Finland).

Handgrip dynamometry

An electronic dynamometer (Takei TKK-5401, Tokio, Japan) was used to determine handgrip strength in both right and left hands. The dynamometer was adjusted for each subject's hand size and the participants were kept in stand position with the arms parallel to the ground and with the elbow joint maintained at 90 degrees of flexion. The participants were instructed to perform a maximal isometric contraction. Each subject was allowed 2 trials non-consecutive per arm, and the highest value was recorded.

Countermovement jump

Muscle power was evaluated using a wireless inertial measurement unit (FreePower®, Sensorize, Rome, Italy). Two standardized counter-movement jumps separated by 2-min rest interval were performed. The wireless inertial measurement unit of FreePower® was positioned approximately at the centre of body mass, placing the belt around the waist. Participants started from a standing position with hands on their hips and were instructed to perform a fast downward movement up to 90° of knee flexion followed by an upward movement trying to jump as high as possible. Maximum jump height was registered for further analysis.

Agility test (5x10)

Agility was evaluated using a 10 x 5 meters maximal shuttle run on an indoor running track. After 1 practice trial a maximum test was performed. Performance time was recorded with an accuracy of 0.01 seconds using Chronometer application for Iphone 4.

Yo-Yo recovery intermittent test

The Yo-Yo test was performed using the level-1 version of the test, following the guidance defined by the test's creator (Bangsbo, 1992). The level-1 Yo-Yo test is a progressive shuttle running test that allows 10 seconds of active recovery after every second 20 meters shuttle. Running speeds are dictated by an audible cue played from a CD. Participants must be at one end of a 20 meters base every time a signal is played. Yo-Yo test performance is considered as the total distance covered by the subject when they drop out.

Data analysis

Data are presented as mean values ± SD and were analysed with IBM SPSS 20.0 using paired-sample t-tests to compare differences between the Snus and Placebo ingestions conditions. In order to address any learning/familiarization effect, data from EXP1 and EXP2 were compared using paired-sample t-tests. Bonferroni post-hoc correction for multiple comparisons was applied obtaining a level of significance of p=0.003.

For HRV data, the recordings were preprocessed to exclude artifacts by eliminating RR intervals, which differed more than 25% from the previous, and the subsequent RR intervals (Malik et al. 1989). Removed RR intervals were replaced by conventional spline interpolation so that the length of the data did not change (i.e., resulting in the same number of beats). We used the smoothness prior method with a Lambda value of 500 to remove disturbing low frequency baseline trend components (Tarvainen et al. 2002). Regarding linear analysis during the experimental conditions, the mean R-R interval (RRi), root-mean-square difference of successive normal R-R intervals (rMSSD) were calculated for the time domain. Geometric Poincaré Plot index (SD1) was also calculated.

Results

No significant differences were found between data from EXP1 and EXP2 (all ps>0.003), showing that there were no learning or fatigue carry-over effects across experimental sessions.

Control variables

No significant differences were observed in relation to sleeping hours between Snus (6.94±1.11) and placebo (6.67±1.09) sessions. Regarding Smoking status assessment, the level of CO (ppm) before completion of the fitness battery test was 2.97±1.45 for the Snus condition and 3.54±3.83 for the Placebo condition respectively. Values defined the participants as non-smokers, in accordance to Deveci et al. (2004).

Results for all dependent variables (Subjective arousal, perceived mental workload, Rate Perceived Exertion, Perceived readiness, HRV measurement, Handgrip dynamometry, Countermovement jump, Agility test, Yo-Yo test) for Snus and Placebo conditions are shown in Table 1.

Regarding HRV measurements, our data showed a significant effect in the Snus condition (basal measure before intake vs. after intake) in the RRi, rMSSD and SD1 variables. No significant differences were observed in the Placebo condition. No significant differences before substance intake were observed between the Snus and Placebo conditions. Interestingly, there were significant differences for all HRV variables when comparing the Snus and Placebo conditions after substance intake (Table 2).

Side effects

Twelve participants reported adverse symptoms at the end of the Snus condition session and only one reported adverse effects at the end of the Placebo condition session (Table 3). Due to these adverse effects some participants could not complete all assessments during the experimental session. The specific N for each dependent variable is reported in Table 1.

Discussion

Nicotine is the main psychoactive substance present in tobacco, targeting neuronal nicotinic acetylcholine receptors. This psychoactive substance has been shown to increase muscle blood flow (Weber et al. 1989), heart rate, blood pressure, level of circulating catecholamine,

and vasoconstriction during light exercise (e.g., Walker et al. 1999). Together with physiological effects, nicotine has also been related to changes in high-order cognitive functions (Heishman et al. 2010). Due to the increased use of nicotine in the sport environment, the WADA decided to include it in its Monitoring program in 2011. For these reasons, in the present study we investigated the effect of Snus (a current common form of tobacco consumption) on physical and mental workload on a sample of amateur sportsmen (football players).

Results from the present study showed that amateur footballers' heart rate variability, subjective arousal and mental workload perceptions, and fitness performance were impaired by acute Snus intake. Crucially, participants' perceived readiness before some fitness tests, and total mental load after the experimental session, were also boosted as a consequence of Snus administration. In addition, 4 of 18 participants (22%) could not complete the fitness test battery due to dizziness, tachycardia, cold sweats and other Snus' side effects. Regarding participants' HRV, the results showed a decrease after Snus administration even before the beginning of the fitness test battery. The results appear to confirm that nicotine leads to reduced vagal tone as indexed by the rMSSD parameter. The effect of Snus was also observed on all the HRV variables analysed compared to the placebo condition.

Our study goes beyond previous research that has investigated the effect of nicotine on HRV (e.g., Barutcu et al. 2005). Indeed, these studies used smoked tobacco, and, consequently, they did not control for possible respiratory disorders, which could have influenced the observed HRV patterns. On the contrary, in our study, we were able to avoid possible respiratory disruption focusing on vagal alteration produced by nicotine by administering the product orally.

As already noted, significant beneficial effects of nicotine have been observed on motor abilities and other high-order cognitive functions (see Heishman et al. 2010, for a review) suggesting relevant performance enhancement (Pesta et al. 2013). In particular, significant positive effects of nicotine have been shown on at least six cognitive domains: fine motor coordination, alerting and spatial attention, short-term episodic memory, and working memory (Heishman el al. 2010). Most published studies support that nicotine causes cognitive enhancement in smokers but the influence of nicotine on human performance in non-smokers is less clear. While some studies have failed to detect nicotine-induced cognitive enhancement (e.g., McClernon et al. 2003) others have even found impairment effects (Heishman et al. 993).

In our study, participants showed reduced perceived readiness before the Handgrip dynamometry test in the Snus condition compared to the Placebo condition. In the same way, 35 minutes after Snus intake, larger mental fatigue values were reported than in after Placebo intake. Furthermore, once the Yo-Yo Test finished (at the end of the experimental session) participants reported higher mental workload in the Snus condition than in the Placebo condition. Therefore, Snus had a negative effect on perceived mental workload, even before starting the physical tests. Perceived arousal was also greater in the Snus condition than in the Placebo condition. Regarding this latter result, research suggests that the effects of nicotine on subjective arousal are dose dependent (Perkins and Stitzer, 1998) with mild positive effects at low doses, moderate positive effects at intermediate doses, and negative effects at high doses. Therefore, it is possible that the nicotine intake level achieved in our study was pharmacologically equivalent to a high dose, considering the lack of tolerance in our nicotine-naïve participants. This explanation could be extended to the perceived readiness and perceived mental workload results, explaining the apparent inconsistent results from studies with non-smokers mentioned above. In contrast to the subjective ratings of mental workload

and arousal, ratings of Perceived Exertion (RPE) did not differ between the Snus and placebo conditions. This is consistent with previous studies (e.g., Mundel and Jones, 2006) that analyzed the effects of nicotine patch on healthy non-smokers and did not observed significant modifications in RPE compared to placebo. Taken together, our results point to a negative effect of Snus on subjective evaluation of cognitive load and arousal.

The difference in performance in the Agility test between the two experimental conditions (Snus vs. Placebo) is an interesting result. We suggest that participants performed better under the effects of Placebo due to the absence of nicotine side effects on the vestibular system. In fact, Zingler et al. (2007) observed that nicotine in non-smokers causes dose-dependent adverse perceptual, ocular motor, vegetative, and postural imbalance effects. These effects can be related to a pharmacological stimulation of the vestibular circuitry. Moreover, given the negative effect of Snus on subjectively perceived mental load and arousal, and the high demands of fast responding of the Agility test, one might wonder whether Snus intake resulted in lower reaction times to the start of the test. Note that this is highly speculative since we did not collect participants' reaction times, and further research is needed to address this issue.

In contrast to the abovementioned results, no differences between the Snus and Placebo conditions were found for Handgrip dynamometry test, Counter-movement jump, and Yo-Yo test. Furthermore, we found no significant variations under the two experimental conditions (Snus vs. Placebo) for most of the tests in the Fitness test battery which contrast with previous literature that have observed the effect of other psychoactive substance (such as caffeine) when using the same tests (Gant et al. 2010; Mohr et al. 2011). For instance, Gant et al. (2010) showed that caffeine administration improved counter-movement jump performance. Moreover, Mohr et al. (2011) colleagues reported that high-intensity intermittent exercise

performance Yo-Yo test was significantly improved by oral caffeine administration in comparison with placebo.

Nicotine absorption varies greatly among individuals. However, according to Lunell and Lunell (2005) the variation in nicotine extraction rates among different Snus users could range from 50 to 300 percent in a same Snus user since the amount of extracted nicotine could be partially an effect of the intensity with which that portion is manipulated in the mouth. In addition, nicotine side effects may differ between non-smokers and smokers due to tolerance and neuroadaptive processes during prolonged nicotine use (Kobiella et al. 2011). Our study with non-smokers and non-Snus users, showed that twelve participants reported after Snus administration adverse events such as increased heart rate, dizziness, and nausea (Table 3). Possible explanations could be found in the amount of nicotine absorbed and excessive sensibility to nicotine. It is likely that, as non-smokers, participants were not tolerant to nicotine unpleasant effects. In fact, four participants had to suspend their participation in the fitness test battery before starting the Yo-Yo Test due to serious sides effects (see Table 3, participants 2, 3, 4, and, 13). It is important to note that, compared to rest, exercise can lead to increase in plasma nicotine levels and toxicity due to increased drug absorption during physical exercise (Lenz et al. 1999).

Apart from the side effects reported above, the effect of nicotine varies as a function of nicotine habituation. It would be therefore interesting for future research to investigate the effects of nicotine on smokers athletes and/or Snus users, comparing objective and subjective physical and mental performance under conditions of satiety and abstinence. Indeed, Snus effects could have been different on non-smokers participants after a familiarization process with this substance although an unethical risk of addiction could appear, which is not in line with the “fair play” and the education of the ideal “athlete 2.0” that rejects the improvement of performance despite the possible health damage (Zabala and Atkinson, 2012).

Perspectives

In spite of being a substance with growing popularity in sport, particularly in Sweden, there is an important lack of knowledge about the potential impact of Snus on physical performance. In addition, World Antidoping Agency is interested on the effects of nicotine, the main component of Snus, on athletes' performance and health, and, consequently, it has been included on its Monitoring Program in 2013. To date, there are no studies assessing the effects of Snus on physical performance, perceived physical effort, and perceived mental workload in the same experiment. Moreover, no previous study has investigated the effect of Snus on football players and their specific physical demands'. The results of the present study are novel and relevant, and could lead to research in other sport contexts (e.g. different countries, type of sport, corresponding physical demands).

Conclusion

In sum, the results of the present study revealed that amateur footballers' heart rate variability, felt arousal, and mental workload perceptions, and performance in an agility physical test were impaired by acute Snus intake. Therefore, taken together, these data argue against Snus as an efficient ergogenic aid due to its detrimental effects on performance.

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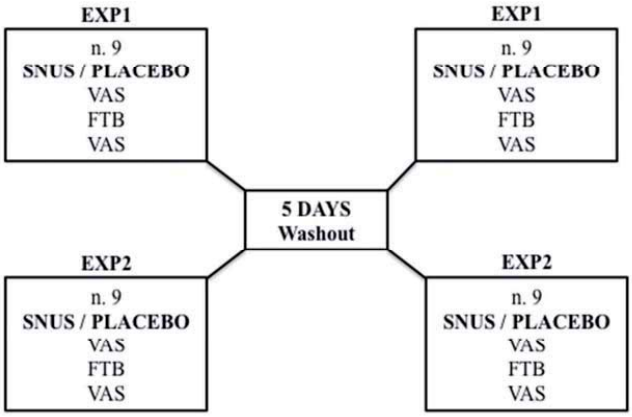

Figure 1. Protocol and experimental design.

Abbreviations: EXP1: Experiment/assessment session 1; EXP2: Experiment/assessment session 2; VAS: visual analogue scale (subjective arousal and mental workload); FTB: Fitness Test Battery; n.: number of participants.

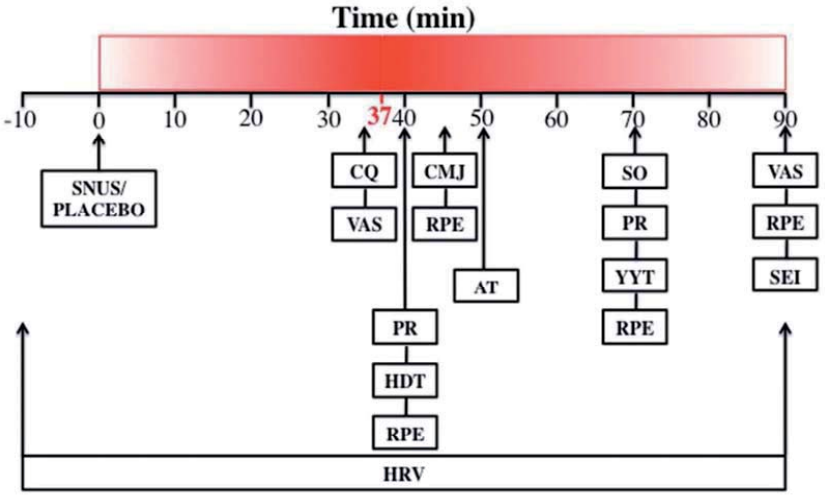

Figure 2. Schematic time plan design.

Red bar is the estimated nicotine plasma concentration (the mean of Tmax is 37.1 ± 10.2 min according to Lunell and Curvall, 2011). Abbreviations: RPE: rating of perceived exertion (Borg's scales); CQ: control questions; VAS: visual analogic scale (subjective arousal and mental workload); PR: perceived readiness; HDT: hand dynamometric test; CMJ: countermovement jump; AT: agility test; SO: substance (Snus / Placebo) out; YYT: Yo-yo recovery intermittent test; SEI: side effects interview; HRV: heart rate variability.

Table 1. Comparison (Bonferroni corrected α =.003) between the Snus and Placebo conditions for all dependent variables included in this study (Perceived mental workload, felt arousal, Rate Perceived Exertion, Perceived readiness, HRV measurement, Handgrip dynamometry, Countermovement jump, Agility test, Yoyo recovery intermittent test).

	SNUS				PLACEBO			p
	n	mean	SD	SE	mean	SD	SE	
CQ1 Sleeping hours	18	6.94	1.11	0.26	6.67	1.09	0.26	0.096
Smokerlyzer (ppm)	18	2.97	1.45	0.34	3.54	3.83	0.90	0.563
VAS1 after intake, before FTB (0-10)	18	4.83	1.86	0.44	5.11	1.75	0.41	0.523
VAS2 after intake, before FTB (0-10)	18	4.00	2.22	0.52	3.89	2.02	0.48	0.734
VAS3 after intake, before FTB (0-10)	18	4.17	2.38	0.56	2.94	1.89	0.45	0.005
Perceived readiness before Handgrip test (1-5)	14	3.71	0.83	0.22	4.43	0.51	0.14	0.001
Handgrip right (Kg)	18	42.22	5.63	1.34	42.06	4.46	1.05	0.834
Handgrip left (Kg)	18	37.22	6.28	1.48	38.33	4.73	1.11	0.068
RPE CR10 after Handgrip test	18	5.72	2.24	0.53	5.67	2.14	0.51	0.842
RPE 6-20 after Handgrip test	18	14.89	2.85	0.67	14.44	2.62	0.62	0.177
Maximum Jump height (m)	17	0.43	0.05	0.01	0.44	0.05	0.01	0.634
RPE CR10 after CMJ	17	6.06	1.89	0.46	5.94	2.11	0.51	0.707
RPE 6-20 after CMJ	17	14.59	2.55	0.62	14.71	2.14	0.52	0.743
Agility Test (seconds)	17	18.82	0.81	0.19	18471	0.62	0.15	0.009
Perceived readiness before YYT (1-5)	10	3.60	0.84	0.27	4.00	0.67	0.21	0.037
Distance YYT (m)	14	1397.14	447.14	119.50	1407.85	481.92	128.79	0.92
VO2max YYT (ml*kg*min)	14	48.28	3.75	10.03	48.23	4.05	10.81	0.952
RPE CR10 after YYT	15	9.40	1.12	0.29	9.20	1.61	0.42	0.55
RPE 6-20 after YYT	15	18.67	0.98	0.25	18.53	1.51	0.39	0.685
Mental load after session (0-10)	16	6.38	2.16	0.54	5.44	1.83	0.46	0.001
VAS1 after session (0-10)	16	7.19	1.97	0.49	7.38	1.31	0.33	0.628
VAS2 level after session (0-10)	16	7.88	1.71	0.43	8.00	1.46	0.37	0.783
VAS3 level after session (0-10)	16	7.13	1.71	0.43	6.44	1.37	0.34	0.102
RPE CR10 after session	15	7.87	1.85	0.48	7.60	0.99	0.25	0.556
RPE 6-20 after session	15	16.67	2.38	0.62	16.60	0.91	0.24	0.927

SD: Standard deviation; SE: Standard error; VAS: Visual Analogue Scale -subjective arousal and mental workload-; VAS1: Activation level; VAS2: Physical fatigue level; VAS3: Mental fatigue level; FTB: Fitness Tests Battery CMJ: Countermovement jump; YYT: Yoyo recovery intermittent test; $VO2_{max}$: maximal oxygen uptake.

Table 2. HRV measurements

	Snus			Placebo		
	RRi	*r*MSSD	SD1	RRi	*r*MSSD	SD1
Basal	948.85±119.717*	62.09±28.3*	43.99±20.06*	895.412±131.74	62.76±23.36	44.33±16.59
Activity	665.19±98.21‡	50.11±28.29‡	35.22±19.45‡	887.28±137.54	72.32±30.56	51.23±21.66

* $p<0.05$ Basal vs. Activity condition.
‡ $p<0.05$ Snus vs. Placebo condition.
RRi: R-R interval; rMSSD: root mean square of successive differences; SD1: instantaneous beat-to-beat variability of the data.

Table 3. Side effects described by the participants that reported them at the end of the their Snus session.

Subject Code	Mild	Moderate	Serious
01AAJ		Tachycardia	
02CCJ			Confuse, Dizziness
03CGJ			Nausea, Dizziness
04CBI	Dizziness	Stomach-ache	Empty sensation, Tiredness, Confuse
05EGA	Tiredness		
07LMJ	Dizziness		
09RLF	Sore throat		
11SSS		Nausea, Dizziness	
12BNV	Tiredness	Dizziness	
13HJE	Dizziness		Nausea
16PGM	Dizziness	Sweating, Increase body temperature	Tremor
17MA		Dizziness, Sweating	Empty sensation, Nausea

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Morente-Sánchez, J. & Zabala, M.

Department of Physical Education and Sports.

Faculty of Sport Sciences (University of Granada)

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XIV

DEPORTE, DOPAJE, ÉTICA Y VALORES: PAUTAS DE INTERVENCIÓN

Jaime Morente Sánchez
Becario FPU (Formación Profesor Universitario)
Departamento de Educación Física y Deportiva
Facultad de Ciencias del Deporte
Universidad de Granada

Mikel Zabala Díaz
Departamento de Educación Física y Deportiva
Facultad de Ciencias del Deporte
Universidad de Granada

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RESUMEN:

Consideramos oportuno sintetizar el trabajo que presentamos a continuación con la siguiente afirmación de una de las figuras más importantes del deporte internacional en los últimos años, Juan Antonio Samaranch (1920-2010), *("Elmovimiento olímpico", 1993, pág. 96)* con la que queda representado lo que implica el dopaje: *Practicar el dopaje es morir. Morir fisiológicamente, al modificar de manera profunda y a veces irreversible los procesos normales, mediante manipulaciones indebidas. Morir físicamente, como lo han demostrado algunos casos trágicos en estos últimos años. Pero también morir espiritual e intelectualmente, al aceptar la trampa y el enmascaramiento de las propias posibilidades, al reconocer la propia impotencia o la falta de voluntad para aceptarse a sí mismo o para sobrepasar los propios límites naturales. Morir moralmente, por último, al autoexcluirse de hecho de las reglas de comportamiento que exige toda sociedad humana.*

1. DEPORTE, ÉTICA Y VALORES.

El **fenómeno sociocultural** del deporte está llegando a cotas extremas, hasta el punto de que se está produciendo un exceso de comercialización del deporte en los últimos años que ha conllevado un triste afán por la búsqueda del enriquecimiento personal por parte de todos los agentes implicados llegando muchos a vender sus valores y ética deportivos con el fin de practicar la sencilla metodología del "todo vale*". El uso del doping aparece como una errónea alternativa de solución mágica* (Sosa, 2001).

Para luchar contra la lacra del dopaje en el deporte debemos hacer un esfuerzo por conocer e identificar las causas de su aparición y extensión. Sólo así podremos actuar de forma coherente y con conocimiento de causa. Autores como Rodríguez Bueno y Rodríguez Cano (2008) y Morente-Sánchez y colaboradores (2014) señalan las siguientes causas de la existencia y extensión del dopaje:

a) La **búsqueda del objetivo principal del deportista**: victoria, incremento del rendimiento, disminución de la fatiga, etc.

b) El **consumo** abusivo aceptado por la sociedad en la que vivimos. Actualmente convivimos en la cultura del medicamento y/o del suplemento farmacológico. Se recurre a la "pastilla mágica" para todo: dolor de cabeza, conciliación del sueño, reducción de la ansiedad, disminución del apetito, etc.

c) Como respuesta a la **presión** a la que son sometidos los deportistas, pudiendo ser ésta de distinta índole: política (por parte de las mismas instituciones), económica (sponsor) y social (familiares, amigos o el más usual por parte de su mismo entorno deportivo: entrenadores, médicos, entre otros).

Si tratamos de buscar información acerca de las motivaciones que llevan al deportista a recurrir al dopaje podemos apoyarnos en ciertos estudios que demuestran que no existe una en concreto sino que se trata de un recurso ilegal que trata de dar saciar diversas motivaciones (Morente-Sánchez y Zabala, 2013). A diferencia de los adultos, los jóvenes infravaloran aspectos relacionados con la salud y el respeto social anteponiendo el logro deportivo (Mroczkowska, 2009a). La conducta de dopaje puede ser explicada a través del complejo proceso de socialización, el cual se prolonga durante toda la vida del individuo. La socialización en el deporte puede ser entendida como un *proceso mediante el cual la cultura deportiva es adquirida por los sujetos sociales, hasta incorporarla como parte de su personalidad* (Castillo, 2007).

El proceso de socialización del deportista comprende una serie de aspectos, dentro de los cuales reside la motivación que lleva al uso de sustancias y métodos prohibidos (Castillo, 2007):

a) El **propio deportista** en su aprendizaje: los rasgos de personalidad, la raza, la edad, el sexo, el lugar de nacimiento, etc.

b) Los **agentes socializadores**. Aquí intervienen aquellas figuras que actúan como modelos de referencia: padres, amigos, ídolos ciclistas, entrenador, manager deportivo, etc.

c) **Contexto social** donde se producen las interacciones. Es decir, aquellos lugares donde tienen lugar las relaciones: escuela, club deportivo, hogar familiar, oficina, etc.

En el deporte quizás el aspecto de mayor influencia que actúa sobre el sujeto sean los agentes socializadores, entre los que debemos destacar:

- La **familia**. Considerada el primer agente transmisor de la cultura. A través de ésta se configura la personalidad del niño, transmitiéndole determinados roles según la experiencia vivida. De acuerdo con Castillo (2007) el seno familiar es donde se producen los procesos más sólidos de socialización deportiva. Está demostrado que aquellos deportista que utilizan sustancias prohibidas no presentan estabilidad emocional en ciertos aspectos fundamentales como son las relaciones familiares y la autoconfianza (Laure y cols. 2004).
- La **escuela** o **club deportivo**. Es considerado el segundo agente socializador, no sólo fija y refuerza determinados patrones de conducta sino que también consolida actitudes positivas frente a la práctica deportiva (Castillo, 2007; Goldberg y cols, 2000).
- Los **medios de comunicación**. A día de hoy constituyen un factor de socialización deportiva extraordinario (Castillo, 2007).

Por tanto, depende de los propios integrantes del mundo del deporte tanto a nivel profesional como aficionado erradicar este tipo de práctica ilícita. Debemos seguir luchando contra el dopaje, fundamentalmente porque la gran mayoría son deportistas honestos que quieren y defienden un deporte limpio, de acuerdo con los ideales y principios que originaron el mismo deporte. Esta lacra, actúa destruyendo los principios de la competición, pervirtiendo la función educativa del deporte, amenazando la salud pública e incluso sirviendo como negocio para la delincuencia organizada (Rodríguez y Rodríguez, 2008).

Fig. 1. Entrenadores como agentes socializadores ensalzando los valores del deporte.

La **ética deportiva** como tal sería otra razón de peso para defender la lucha contra el fenómeno del dopaje. Puesto que esta práctica es contraria a ella, destruyendo los beneficios que de forma tradicional se han buscado en y con el deporte. *El comportamiento leal en el deporte resulta beneficiosos para la persona que lo practica, para las organizaciones deportivas que lo*

promueven y controlan y en su conjunto para la sociedad en que se desarrolla (Rodríguez Bueno y Rodríguez Cano, 2008). Así mismo, podemos afirmar sin temor a equivocarnos que el dopaje convierte al deportista y al deporte en un objeto susceptible de poder ser manipulado por cualquiera, por eso debemos rechazarlo. Incluso hay estudios que presentan casos donde se demuestra que ganar una medalla utilizando sustancias prohibidas genera en el sujeto autodecepción porque no permite evaluar sus propias habilidades y limitaciones (Mroczkowska, 2009b).

Lógicamente la puesta en peligro del estado de bienestar y salud óptimos del sujeto también debe ser una motivación a la hora de apoyar la lucha antidopaje. El dopaje es contrario al concepto de bienestar y calidad de vida, pues rompe el equilibrio físico, psíquico y social. Esta práctica ilícita provoca multitud de efectos indeseados sobre el organismo y la persona, tal y como se ha visto anteriormente en el capítulo III destinado a ello.

Por último, en relación a las motivaciones que deben llevarnos a colaborar en la lucha antidopaje cabe destacar la propia ilegalidad de esta conducta. El Título III de la LOPSLDD, contiene un artículo, el 44, por el que se introduce el nuevo artículo 361 *bis* en la Ley Orgánica 10/1995, de 23 de noviembre, del Código penal y, con él, el nuevo delito de dopaje deportivo entró en vigor el 22 de febrero de 2007.

2. EL DEPORTE COMO VEHÍCULO INSTAURADOR DE VALORES

El deporte es un método educativo que tiene mayores posibilidades que cualquier otro tipo de práctica y/o materia para poder llegar a lo más profundo de la personalidad, que es donde radica la base de la inadaptación social (Blanco, 1979). Por tratarse de una actividad que favorece el desarrollo de mecanismos y hábitos que enlazan la inteligencia, la motivación y la acción, centra el placer en la propia competencia del individuo y en las relaciones personales, en lugar de hacerlo sobre la posesión de objetos. Por todo ello, la actividad deportiva constituye una potente herramienta de prevención del consumo de sustancias prohibidas (Gil, 2007).

Fig. 2. Jóvenes deportistas desarrollando una actividad de sensibilización en grupo I.

Actualmente la mayoría de los jóvenes no se basan en criterios familiares o educativos para decidir sus conductas. Ante esta multifactorial carencia, el deporte se está convirtiendo en su principal referente moral porque a través de él aprenden valores y conductas éticas y se

convierte en una filosofía de la vida que intenta desarrollar de un modo equilibrado cuerpo y mente. Mediante el deporte, los jóvenes aprenden a saber ganar, perder, tener coraje, ser leales e intentar superarse ante la adversidad (Morente-Sánchez, 2010). Este aprendizaje tendrá influencia a lo largo de su vida. Por ello es tan importante insistir sobre los aspectos éticos del deporte.

Por tanto, hemos de tratar de erradicar esta práctica ilícita transmitiendo la máxima de que el **dopaje no es la "panacea" del rendimiento deportivo**, sino una forma tan fácil como amoral de intentar conseguir una evolución en el rendimiento deportivo que, en ocasiones, no se da. En este sentido debemos informar acerca de la existencia de otras vías tan efectivas como aquella pero con un denominador bien distinto: son legales, eficientes y saludables. No olvidemos que sin recurrir al dopaje se puede ganar o perder, al igual que si recurrimos a él. En este sentido, para poder ganar además de poseer una genética idónea en relación con la disciplina deportiva en cuestión, se deben seguir una serie de pautas fundamentales: desarrollar un programa de entrenamiento correctamente programado y planificado, respetar los periodos de descanso, realizar una dieta equilibrada y disponer de una atención médica específica acorde con nuestro nivel. En definitiva, estar bien asesorados en nuestro día a día por profesionales cualificados, porque sólo así podremos alcanzar el verdadero éxito deportivo:

- **Entrenamiento deportivo correctamente programado y planificado**. El entrenamiento llevado a cabo por un deportista debe de cumplir una serie de principios. En el campo de las Ciencias del Deporte, se conocen los siguientes principios de estructuración del entrenamiento deportivo (Delgado y Feriche, 2003; Mujika, 2009; Morente-Sánchez, 2014): principios de esfuerzo (unidad funcional, multilateralidad, incremento paulatino del esfuerzo, sobrecarga y variedad); principios de ciclización (continuidad y periodicidad) y principios de especialización (especificidad, individualización, modelado del proceso y transferencia).

  Además el entrenamiento debe planificarse de forma científica, es decir, siguiendo las leyes del entrenamiento deportivo: Ley del umbral o principio de intensidad óptima del estímulo, supercompensación (efecto a corto plazo) y síndrome general de adaptación (efecto a largo plazo). Siguiendo los pasos marcados de forma controlada optimizaremos el rendimiento asegurando un estímulo óptimo y anulando el riesgo de sobreentrenamiento (Feriche y Delgado, 2003).

- **Descanso óptimo**. El descanso es nuestra principal baza junto con la dieta para conseguir una recuperación rápida y eficaz por parte de nuestro deportista. Éste debe ser programado en función de las características del entrenamiento y de la respuesta individualizada del deportista (Guía del deportista, 2005). Este descanso no debe ser entendido únicamente como una "no acción" o acción pasiva, sino como una serie de acciones y hábitos, tales como unos correctos hábitos de higiene, sueño, amplitud de movimiento, técnicas de relajación y/o ayudas ergogénicas.

- **Dieta equilibrada y controlada**. La dieta debe ser entendida como un medio más de entrenamiento, a partir del cual podemos lograr una recuperación anticipada por parte de nuestro deportista. Las consecuencias de una dieta correctamente adaptada son perceptibles, en un plazo más o menos largo, sobre el rendimiento del deportista (Guía del deportista, 2005). A día de hoy existe la posibilidad de utilizar alimentos funcionales que permiten conseguir objetivos semejantes al obtenido mediante prácticas ilícitas (James y cols. 2010).

- **Atención médica específica**. Debe ser entendida como una atención médico-biológica al deportista centrada en la recuperación de éste, con el fin de conseguir un entrenamiento deportivo lo más saludable posible. Realizado éste a través del aporte de ayudas ergogénicas (si fuese necesario), terapias manuales (masaje deportivo),

electroestimulación u otras medidas de carácter médico-biológico (Feriche y Delgado, 2003).

Fig. 3. Deporte saludable y éxito deportivo de la mano.

3. PAUTAS DE INTERVENCIÓN.

Actualmente se sigue luchando contra las conductas dopantes de manera incorrecta en la mayoría de los casos. Ésta no se realiza desde la raíz del problema sino una vez ya generado éste. Hay estudios que afirman que no basta con la realización de controles antidoping para erradicar este tipo de práctica ilícita, y que por el contrario, se necesita un importante cambio a nivel de actitudes hacia el dopaje (Alaranta y cols. 2006)

Sosa (2001) afirma que *pensar que la solución ante un resultado de doping positivo es solamente la sanción disciplinaria, es un pensamiento obsoleto a esta altura de la ciencia deportiva.* Generalmente el primer pensamiento tras conocer el positivo de un sujeto es especular con qué sanción recaerá sobre él y esta idea barre absolutamente con todos los aspectos que podrían intentar modificar una conducta de doping. Lo ideal sería recapacitar sobre qué ha llevado a ese sujeto a ese extremo para actuar en consecuencia a partir de una intervención adecuada. Este mismo autor afirma que es necesario implementar medidas de carácter preventivo que tengan en consideración a los más pequeños los cuales aún poseen a una actitud de dopaje maleable (Goldberg, 2000).

Este carácter preventivo como medio eficaz en la lucha contra el dopaje, del cual se hace eco la literatura científica (Morente-Sánchez y Zabala, 2013), también se recoge de las palabras de Hardie (2009) en un artículo en el periódico El País haciendo alusión al binomio dopaje-ciclismo: *¿No ha llegado el momento de entrar en acción? Ya basta. ¿Cuándo empezaremos a atacar el problema de raíz en vez de reaccionar con una caza de brujas sobre aquellos que hicieron lo que vosotros queríais y que dieron sus vidas por tan bello deporte como el ciclismo?* Además de las palabras de Hardie (2009) se recogen otras reflexiones tales como: *¿No sabéis que el problema no reside en las elecciones efectuadas por los ciclistas de forma individual? ¿No estáis al tanto de que estos chavales crecen institucionalizados desde niños y se les enseña que sólo hay un objetivo, el de ganar a toda costa?*

No tratamos de transmitir que la lucha contra el dopaje a través de métodos correctivos mediante sanciones sea incorrecta o deba eliminarse, sino que también debemos actuar desde la

prevención en edades tempranas con el fin de evitar situaciones que luego debamos corregir cuando quizás sea demasiado tarde (Alaranta y cols, 2006). Las sanciones se deben dar como último recurso porque siempre habrá alguien que no asimile o no quiera asimilar los efectos de un programa de intervención. Pero si no actuamos desde la formación del individuo siempre tenderemos hacia este problema, haciéndose cada vez más visible y consistente.

Por tanto, tal y como demuestran diferentes estudios, la prevención en edades tempranas debe ser nuestra principal baza en la lucha contra el dopaje (Morente-Sánchez y cols, 2010; Goulet y cols, 2010). El entrenador desde su posición tiene que ser el mentor de sus pupilos e intervenir y educar, enseñando los peligros que su uso conlleva. Así mismo, hay estudios que demuestran que la metodología de trabajo en términos de hacia dónde orientar el éxito también tiene relación con las actitudes que presentarán los chicos hacia el dopaje. En este sentido, aquellos niños que son orientados hacia el ego, es decir, tratar de conseguir el objetivo para ser superior a los demás conlleva a largo plazo una actitud hacia el dopaje más alarmante que aquellos que son orientados hacia la tarea como tal, es decir buscan la autosuperación y competir consigo mismos (Sas-Nowosielski y Switatkowska, 2008).

Fig. 4. Jóvenes deportistas desarrollando una actividad de sensibilización en grupo II.

En definitiva, todo club o escuela deportiva debe ser entendida como el lugar donde confluyen un número determinado de niños/as con el fin de enseñarles actividades relacionadas con su especialidad, sin olvidar aspectos tan importantes como la educación en valores, hábitos alimenticios y y disciplina, entre otros. Todo ello rodeado de un grupo de profesionales del deporte que transmiten todos estos conocimientos, amparados a ser posible por las instituciones públicas y entidades privadas (Zabala, y cols, 2007).

Es imprescindible indicar que el modelo educativo tradicional caracterizado por el papel fundamental del educador como impulsor de valores a día de hoy resulta insuficiente, ya que actualmente los efectos positivos que éste pudiera generar se ven contrarrestados por el posible efecto negativo que ejercen otros estamentos susceptibles de ejercer algún tipo de influencia sobre la formación del esquema de valores del individuo, como por ejemplo los ejercidos por los medios de comunicación y el entorno cercano (Castillo, 2007).

3.1. Educación en valores.

La **filosofía olímpica** debe ser el modelo a seguir en relación con lo que queremos conseguir y desarrollar, ya que constituye una filosofía en la que el deporte es considerado como una actividad formativa y de desarrollo tanto a nivel individual como social en el individuo. *El Olimpismo es una filosofía de la vida, que exalta y combina en un conjunto armónico las cualidades del cuerpo, la voluntad y el espíritu. Al asociar el deporte con la cultura y la formación, el Olimpismo se propone crear un etilo de vida basado en la alegría del esfuerzo, el*

valor educativo del buen ejemplo y el respeto por los principios éticos fundamentales universales (Artículo 1 de la Carta Olímpica, 2004).

Desde el Consejo Superior de Deportes (2005) se desarrolló el **Código de Ética Deportiva**, en el que se establecen cuáles deben ser los comportamientos desde un punto de vista ético y moral de los diferentes agentes implicados en la actividad deportiva: deportista, entrenadores o técnicos, médicos, federaciones u otros organismos, padres o madres, etc.

Nuestra intervención irá encaminada a infundir en el deportista una serie de valores. Para ello emplearemos aplicaremos la conocida "**Educación en valores**", ya que de acuerdo con Cerillo (2003) *la educación en valores es la clave de todo cambio social*. "Educación" podríamos definirla como un proceso de transmisión de conocimientos, costumbres y formas de actuar. Por su parte, podemos entenderemos "Valores" como una serie de principios o creencias que regulan el comportamiento de los individuos (Cerillo, 2003). Por tanto podemos entender a la educación en valores como *la transmisión de unos principios o creencias que van a ser aceptados y que a partir de entonces regularan el comportamiento de ese individuo*.

Así mismo, debemos destacar el papel que juegan los valores en el ser humano, porque estos involucran nuestros sentimientos y emociones. El deporte, como hemos mencionado anteriormente, representa una fuente de transmisión de valores tanto para el deportista como para el espectador, ya que este último puede adoptar al deportista como un modelo a seguir. Por ello el dopaje hace tanto daño cada vez que, por desgracia, hace acto de presencia en los medios de comunicación destruyendo héroes y minando la ilusión de aquellos que apuestan por un deporte limpio.

Como indicaba el Pierre de Coubertain en los albores del Olimpismo de la era moderna (1896), a través de una buena educación en valores se volverá a la esencia del deporte. Universalidad, paz, multiculturalidad, igualdad, respeto, juego limpio, justicia, deportividad, honestidad, solidaridad, fraternidad, compañerismo, coraje, esfuerzo, superación, constancia y colaboración, son algunos de los valores que emanan del Olimpismo y que como tales hemos de utilizar como guía a la hora de monitorizar, preparar o realizar cualquier tipo de práctica deportiva (Castillo, 2007).

3.2. Programa de intervención

El programa de intervención puede adoptar diferentes formas, teniendo todas ellas una finalidad común. La intervención debe estar orientada hacia la información y la formación personal de los sujetos, tanto jóvenes jugadores como entrenadores, tanto alumnos como profesores pues por desgracia en la desinformación y en la falta de concienciación acerca de esta lacra subyace el origen del problema (Ozdemir y cols, 2005; Dunn, 2010; Morente-Sánchez y Zabala, 2013).

Existen diferentes tipos de intervención a nivel metodológico cuyos recursos utilizaremos en función del contexto en el que nos movamos. En este sentido podemos recurrir a juegos, charlas con/para educadores, supuestos prácticos para fomentar las actitudes y estudios de casos reales, entre otros. A continuación se presentaran varios ejemplos de programas de intervención encaminados a fomentar actitudes hacia el dopaje que han sido aplicados con éxito en diferentes países y, que por consiguiente, demuestran que erradicar esta práctica ilícita es posible.

En primer lugar, debemos resaltar que la Comisión Europea ha financiado en los últimos años 2 proyectos encaminados a la prevención del dopaje. **ATLAS** y **ATHENA** son programas específicos en la prevención del uso de sustancias y métodos prohibidos en los dos géneros y de la promoción de la salud, diseñados para reducir el abuso de agentes anabólicos y esteroides. El programa de Entrenamiento Atlético y Aprendizaje para Evitar los Esteroides (ATLAS) se dirige a los atletas de sexo masculino. En cambio, ATHENA es el programa introducido para las atletas de sexo femenino. El programa de Atletas que tiene como Objetivo un Ejercicio Sano y Alternativas Nutricionales (ATHENA) resalta el papel de mujeres jóvenes en los deportes,

costumbres alimenticias desordenadas y qué le sucede al cuerpo con el consumo de drogas. Por lo tanto, las lecciones dentro de los programas ATLAS y ATHENA se basan en la nutrición sana durante la práctica de actividad física y en el entrenamiento deportivo sano como alternativas al uso del alcohol y las drogas ilícitas que aumentan la resistencia. Ambos programas fueron llevados simultáneamente de manera interactiva, siendo atractivos y fáciles de ejecutar.

El programa de intervención como tal de ATLAS y ATHENA está dirigido por el entrenador y orientado a los deportistas estudiantes. Está dividido en 10 sesiones para ATLAS y 8 sesiones para ATHENA cada una de 45 minutos de duración. Las sesiones incluyen un supuesto práctico improvisado, campañas creadas por y para estudiantes, anuncios publicitarios y juegos educacionales y de rol interactivos. Los atletas aprenden a ajustar sus propias metas y a autocontrolarse. Los estudiantes también aprenden las actitudes y las destrezas que les ayudarán a la hora de tomar decisiones sanas durante la práctica deportiva y durante su vida.

Ambos programas demostraron científicamente efectos importantes y significativos a largo plazo. Los participantes del programa ATLAS demostraron una disminución del uso del alcohol y de drogas, una reducción del uso de esteroides, una reducción del uso de suplementos, bebidas energéticas, una mejora a nivel de hábitos alimenticios y práctica físico-deportiva. Los estudiantes creyeron que eran mejores atletas y tuvieron una mayor capacidad para rechazar las drogas. Las atletas de sexo femenino que participaban en el programa ATHENA redujeron el uso de las píldoras adelgazantes, usaron menos esteroides, anfetaminas y suplementos deportivos, mejoraron su alimentación, conducían menos bajo los efectos del alcohol, redujeron su actividad sexual, se redujo el número de lesiones y el uso a largo plazo de las píldoras dietéticas, del alcohol y de la marihuana.

Atendiendo a estudios concretos, Goldberg y colaboradores (2000), dentro del mencionado proyecto ATLAS, llevaron a cabo de forma eficaz un interesante protocolo de intervención, sobre una muestra de 2516 deportistas amateur. Al finalizar la intervención la actitud hacia el consumo de esteroides anabolizantes, suplementos, tabaco y alcohol fue significativamente menor en el grupo experimental. Del mismo modo, el nivel de autoconfianza de este grupo aumentó. Un año después se repitió el protocolo de evaluación pertinente y comprobaron la retención del aprendizaje ya que los resultados se mantenían en su mayor medida.

Por otro lado, un estudio realizado por James y colaboradores (2010) con una muestra de 236 deportistas usuarios habituales de salas de musculación, demostró que informando (a través de sencillos folletos) acerca de los efectos positivos de ciertos alimentos que para muchos eran desconocidos (remolacha, ternera, etc) se podía revertir la actitud hacia el dopaje de un sujeto. Es decir, instruyendo y haciendo partícipe al sujeto de los efectos que pueden llegar a producir ciertos alimentos que están a su alcance (alimentación funcional), así como de por qué y para qué deben usarse consiguieron pasar de 73/115 (pretest) que creían que la alimentación funcional jamás conseguiría alcanzar los efectos producidos por las sustancias prohibidas a 78/115 (postest) que sí confiaban en mejorar su rendimiento aplicando los conocimientos adquiridos durante la intervención y, por tanto, rechazando la posibilidad de cualquier práctica ilícita.

En España, la Real Federación Española de Ciclismo (RFEC) de forma pionera puso en marcha en 2009 el proyecto "**Prevenir para ganar**" (Zabala y cols., 2010) orientado al deportista y a su entorno próximo (técnicos y familiares). El proyecto se encuentra en fase de desarrollo hasta 2012. Se pretenden alcanzar los siguientes objetivos:1) Formar en conceptos relacionados con la práctica del doping y sus efectos a distintos niveles; 2) Concienciar de la importancia de un deporte libre de prácticas dopantes; 3) Cambiar los patrones de conocimiento y opinión acerca de la práctica dopante, así como determinados patrones de conducta observados, desde una actitud crítica al respecto en base al "Juego Limpio" y el respeto a las normas de convivencia deportiva. Actualmente, se han confeccionado contenidos específicos por edades y categorías, aplicados en charlas y foros de trabajo y cuestionarios de opinión con metodología de escalas

tipo Likert para su posterior validación. Por otro lado, se han elaborado índices para que los monitores realicen la observación sistemática de actitudes basadas en comportamientos ante determinadas situaciones presentadas.

Fig. 5. Trascendencia mediática del proyecto “Prevenir para ganar”.

A pesar de que uno de los temas principales a tratar por cualquier sistema de salud es la prevención, desafortunadamente, en la lucha contra el dopaje, las actividades se han centrado en el desarrollo de nuevas técnicas para la identificación de sustancias prohibidas, dejando en un segundo plano el aspecto preventivo. Los controles antidopaje deben considerarse como una forma de garantizar una competición libre de drogas y de métodos prohibidos. Pero la mejor manera de combatir el dopaje es a través de la educación y la información. Generalmente, la mayor parte de los esfuerzos intentan descubrir a los culpables, mientras que se descuidan otras acciones que a largo plazo serían eficientes.

3.3. Aplicación práctica

A continuación presentamos, a modo de ejemplo, una aplicación práctica que puede ser llevada a cabo en un escuela deportiva, sesión de Educación Física o cualquier otro foro/contexto donde el deporte puede ser utilizado como vehículo instaurador de valores como tal en relación al binomio deporte-dopaje. Presentamos tres propuestas (actividades, caso práctico y autoevaluación) que permitan activar la reflexión intrínseca acerca de esta temática.

ACTIVIDADES

1. **Visita el siguiente link y participa en el siguiente videojuego propuesta por la WADA/AMA para valorar tu nivel en relación al contenido desarrollado en este capítulo:**

   http://wada-ama.org/en/Education-Awareness/Youth-Zone/Play-True-Challenge/

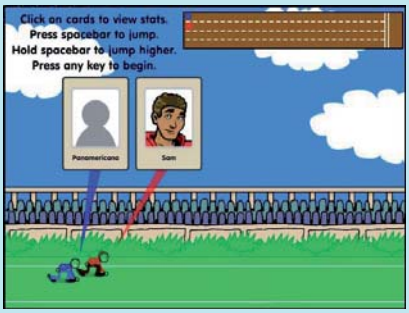

Fig. 6. Propuesta de actividad online: Play true Challenge I.

Fig. 7. Propuesta de actividad online: Play true Challenge II.

CASO PRÁCTICO

1. **Juegos de rol desarrollado en pequeñas dinámicas de grupo.**

Haremos 4 grupos (A, B, C, D) los cuales se situarán formando los 4 vértices de un cuadrado. En todos ellos habrá un RESPONSABLE a quién se le planteará un supuesto práctico que tendrá que plantear a sus compañeros de grupo. Se dejará un breve período de tiempo para consensuar una línea de actuación al respecto y posteriormente cada grupo a través de un PORTAVOZ la hará pública

supuesto I:** ***Tu mejor amigo te pide opinión acerca de su decisión de tomar sustancias prohibidas para mejorar el rendimiento con el fin de que puedas conseguir tus anhelados objetivos ya que esta temporada es tu última en la categoría lo cual supone tu "último tren".

supuesto II ***: Tu entrenador te recomienda consumir sustancias prohibidas para mejorar tu rendimiento, un tanto bajo últimamente, en aras de poder asimilar nuevas y mayores cargas de entrenamiento que te permitan alcanzar el rendimiento esperado e incluso superarlo.***

Nota:

- Supuesto I, irá dirigido a grupos A y C, además el RESPONSABLE del grupo C será "animado" a defender la conducta dopante con el fin de valorar luego el poder de una influencia negativa en un grupo.

- Supuesto II, irá dirigido, por su parte, a B y D. El RESPONSABLE de B, hará de "mala influencia" en su subgrupo.

AUTOEVALUACIÓN

1. **Durante el capítulo se ha hablado de los acrónimos ATLAS y ATHENAS. ¿A qué hacen referencia y cuál es su relación con la lucha antidopaje?**
2. **¿Qué federación deportiva española ha sido pionera en el diseño y desarrollo de un proyecto orientado única y exclusivamente a prevenir y erradicar la práctica dopante?**

   a) **Real Federación Española de Fútbol (RFEF)**

   b) **Real Federación Española de Ciclismo (RFEC)**

   c) **Real Federación Española de Atletismo (RFEA)**

   d) **Todas las anteriores**

3. **La mayoría de los estudios concluyen que se debe actuar sobre el siguiente tipo de población para luchar contra el dopaje a partir de la prevención:**

   e) **Niños y adolescentes (edades tempranas)**

   f) **Adultos**

   g) **Deportistas de élite**

   h) **Personas mayores (ancianos)**

4. **Lee, comprende y realiza una breve reflexión acerca del siguiente párrafo:**

Practicar el dopaje es morir. Morir fisiológicamente, al modificar de manera profunda y a veces irreversible los procesos normales, mediante manipulaciones indebidas. Morir fisicamente, como lo han demostrado algunos casos trágicos en estos últimos años. Pero también morir espiritual e intelectualmente, al aceptar la trampa y el enmascaramiento de las propias posibilidades, al reconocer la propia impotencia o la falta de voluntad para aceptarse a sí mismo o para sobrepasar los propios límites naturales. Morir moralmente, por último, al autoexcluirse de hecho de las reglas de comportamiento que exige toda sociedad humana. (Samaranch, 1920-2010)

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CONCLUSIÓN

Conclusión general

Consideramos que, aparte de mantener los controles antidopaje y hacerlos más eficientes, el establecimiento de programas de prevención, basados en estrategias educativas durante una etapa temprana de la carrera del deportista con el objetivo de establecer y reforzar actitudes no tolerantes hacia el dopaje, podrían constituir un útil complemento para erradicar la cultura del dopaje de forma eficiente a medio-largo plazo. Por lo tanto, en términos de Alaranta et al. (2006), "*controlar el dopaje solo a través de tests no es suficiente; se hace necesario un profundo cambio a nivel de actitudes, el cual debe ser supervisado regularmente*".

Conclusiones específicas (relacionadas con los objetivos):

1. En general, a) existía poca información acerca de actitudes, creencias y conocimientos relacionados con el dopaje en deportistas de élite; b) se observó un uso generalizado de sustancias para la mejora del rendimiento en el deporte de élite, a pesar de la inquietante falta de conocimiento existente sobre suplementación dietética y sus derivados efectos secundarios.

2. La versión española de la *Escala de Actitud hacia la Mejora del Rendimiento* presentó unas propiedades psicométricas óptimas, por lo tanto su uso queda justificado.

3. El ciclismo español, en líneas generales, no es permisivo con el dopaje. Los directores de equipo, que constituían la muestra de mayor edad estando formada principalmente por ex ciclistas profesionales, mostraron actitudes más permisivas que los actuales ciclistas de élite; por tanto, consideramos que "algo está cambiando en el ciclismo en materia de dopaje". No obstante, la muestra de ciclistas de élite se mostró considerablemente más permisiva que la otra muestra de élite analizada: futbolistas.

4. Los futbolistas analizados no toleran el dopaje, siendo los de élite quienes mostraron menos permisividad. Se detectó una preocupante falta de conocimiento en materia de dopaje. Tanto los futbolistas como el resto de partes implicadas resaltaron la existencia de un tratamiento diferente entre deportes en relación al dopaje, siendo considerado el ciclismo como el más perseguido y los deportes colectivos como los menos perseguidos.

5. Los estudiantes de Ciencias del Deporte analizados mostraron su desacuerdo con el uso de sustancias prohibidas en el deporte sin existir diferencias en relación al tipo de deporte practicado (individual, colectivo y ambos).

6. El Snus afectó negativamente sobre la variabilidad de la frecuencia cardíaca, la percepción de arousal y carga mental y el rendimiento físico de los fubolistas amateur.

7. Los jovenes deportistas evaluados (tanto ciclistas como futbolistas) mostraron unas actitudes más permisivas que otros grupos de mayor edad, lo cual refuerza la idea de que programas preventivos son necesarios en una etapa temprana de la carrera del deportista debido a su vulnerabilidad.

CONCLUSION

Overall Conclusion

We suggest that, apart from maintaining doping controls and improving their efficiency, prevention programmes based on education strategies at an early stage of an athlete's career, in order to establish and reinforce non-tolerant attitudes towards doping, could be a useful aid to efficiently eradicate the doping culture in sport in the middle to long term. Therefore, according to Alaranta et al., (2006), "*controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed*".

Specific conclusions (related to aims):

1. In general, a) little was known about attitudes, beliefs, and knowledge regarding doping in elite athletes; b) the use of performance-enhancing substances is widespread in elite sport even though very little is known about dietary supplements and their possible side effects.

2. Spanish version of the Performance Enhancement Attitude Scale (PEAS) has satisfactory psychometric properties that justify its use.

3. Spanish cycling is not permissive in relation to doping. Cycling team managers, the oldest group and mainly composed of former cyclists, showed significantly more permissive attitudes than elite cyclists; therefore, it is suggested that "something is changing in cycling regarding doping". However, elite cyclists keep showing a considerably more permissive attitude than the other elite athletes group assessed: football players.

4. Football players analyzed are not tolerant towards doping, being the least lenient elite group. A worrying lack of knowledge concerning doping was detected. Footballers and other stakeholders assessed strongly highlighted the existence of

a different treatment among sports regarding doping; cycling is considered the most severely controlled and, team sports, the least.

5. Spanish Sport Sciences University students analyzed did disagree with the use of banned substances in competitive sports. No differences were found in terms of the kind of sport practiced (individual, team, and both).

6. Amateur footballers' heart rate variability, felt arousal and mental workload perceptions, as well as fitness performance, were impaired by acute Snus (nicotine) intake.

7. Young elite athletes assessed (both cyclists and footballers) showed more permissive attitudes than other older groups, which support the idea that anti-doping education programmes are needed at an early stage of athletes' career due to their vulnerability.

RESUMEN DE PRINCIPALES RESULTADOS Y SUGERENCIAS

Revisiones [Reviews]

I. Morente-Sánchez, J. & Zabala, M. (2013). Doping in Sport: A Review of Elite Athletes' Attitudes, Beliefs and Knowledge. *Sports Medicine*. 43(6): 395-411 (JCR: 5.237)

- ✓ En general, existía poca información sobre actitudes, creencias y conocimientos acerca de dopaje en deportistas de élite, probablemente debido a que a) el acceso a este tipo de muestras no es fácil; b) el dopaje es un tema tabú en la comunidad de deportistas de élite; y, c) podrían ver comprometida su carrera deportiva aunque la confidencialidad y anonimato fueran garantizados por los investigadores.

- ✓ Los deportistas que recurrían al uso de sustancias prohibidas principalmente lo hacía para mejorar el rendimiento, aunque reconocen que es una práctica deshonesta, no saludable e incluso peligrosa debido al riesgo de sanción.

- ✓ Las actuales generaciones de deportistas están más familiarizadas con la normativa antidopaje que las anteriores, aunque sigue existiendo una importante falta de conocimiento, la cual se podría subsanar con programas educativos bien diseñados.

- ✓ El "efecto de falso consenso" parece asumir un rol importante en el uso de sustancias prohibidas. Por tanto, la decisión de un deportista de consumir sustancias prohibidas podría estar influenciada por la creencia de que sus rivales también lo hacen.

- ✓ Aparte de los controles antidoping, las actuales medidas derivadas de los programas antidopaje son consideradas inefectivas e ineficientes, particularmente el sistema de localización permanente de la Agencia Mundial Antidopaje.

- ✓ Los deportistas de élite consideran que la dureza de las penas por dopaje es apropiada o no suficientemente severa, y ponen de manifiesto la diferencia en cuanto a trato entre deportes.

- ✓ Los asesores y demás partes implicadas en el deporte de élite que puedan influir sobre el comportamiento del deportista deben ser educados al respecto, y por tanto también deben ser castigados si se demuestra su influencia en alguna infracción de la normativa. De esta manera todas las partes implicadas en el deporte de élite estarían concienciadas de la magnitud del problema.

- ✓ Futuros estudios deberían tener en cuenta las posibles diferencias geográficas y/o culturales (religión, estatus económico, etc.).

- ✓ La actual metodología de investigación relacionada con la evaluación de las actitudes hacia el dopaje presenta limitaciones, especialmente la referida al uso de cuestionarios, ya que se usan diferentes tipologías, muchas de ellas no validadas. Todo ello hace que las comparaciones entre estudios sean prácticamente imposibles.

- ✓ Se recomienda el uso combinado de instrumentos de medida cualitativo y cuantitativo, tales como entrevista, cuestionarios (estandarizados ad-hoc y validados), pruebas de asociación implícita, e idealmente, pruebas biomédicas no invasivas (muestras de pelo o saliva). Podría haber una diferencia significativa entre lo que los atletas dicen, lo que realmente piensan y lo que hacen, una de las principales limitaciones hasta la fecha.

- ✓ Es muy importante que las instituciones deportivas a todos los niveles (desde la Agencia Mundial Antidopaje hasta los gobiernos regionales) destinen más recursos a proyectos de carácter psicosocial, ya que los de carácter biomédico (controles antidopaje) han sido la principal prioridad a la hora de invertir dentro los programas antidopaje actuales.

- ✓ Los organizadores de eventos y las federaciones deben velar para que las reglas no favorezcan a aquellos que recurren a la práctica dopante (por ejemplo: reduciendo las exigencias físicas de la competición, permitiendo descansos más grandes, tiempos muertos, y fomentado, en la medida de lo posible, la

importancia de los aspectos técnico-tácticos más allá de los físicos o condicionales).

II. **Morente-Sánchez, J. & Zabala, M. Supplements use in elite athletes in relation with attitudes, beliefs and knowledge.** ***International Journal of drugs policy*****. Submitted. (JCR: 2.759)**

- ✓ El uso de suplementos en deportistas de élite está generalizado. Como era de esperar, las prevalencia de uso de sustancias permitidas era mayor que la prevalencia de uso de sustancias prohibidas.
- ✓ Existe una inquietante falta de conocimiento sobre suplementación dietética y sus derivados efectos secundarios entre los deportistas.
- ✓ Este tipo de estudios proporciona información específica sobre potenciales usuarios de sustancias prohibidas, identificando por tanto grupos de riesgo sobre los cuales poder intervenir con mayor éxito desde la perspectiva de la prevención.

Instrumentos de medida [Measurement instruments]

III. **Morente-Sánchez, J., Femia-Marzo, P., & Zabala, M. (2014). Cross-cultural adaptation and validation of the Spanish version of the Performance Enhancement Attitude Scale (Petróczi, 2002).** ***Journal of sports science and medicine*****. Accepted. (JCR: 0.885)**

- ✓ La versión española de la *Escala de Actitud hacia la mejora del Rendimiento* (PEAS) posee propiedades psicométricas óptimas.
- ✓ La consistencia interna y la correlación test-retest fue buena, apoyando la fiabilidad de la escala. Además, se ha demostrado un ajuste aceptable al modelo sugiriendo que es suficiente evidencia para corroborar la validez de constructo de la escala.
- ✓ Por lo tanto, los resultados obtenidos habilitan el uso de esta versión española del PEAS.

Deportes individuales [individual sports]

IV. Morente-Sánchez, J., Mateo-March, M., & Zabala, M. (2013). Attitudes towards doping in Spanish national cycling teams according to different Olympic disciplines. *PLoS ONE* 8(8): e70999. (JCR: 4.416)

- ✓ Los ciclistas del equipo nacional español de las diferentes disciplinas Olímpicas, en general, no son tolerantes con el dopaje.
- ✓ Los ciclistas de las modalidades de BMX y pista presentaron unas actitudes hacia el uso de sustancias prohibidas más permisivas que los ciclistas de MTB y carretera. En relación a estos potenciales grupos de riesgo, sería interesante analizarlos de forma más exhaustiva buscando las causas de esa permisividad para actuar sobre ellos de forma eficiente.
- ✓ Además, casi la mitad de la muestra evaluada declaró que existe un trato diferente en materia de dopaje entre el ciclismo y el resto de deportes.
- ✓ Casi el 10% de los ciclistas de élite evaluados han visto a otros incitando o siendo incitados a doparse.

V. Morente-Sánchez, J., Mateo-March, M., & Zabala, M. (2014). Attitudes towards doping in spanish road cycling national teams. *International Journal of Sport Psychology*. Accepted. *(JCR: 0.867)*

- ✓ Los españoles ciclistas de élite de la modalidad de carretera no son permisivos con el fenómeno del dopaje.
- ✓ Los participantes más jóvenes del presente estudio, los ciclistas de la categoría Junior, mostraron unas actitudes más permisivas que el resto de grupos analizados.
- ✓ Estos resultados refuerzan la idea de que, aparte de mantener los controles antidopaje, sería interesante la inclusión programas preventivos desde edades tempranas para educar en materia de dopaje tanto a los jóvenes ciclistas como a su entorno.

VI. Morente-Sánchez, J., Leruite, M., Mateo-March, M., & Zabala, M. (2013). Attitudes towards doping in Spanish competitive female cyclists vs triathletes. *Journal of Science and Cycling*. 2(2), 40-48

- ✓ Las ciclistas federadas españolas evaluadas se mostraron más permisivas hacia el uso de sustancias prohibidas en el deporte que las triatletas.

- ✓ **Morente-Sánchez, J., Mateo-March, M. Freire SantaCruz, C., & Zabala, M. Analysis of psychosocial factors in amateur cyclists according to their doping behaviour: users vs. Non-users.** ***Psychological Science. Submitted. (JCR: 4.431)***

- ✓ Los participantes amateur federados evaluados en esta carrera ciclista de carácter internacional (UCI Golden Bike) mostraron una actitud no permisiva hacia el dopaje, no obstante, en comparación con otros grupos analizados constituyen un grupo de riesgo.

- ✓ Los ciclistas amateur que reconocieron el consumo de sustancias prohibidas obtuvieron unas puntuaciones más elevadas en el PEAS (actitudes hacia el dopaje más permisivas) en comparación con aquellos que no habían recurrido a prácticas ilegales.

- ✓ Los participantes que reconocieron prácticas dopantes mostraron unos niveles de autoestima y autoeficacia menores y sobreestimaron ("efecto del falso consenso") el porcentaje deportistas dopados entre sus compañeros (uso proyectado), en comparación con aquellos que jamás habían recurrido al uso de sustancias prohibidas.

- ✓ Se observó que a más permisividad en relación a las actitudes hacia el dopaje, menos nivel de autoestima, menos nivel de autoeficacia y más uso proyectado.

- ✓ Observamos una correlación entre las actitudes hacia el dopaje y la autoestima, aunque dicha asociación era débil. Podría ser debido a que este tipo de muestra (ciclistas amateur) busca objetivos como la mejora del rendimiento en lugar de cambiar y/o mejorar su imagen corporal. En este sentido, recomendamos abordar este contenido en futuras investigaciones ya que hay cierta falta de información al respecto.

- ✓ Se detectó que las variables actitudes hacia el dopaje y autoeficacia podrían tener un importante valor como potenciales predictores del comportamiento dopante.

- ✓ Estos resultados apoyan la idea de que la batalla contra el dopaje podría ser complementada desde una perspectiva centrada en la prevención usando las actitudes como un predictor de comportamiento dopante aparte de mantener los controles antidopaje.

VII. Morente-Sánchez, J., Mateo-March, M., Freire, C., & Zabala, M. Opinión y experiencia respecto al dopaje de los directores nacionales de ciclismo españoles. ***Archivos de Medicina del Deporte*****. 31 (1), 359-368.**

- ✓ Los directores de equipo (ciclismo) españoles evaluados, muchos ex ciclistas profesionales, reconocían la existencia del fenómeno del dopaje y se consideraban a sí mismos como el principal agente responsable.

- ✓ Dos tercios de los directores de equipo españoles evaluados reconocían que habían sido instados a la práctica dopante y que conocían casos similares.

- ✓ La principal solución propuesta por este colectivo para erradicar el dopaje eran la "prevención temprana" e "incrementar el número de controles".

- ✓ Destacamos la cercana y reconocida coexistencia de esta muestra con el fenómeno del dopaje especialmente en el grupo formado por ex ciclistas profesionales.

VIII. Morente-Sánchez, J. & Zabala, M. Spanish cycling and attitudes towards doping of different stakeholders involved. ***Sociology of Sports Journal*****. Submitted. (JCR: 0.727)**

- ✓ En relación a las distintas partes implicadas en el ciclismo, los directores de equipo españoles evaluados, que constituían el grupo más veterano, mostraron actitudes más permisivas hacia el dopaje que el resto de grupos evaluados: ciclistas de élite, jóvenes ciclistas y preparadores físicos.

- ✓ Consideramos que "algo está cambiando en el ciclismo español" en materia de dopaje, ya que los ciclistas de élite de la actualidad son los que presentan actitudes menos permisivas.

- ✓ Los ciclistas jóvenes evaluados presentaron más permisividad hacia el dopaje que los ciclistas de élite y los preparadores físicos, este hecho refuerza la idea de que programas educativos de carácter preventivo son necesarios en edades tempranas.

Deportes colectivos [team sports]

IX. Morente-Sánchez, J. & Zabala, M. Attitudes, beliefs and knowledge related to doping in Spanish football players according to different categories. *Plos One*. Submitted. (JCR: 4.4116)

- ✓ Los futbolistas profesionales evaluados son considerablemente menos permisivos que los ciclistas de élite analizados en relación al fenómeno del dopaje.

- ✓ Para ambas muestras de deportistas de elite, ciclistas y futbolistas, el dopaje está asociado a la palabra "trampa"; la principal razón para recurrir a la práctica dopante fue "mejorar el rendimiento" para conseguir "logro deportivo"; el agente responsable de dopaje más mencionado fue "médico"; y la propuesta de solución para erradicar el dopaje más demandada fue reforzar "los controles antidopaje".

- ✓ En relación a las actitudes hacia el dopaje, los futbolistas de élite obtuvieron una puntuación en el PEAS menor (menos permisivos) que el resto de grupos evaluados: profesionales no-élite, amateur y sub-18.

- ✓ También observamos cómo el uso proyectado, es decir, el porcentaje de deportistas de tu especialidad que crees que recurren al dopaje, fue menor en la categoría de profesionales de elite.

- ✓ En el fútbol profesional se observó un uso generalizado de suplementos (casi 50%) y unos niveles muy bajos de conocimiento en materia de dopaje.

- ✓ Casi tres cuartos (73.5%) de los futbolistas evaluados consideraron que existe un trato discriminatorio entre deportes en materia de dopaje, siendo considerado el ciclismo como el deporte más perseguido (44%) y los deportes colectivos como los menos perseguidos (27.8%).

- ✓ Los futbolistas amateur y los de elite sub-18 fueron los grupos que presentaron mayor permisividad en cuanto a actitudes hacia el dopaje. Por tanto, estamos ante otro nuevo caso que refuerza la conclusión principal relacionada con la necesidad de establecer programas preventivos desde edades tempranas debido a su vulnerabilidad.

- ✓ En relación al conocimiento en materia de normativa antidopaje, casi toda (>90%) la muestra total de futbolistas no conocía la lista de sustancias prohibidas ni el significado del acrónimo "WADA".

- ✓ Cerca del 5% (4.5%) de la muestra total de futbolistas reconoció haber consumido alguna vez sustancias prohibidas, mientras que casi un cuarto de la misma (22.3) reconoció conocer personas que recurrían/recurrieron al dopaje alguna vez.

X. Morente-Sánchez, J. & Zabala, M. Situation of doping in technical staff members of Spanish football teams. ***Science and Medicine in Football*** **(special issue of** ***Journal of Sports Sciences*****). Submitted. (JCR: 2.082)**

- ✓ Un tercio (33.5%) de la muestra total evaluada de miembros de cuerpos técnicos de equipos de fútbol conocía a alguien que había recurrido alguna vez al dopaje, y además se reconocían a sí mismos como agentes responsables del dopaje, principalmente se hizo mención a los agentes "médico" y "entrenador".

- ✓ Observamos una preocupante falta de conocimiento acerca de la normativa antidopaje también entre los miembros del cuerpo técnico de los equipos de fútbol evaluados, sobre todo a nivel de entrenadores.

- ✓ Consideramos, por consiguiente, que los programas educativos de carácter preventivo en materia de dopaje no sólo deben estar orientados a los futbolistas, sino también a aquellos grupos implicados, que a su vez pueden influir sobre las actitudes y comportamientos de los deportistas.

Estudiantes de Ciencias del Deporte [Sport Sciences student]

XI. Morente-Sánchez, J., Mateo-March, M., Freire, C., & Zabala, M. Attitude towards doping in Spanish Sport Sciences university students according to the type of sport practiced: individual versus team sport. ***Science and Sport*****. Submitted (R3). (JCR: 0.490)**

- ✓ Los estudiantes de Ciencias del Deporte analizados, en general, están en desacuerdo con el uso de sustancias prohibidas.
- ✓ No se observaron diferencias en cuanto a actitudes hacia el dopaje en función del tipo de deporte practicado (individual, colectivo y ambos).
- ✓ Recomendamos estudios similares en diferentes países recurriendo al mismo instrumento de evaluación (por ejemplo: PEAS) para conocer y comparar las actitudes hacia el dopaje en la comunidad de Ciencias del Deporte, y para poder detectar posibles influencias culturales y/o geográficas.

Análisis de una sustancia en observación por la Agencia Mundial Antidopaje en 2013.

[Analysis of a substance placed on WADA's 2013 monitoring program]

XII. Morente-Sánchez, J., Zandonai, T., Mateo-March, M., Sanabria, D., Chiamulera, C. & Zabala, M. Acute effect of snus on physical performance and perceived cognitive load on amateur footballers. ***Scandinavian Journal of Medicine & Science in Sports*****. Submitted. (JCR: 3.214)**

- ✓ La ingesta de Snus afectó negativamente a la variabilidad de la frecuencia cardíaca, a la percepción de arousal y carga mental y al rendimiento físico en futbolistas amateur.
- ✓ No recomendamos el uso de Snus como ayuda ergogénica. Además, 4 de los 18 participantes en el estudio (22%) no pudieron finalizar la sesión de evaluación debido a mareos, taquicardia, y otros efectos secundarios de esta sustancia.

Propuesta de prevención [Prevention proposal]

XIII. Morente-Sánchez, J. & Zabala, M. (2014). Deporte, dopaje, ética y valores: pautas de intervención. ***Revista digital: efdeportes.*** **189**

- ✓ De acuerdo con la conclusión principal de esta Tesis Doctoral Internacional, para minimizar el fenómeno del dopaje sería interesante fomentar la aplicación de este tipo programas de prevención e información en los deportistas en sus edades tempranas, e involucrar en los mismos al resto de partes de implicadas (entrenadores, médico, familia, etc.), para establecer y fortalecer actitudes y comportamientos correctos.

Tabla 1. Resumen de resultados procedentes del PEAS de las distintas bases de datos analizadas en la presente Tesis Doctoral Internacional.

Resumen de resultados procedentes del PEAS (Perfomance Enhancement Attitude Scale: PEAS)	**n**	**Intrumento**	**PEAS (puntuación)**		**Error estándar**	**Fiabilidad (alfa Cronbach)**	**Administración**	**Situación científica**
Deportistas			**Media**	**DT**				
Ciclistas élite: equipos nacionales de ciclismo	74	PEAS	36,12	9,39	1,09	0,71	in situ (papel)	Artículo IV
Ciclistas federadas chicas	80	PEAS	36,63	14,27	1,60	0,85	online	Artículo VI
Triatletas federadas chicas	126	PEAS	32,37	11,41	1,02	0,78	online	Artículo VI
Ciclistas amateur: Quebrantahuesos edición 2011 (carrera UCI)	2022	PEAS	41,62	12,51	0,28	0,78	online	Artículo VII
Ciclistas amateur: Quebrantahuesos edición 2012 (carrera UCI)	344	PEAS	39,51	13	0,69	0,81	online	Artículo VII
Ciclistas: escuelas de la Federación Española Ciclismo	44	PEAS	37,82	11,30	1,70	0,72	in situ (papel)	Artículo IX
Futbolistas: desde élite hasta sub-18	1324	version 2013	34,02	11,08	0,30	0,79	in situ (papel)	Artículo X
Futbolistas élite: 1ª y 2ªA división	304	version 2013	30,61	9,91	0,57	0,76	in situ (papel)	Artículo X
Futbolistas profesionales no élite: 2ªB división	308	version 2013	34,23	11,13	0,63	0,79	in situ (papel)	Artículo X
Futbolistas amateur: 3ª división	330	version 2013	35,05	10,34	0,57	0,71	in situ (papel)	Artículo X
Futbol base: élite sub-18 (juvenil-cadete)	334	version 2013	35,93	11,50	0,63	0.79	in situ (papel)	Artículo X
Futbolistas élite: 1ª división femenina	48	version 2013	33,75	14,73	2,13	0,91	in situ (papel)	Artículo X
Técnicos deportivos								
Ciclismo: directores equipo	114	PEAS	40,12	11,13	1,04	0,75	in situ (papel)	Artículo VIII
Fútbol: entrenadores (desde élite hasta sub-18)	101	version 2013	31,91	11,41	1,14	0,77	in situ (papel)	Artículo XI
Ciencias del Deporte								
Estudiantes Ciencias Deporte (Granada, España)	271	PEAS	34,69	9,31	0,57	0,76	Online	Artículo XII
Estudiantes Ciencias Deporte (John Moores University, Liverpool, UK)	123	version 2013	38,46	9,25	0,83	0,70	Online	***Inédito***
Estudiantes Ciencias del Deporte (15 Facultades españolas)	846	version 2013	36,29	9,91	0,34	0,75	Online	***Inédito***
Fútbol: preparadores físicos (desde élite hasta sub-18)	68	version 2013	31,27	9,44	1,14	0,68	in situ (papel)	Artículo XI
Entorno del Deportista								
Fútbol: entorno/resto staff (desde élite hasta sub-18)	68	version 2013	31,58	11,18	1,36	0,85	in situ (papel)	Artículo XI
Médicos: miembros de la Federación nacional Médicos Deportivos	85	version 2013	35,58	10,04	1,09	0,72	online	***Inédito***
Total participantes	5690							

SUMMARY OF MAIN FINDINGS AND SUGGESTIONS

Revisiones [Reviews]

I. Morente-Sánchez, J. & Zabala, M. (2013). Doping in Sport: A Review of Elite Athletes' Attitudes, Beliefs and Knowledge. *Sports Medicine*. 43(6): 395-411 (JCR: 5.237)

- ✓ In general, little was known about attitudes, beliefs, and knowledge regarding doping in elite athletes, probably due to the fact that a) the access to this high quality sample is not easy; b) doping is a taboo subject in elite athletes' community; and c) they could compromise their sporting career even if anonymity and confidentiality are guaranteed by the investigators.

- ✓ It has been emphasized that athletes who use banned substances mainly do so to improve their performance, even though most athletes acknowledge that doping is dishonest, unhealthy and risky due to the impact of sanctions.

- ✓ The current generation of athletes are more familiar with anti-doping rules than previous generations, but there is still a lack of knowledge that could be sorted out through well-designed educational programmes.

- ✓ The "false consensus effect" seems to play a key role in legitimizing the use of banned substances. It means that an individual's decision to take banned substances is influenced by the assumption that his or her competitors are also taking drugs.

- ✓ Apart from drug testing, current anti-doping programmes are generally considered to be ineffective and inefficient, particularly WADA's location reporting system.

- ✓ Elite athletes consider that the severity of punishment is appropriate or not hard enough, and they underline there are some differences between sports.

- ✓ The advisors and stakeholders who can influence athletes should also be educated and punished if they are found guilty of supporting doping. In this way,

all interested parties in elite sport would be aware of the magnitude of the problem.

- ✓ Further investigations should also consider the possible geographical and/or cultural differences (e.g. religion and economical status).

- ✓ The current research methods that focused on attitudes towards doping have some limitations, particularly questionnaires, which frequently differ among studies, are seldom non-validated and, therefore, incomparable.

- ✓ A combination of qualitative and quantitative measurements, using interviews, standardized questionnaires (bespoke and validated), implicit associations tests, and, ideally, less-invasive biomedical tests (e.g. based on hair or saliva samples) are recommended. There could be a significant difference between what athletes say, what they really think and what they do, a major limitation of data collection methods used to date.

- ✓ It is also very important that the sport institutions at all levels (from WADA to regional governments) provide more resources to psychosocial projects in relation to the biomedical approach (i.e., anti-doping controls), which have been the main priority of anti-doping programmes currently in use.

- ✓ Event organizers and federations should make sure that sporting rules do not favour the possible advantages of using banned substances in competitions (i.e., by reducing the physical exigencies in competitions, allowing longer recovery between stages, break times, and encouraging, where possible, the importance of technical/tactical aspects rather than physical aspects).

II. Morente-Sánchez, J. & Zabala, M. Supplements use in elite athletes in relation with attitudes, beliefs and knowledge. ***International Journal of drugs policy*****. Submitted. (JCR: 2.759)**

- ✓ The use of supplements is widespread in elite sport. As expected, non-banned substances are more frequently used than doping substances.

- ✓ There is also a worrying lack of information about dietary supplements and the possible side effects of performance enhancing substances.

- ✓ These studies provided specific information about potential doping users, identifying risk groups and, consequently, allowing a more successful intervention from the prevention perspective.

Instrumentos de medida [Measurement instruments]

III. Morente-Sánchez, J., Femia-Marzo, P., & Zabala, M. (2014). Cross-cultural adaptation and validation of the Spanish version of the Performance Enhancement Attitude Scale (Petróczi, 2002). *Journal of sports science and medicine*. Accepted. (JCR: 0.885)

- ✓ Spanish version of the Performance Enhancement Attitude Scale (PEAS) has satisfactory psychometric properties.
- ✓ Internal consistency and test-retest correlation were good, supporting the reliability of the scale. Moreover, it proved to be an acceptable measurement model fit and we suggest that there is enough evidence to sustain the construct validity of the scale.
- ✓ Therefore, the results justify the use of the PEAS in its Spanish version.

Deportes individuales [Individual sports]

IV. Morente-Sánchez, J., Mateo-March, M., & Zabala, M. (2013). Attitudes towards doping in Spanish national cycling teams according to different Olympic disciplines. *PLoS ONE* 8(8): e70999. (JCR: 4.416)

- ✓ In general, the cyclists from the Spanish national team who take part in Olympic cycling disciplines show no tolerance towards doping.
- ✓ BMX and Track riders are a little more permissive towards the use of banned substances than MTB and Road. Regarding those potential risk groups, it could be interesting to analyze them more exhaustively in order to look for the causes of that permissiveness and improve the interventions effectiveness.
- ✓ Moreover, almost half of the elite cyclists stated that there was a different treatment among cycling and other sports.

- ✓ Almost ten percent of elite cyclists assessed have seen other people inciting o being incited to dope.

V. Morente-Sánchez, J., Mateo-March, M., & Zabala, M. (2014). Attitudes towards doping in spanish road cycling national teams. ***International Journal of Sport Psychology.*** **Accepted.** ***(JCR: 0.867)***

- ✓ Spanish elite road cyclists are not permissive with doping.
- ✓ The youngest participants in this study, junior cyclists, showed more permissive attitudes towards doping than the rest of the groups assessed.
- ✓ This reinforces the idea that, apart from controls, prevention programmes are desirable from the earliest ages in order to educate cyclists as well as all the people around them.

VI. Morente-Sánchez, J., Leruite, M., Mateo-March, M., & Zabala, M. (2013). Attitudes towards doping in Spanish competitive female cyclists vs triathletes. ***Journal of Science and Cycling*****. 2(2), 40-48**

- ✓ Female competitive under-licensed Spanish cyclists assessed were more permissive towards the use of banned substances than triathletes.

VII. **Morente-Sánchez, J., Mateo-March, M. Freire SantaCruz, C., & Zabala, M. Analysis of psychosocial factors in amateur cyclists according to their doping behaviour: users vs. Non-users.** ***Psychological Science. Submitted. (JCR: 4.431)***

- ✓ Amateur competitive under-licensed participants of this International cycling race (UCI Golden bike), in general, were not permissive regarding doping in comparison with other groups analyzed, they could be considered a risk group.
- ✓ Confessed doping users scored significantly higher on the PEAS (more lenient attitudes towards doping) in comparison with those who reported not to use banned substances.
- ✓ Confessed dopers showed lower levels of self-esteem and self-efficacy and overestimated ("false consensus effect") the percentage of users among their mates (projected use) in comparison with non-dopers.

- ✓ It was observed that the more permissiveness regarding attitudes towards doping, the less self-esteem, the less self-efficacy, and the more projected use
- ✓ It is remarkable the negative correlation between attitudes towards doping and self-esteem. but the relationship was weak. It could be because this type of sample (amateur cyclists) looked for other aims, such as performance improvement, instead of changing their body image. This is the reason why we recommend further research in this field, as there is a significant lack of information on this matter.
- ✓ It was detected that the variables attitudes towards doping and self-efficacy could be potential predictors to detect doping users.
- ✓ These results support the idea that the battle against doping could be complemented from a preventive antidoping perspective, apart from maintaining drug testing, using attitudes like a doping behaviour predictor

VIII. Morente-Sánchez, J., Mateo-March, M., Freire, C., & Zabala, M. (2014). Opinión y experiencia respecto al dopaje de los directores nacionales de ciclismo españoles. ***Archivos de Medicina del Deporte*****. 31 (1), 359-368.**

- ✓ Spanish cycling team managers assessed, mainly former professional cyclists, accepted the existence of the phenomenon of doping and they also recognized they were the main responsible doping agent.
- ✓ Two thirds of Spanish cycling team managers assessed recognized that they have been suggested to dope and also know similar cases.
- ✓ The main proposals of solutions to eradicate doping were "prevention from early ages" and "increase the number of controls".
- ✓ It was underlined a recognized and close coexistence with doping for the total sample, especially from the perspective of former professional cyclists.

IX. Morente-Sánchez, J. & Zabala, M. Spanish cycling and attitudes towards doping of different stakeholders involved. ***Sociology of Sports Journal*****. Submitted. (JCR: 0.727)**

- ✓ Regarding cycling stakeholders, cycling team managers, the oldest group, are significantly more lenient towards doping than other groups assessed: elite cyclists, young cyclists and physical trainers.

- ✓ It could be suggested that "something is changing in Spanish cycling" in relation to doping, because the current elite cyclists showed the least permissive attitudes towards doping.

- ✓ Data from the youngest cyclists, more permissive than elite cyclists and physical trainers, support the idea that anti-doping education programmes are needed from early ages.

Deportes colectivos [team sports]

X. Morente-Sánchez, J. & Zabala, M. Attitudes, beliefs and knowledge related to doping in Spanish football players according to different categories. *Plos One*. Submitted. (JCR: 4.4116)

- ✓ Professional footballers assessed are considerably less permissive than Spanish elite cyclists assessed regarding the phenomenon of doping.

- ✓ For both elite athletes samples assessed, cyclists and football players, doping is associated with the word "cheating"; the main reason for the initiation in doping was "improving performance" for "sport achievement"; the main responsible agent of doping was "doctor"; and the most mentioned proposal to sort out the problem was "reinforcing doping tests".

- ✓ Regarding attitudes towards doping, elite professional footballers scored significantly lower (less permissive) on the PEAS than other groups assessed: professional non-elite, amateur and elite under-eighteen football players.

- ✓ It was also observed how the projected use, percentage of other footballers who are assumed to use banned substances, was lower in elite professional footballers than in other groups assessed.

- ✓ In professional football, high levels of supplements use (almost 50%) and very low levels of knowledge regarding doping were found.

- ✓ Almost three quarters (73.5%) of footballers assessed stated that, regarding doping, there was "a different treatment among sports", and "cycling" is considered as the most severely controlled (44%) and, "team sports", the least (27.8%).

- ✓ Under-eighteen amateur and elite footballers were a little more lenient towards doping than other samples analyzed. Furthermore, this is another example that reinforces the idea that anti-doping education programmes are needed from early ages due to their vulnerability.

- ✓ Regarding knowledge of antidoping rules, the vast majority of the sample (>90%) of footballers assessed did not know neither the list of banned substances nor the meaning of the acronym "WADA".

- ✓ Almost 5% (4.5%) of total sample of footballers assessed recognized having used banned substances and almost one quarter (22.3%) knew dopers.

XI. Morente-Sánchez, J. & Zabala, M. Situation of doping in technical staff members of Spanish football teams. ***Science and Medicine in Football*** **(special issue of** ***Journal of Sports Sciences*****). Submitted. (JCR: 2.082)**

- ✓ One third (33.5%) of the sample of members of football technical staff assessed knew somebody who had used any doping substances and they also recognized they were the main doping responsible agents ("doctor" and "coach" were the most frequently reported).

- ✓ A worrying lack of knowledge about antidoping rules was also detected among members of football technical staff assessed, mainly coaches.

- ✓ It is underlined that education programmes to prevent doping are desirable not only for football players, but also for other football stakeholders that play an important role in relation to their influence on athletes' decisions and behaviour.

Estudiantes de Ciencias del Deporte [Sport Sciences students]

XII. Morente-Sánchez, J., Mateo-March, M., Freire, C., & Zabala, M. Attitude towards doping in Spanish Sport Sciences university students according to the type of sport practiced: individual versus team sport. ***Science and Sport*****. Submitted (R3). (JCR: 0.490)**

- ✓ Spanish Sport Sciences University students in general disagree with the use of banned performance enhancing substances in competitive sports.
- ✓ Moreover, there are no differences in attitudes towards doping due to the type of sport practiced (individual, team, or both).
- ✓ Further studies using the same validated assessment tools (i.e. PEAS) among students from different countries are recommended in order to improve understanding on the attitude towards doping in the Sports Sciences community and also to analyze the possible geographical and/or cultural influences.

Análisis de una sustancia en observación por la Agencia Mundial Antidopaje en 2013

[Analysis of a substance placed on WADA's 2013 monitoring program]

XIV. Morente-Sánchez, J., Zandonai, T., Mateo-March, M., Sanabria, D., Chiamulera, C. & Zabala, M. Acute effect of snus on physical performance and perceived cognitive load on amateur footballers. ***Scandinavian Journal of Medicine & Science in Sports*****. Submitted. (JCR: 3.214)**

- ✓ Amateur footballers' heart rate variability, arousal and mental workload perceptions, and fitness performance were impaired by acute snus intake.
- ✓ Snus use is not recommended as an ergogenic aid. In addition, 4 out of 18 participants (22%) could not finish the assessment session due to dizziness, tachycardia, and other snus' side effects.

Propuesta de prevención [Prevention proposal]

XIII. Morente-Sánchez, J. & Zabala, M. (2014). Deporte, dopaje, ética y valores: pautas de intervención. ***Revista digital: efdeportes.*** **189**

- ✓ According to the main conclusion of this International Doctoral Thesis, this type of information and prevention programmes - starting with athletes at a young age and involving other stakeholders (e.g., the athletes' doctors, coaches, or family) - are necessary to minimize the phenomenon of doping, and establish and reinforce correct attitudes and behaviours.

Table 1. Summary of results related to PEAS from different databases assessed in this International Doctoral Thesis.

Summary of results from PEAS (Perfomance Enhancement Attitude Scale: PEAS)	n	Intrument	PEAS (Overall score)			Reliability (alfa Cronbach)	Administration	Scientific Status
Athletes			**mean**	**SD**	**SEM**			
Elite cyclists: Spanish National teams	74	PEAS	36,12	9,39	1,09	0,71	in situ (on paper)	Paper IV
Cyclists: Female under-licence	80	PEAS	36,63	14,27	1,60	0,85	online	Paper VI
Triathletes: Female under-licence	126	PEAS	32,37	11,41	1,02	0,78	online	Paper VI
Amateur cyclists: Quebrantahuesos (UCI race) 2011 edition	2022	PEAS	41,62	12,51	0,28	0,78	online	Paper VII
Amateur cyclists: Quebrantahuesos (UCI race) 2012 edition	344	PEAS	39,51	12,62	0,68	0,81	online	Paper VII
Young cyclists: training camps Spanish Cycling Federation	44	PEAS	37,82	11,30	1,70	0,72	in situ (on paper)	Paper IX
Football players: from elite to U18	1324	version 2013	34,02	11,08	0,30	0,79	in situ (on paper)	Paper X
Elite football players: 1st and 2nd divisions	304	version 2013	30,61	9,91	0,57	0,76	in situ (on paper)	Paper X
Non-elite professional football players: 2nd B division	308	version 2013	34,23	11,13	0,63	0,79	in situ (on paper)	Paper X
Amateur football players: 3rd division	330	version 2013	35,05	10,34	0,57	0,71	in situ (on paper)	Paper X
Young football players: elite U18	334	version 2013	35,93	11,50	0,63	0.79	in situ (on paper)	Paper X
Elite football players: female 1st division	48	version 2013	33,75	14,73	2,13	0,91	in situ (on paper)	Paper X
Coaches								
Cycling team managers	114	PEAS	40,12	11,13	1,04	0,75	in situ (on paper)	Paper VIII
Football coaches: from elite to U18	101	version 2013	31,91	11,41	1,14	0,77	in situ (on paper)	Paper XI
Sport Sciences								
Sport Sciences students (University Granada, Spain)	271	PEAS	34,69	9,31	0,57	0,76	online	Paper XII
Sport Sciences students (J. Moores University, Liverpool, UK)	123	version 2013	38,46	9,25	0,83	0,70	online	***Unpublished***
Sport Sciences students (15 Spanish Faculties)	846	version 2013	36,29	9,91	0,34	0,75	online	***Unpublished***
Football fitness trainers: from elite to U18	68	version 2013	31,27	9,44	1,14	0,68	in situ (on paper)	Paper XI
Environment								
Football others memebers of technical staff: from elite to U18	68	version 2013	31,58	11,18	1,36	0,85	in situ (on paper)	Paper XI
Physicians: Spanish College of Sports Physicians	85	version 2013	35,58	10,04	1,09	0,72	online	***Unpublished***
Total participants	5690							

ANEXOS [ANNEXES]

a) **Versión 2013 del cuestionario utilizado.**

   [Questionnaires used: 2013 version]

b) **Difusión científica de los resultados en Congresos Nacionales e Internacionales.**

   [Scientific dissemination in National and International Congresses]

ANEXOS [ANNEXES]

a) Versión 2013 del cuestionario utilizado.

[Questionnaires used: 2013 version]

"Dopaje en el deporte: ACTITUDES, CREENCIAS Y CONOCIMIENTOS"

(versión: Deportistas)

Estimado compañero/a, los no más de 5 minutos que te llevará rellenar este cuestionario nos permitirán profundizar en el conocimiento del fenómeno del dopaje. Con tus respuestas nos ayudas a medir actitudes hacia el Dopaje en el mundo del deporte, lo que contribuirá, sin duda, a conocer y valorar la situación de forma objetiva para poder actuar en consecuencia. Este cuestionario es ***ANÓNIMO*** *y* ***VOLUNTARIO****, por lo tanto, te pedimos****SINCERIDAD****. Sin ella, todo será en vano.*

¡Muchas gracias por tu participación!

- ***Edad (años)**:
- ***Rodea el SEXO al que perteneces**: Masculino Femenino
- ***Provincia**: _____ ***País**: _____
-***Rodea en qué estrato socioeconómico te ubicarías:** Bajo Medio Medio-Alto Alto
-***Rodea tu posición a nivel académico alcanzado hasta la fecha:**
-ESO/Grado Medio -Bach/Grado Superior -Alumno Univ. -Diplomado -Licenciado -Máster

- ***Como DEPORTISTA EN ACTIVO, subraya el TIPO DE DEPORTE PRACTICADO:**
-Individuales (atletismo, gimnasia,…) -Colectivos (fútbol, baloncesto,…) -Ambos por igual -Ninguno

- ***¿Qué DEPORTE concreto practicas?:** _____

-*¿**Cuántos años llevas practicando este deporte? (AÑOS DE EXPERIENCIA):**_____

- *Como DEPORTISTA EN ACTIVO, ¿en qué NIVEL DE PRÁCTICA te enmarcarías? (rodea/subraya):
Aficionado (esporádico) / Amateur (práctica regular) / Profesional (dedicación exclusiva) / Élite (máx. categoría) / No soy

- * **MARCA LA CATEGORÍA en la que compites (una sola casilla)**:
Sénior (rodee la categoría): - Élite (máxima categoría) - Profesional - Amateur
Etapas de formación (rodea la categoría): - Juvenil - Cadete - Infantil - Alevín - Benjamín
Deportistas aficionados (práctica esporádica, no competitiva) ☐

-***En la actualidad, indica el número de horas que entrenas semanalmente**: _____

- *¿Sueles tomar algún suplemento nutricional o ayuda ergogénica para mantener/mejorar tu rendimiento, acelerar/acortar recuperación…? (rodea la respuesta): SI NO
-*Si tu respuesta ha sido afirmativa, indica cuál/cuáles_____

- *Autoevalúa tu conocimiento actual sobre la lista de sustancias y métodos prohibidos por la Agencia Mundial Antidopaje, valorando de 0 a 10, significando 0= no tengo ni idea y 10=conozco perfectamente la lista. Sinceridad. (marca la respuesta): 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10

- *¿Sabes qué significa el acrónimo WADA? (rodea la respuesta): SI NO
- *Si tu respuesta ha sido afirmativa, escribe la definición de WADA:_____

- *¿Conoces la lista de sustancias y métodos prohibidos por la Agencia Mundial Antidopaje? (rodea la respuesta): SI NO
-***Si tu respuesta ha sido afirmativa, escribe las categorías principales de dicha lista**:_____

- * El clenbuterol es un… (rodea la respuesta que consideres correcta)

- Anabolizante -Cannabinoide -Agente enmascarante -Glucocorticoesteroide -NS/NC

- *El Código Mundial Antidopaje establece que una sustancia será incluida en la lista de sustancias y métodos prohibidos siempre y cuando…

a) Mejore el rendimiento.
b) Presente un riesgo confirmado o potencial sobre la salud del deportista.
c) Atente contra el espíritu deportivo.
d) Cumpla con 2 de los 3 criterios establecidos en las opciones A, B y C.

*A continuación se te presentan 17 afirmaciones. Léelas sin prisa. En cada una de ellas debes indicar la puntuación que consideres según tu propia opinión, teniendo en cuenta que:

1= "TOTALMENTE EN DESACUERDO" **2**= "CLARAMENTE EN DESACUERDO"
3= "ALGO EN DESACUERDO" **4**= "ALGO DE ACUERDO"
5= "DE ACUERDO" **6**= "TOTALMENTE DE ACUERDO"

1. Legalizar productos para mejorar el rendimiento sería beneficioso para el deporte.	1	2	3	4	5	6
2. Doparse es necesario para ser competitivo.	1	2	3	4	5	6
3. Se exageran los riesgos relacionados con el dopaje.	1	2	3	4	5	6
4. Las drogas recreacionales motivan a entrenar y competir al más alto nivel.	1	2	3	4	5	6
5. Los deportistas no deberían sentirse culpables por saltarse las reglas y tomar fármacos para mejorar el rendimiento.	1	2	3	4	5	6
6. Los deportistas son presionados para tomar fármacos que mejoran el rendimiento.	1	2	3	4	5	6
7. Los problemas de salud y las lesiones derivados del entrenamiento riguroso son tan perjudiciales como las repercusiones del dopaje.	1	2	3	4	5	6
8. Los medios de comunicación exageran el asunto del dopaje.	1	2	3	4	5	6
9. Los medios de comunicación deberían hablar menos de dopaje.	1	2	3	4	5	6
10. El deporte es la única alternativa como profesión que tienen los deportistas.	1	2	3	4	5	6
11. Los deportistas que toman drogas recreacionales lo hacen porque les ayudan en el deporte.	1	2	3	4	5	6
12. Las drogas recreacionales ayudan a superar el aburrimiento durante los entrenamientos.	1	2	3	4	5	6
13. El dopaje es una parte inevitable del deporte competitivo.	1	2	3	4	5	6
14. Los deportistas suelen perder tiempo debido a lesiones y los fármacos pueden ayudarles a recuperar el tiempo perdido.	1	2	3	4	5	6
15. Doparse no es hacer trampas ya que todo el mundo lo hace.	1	2	3	4	5	6
16. Sólo debería valorarse la calidad del rendimiento, no la manera con la que se consigan.	1	2	3	4	5	6
17. No hay diferencia entre utilizar fármacos, formas aerodinámicas o bañadores especiales, ya que todos sirven para mejorar el rendimiento.	1	2	3	4	5	6

- *Indicaen orden de importancialas 3 primeras palabras que se te vengan a la mente asociadas a Dopaje:

1ª_____; 2ª_____; 3ª_____

- *Indicaen orden de importancia las 3 razones por las que un deportista podría llegar a recurrir al Dopaje:

1ª_____
2ª_____
3ª_____

- *Indicaen orden de importancia 3 agentes responsables del dopaje en el deporte:

1º_____; 2º_____; 3º_____

- *¿Consideras que hay diferencias entre deportes en cuanto al dopaje? (Rodea) SÍ NO
- *Si la respuesta ha sido afirmativa, **¿cuáles consideras los deportes más y menos perseguidos?**:
-Más perseguidos:
-Menos perseguidos:

- *¿Alguna vez te han instado o sugerido al dopaje A TI? (Rodea) SI NO
- *Si la respuesta ha sido afirmativa, **¿Qué tipo de agente?**:
-Compañero deportivo -Médico -Entrenador -Pareja -Amigo/Conocido -Familiar
-Otro: _____

- *¿Alguna vez has visto que insten al dopaje a OTRO/A COMPAÑERO/A? (RODEA) SI NO
- ***Si la respuesta ha sido afirmativa, **¿Qué tipo de agente?
-Compañero deportivo -Médico -Entrenador -Pareja -Amigo/Conocido -Familiar
-Otro: _____

- *¿Conoces a ciencia cierta a alguien que haya tomado conscientemente alguna sustancia prohibida? (rodea la respuesta):-SI -NO

- *¿Alguna vez has tomado conscientemente alguna sustancia que viole las reglas de dopaje de la Agencia Mundial Antidopaje? (rodea la respuesta):-SI -NO

- *Dentro de tu especialidad deportiva, ¿qué porcentaje (0 a 100%) de deportistas crees que utiliza sustancias prohibidas? (indica el % múltiplo de 5):_____%

- *Imagina que existe una sustancia prohibida que mejora significativamente el rendimiento y es indetectable. ¿Cuántos deportistas de especialidad crees que recurrían a ella? (rodea la respuesta):
-Todos -Probablemente la mayoría - Probablemente algunos -Nadie -NS/NC

- *¿Recurrías tú a ella?(rodea):-Sí -Probablemente, sí - Probablemente, no -No -NS/NC

- *Si te garantizaran la inexistencia de efectos secundarios ¿Recurrirías a ella? (rodea la respuesta):
-Sí -Probablemente, sí - Probablemente, no -No -NS/NC

- *A sabiendas de que sus efectos secundarios podrían acortar tu esperanza de vida, ¿Recurrirías a esta sustancia que mejora significativamente el rendimiento y es indetectable? (rodea respuesta):
-Sí -Probablemente, sí - Probablemente, no -No -NS/NC

- *¿Cómo de feliz estás en relación a tu imagen corporal? (rodea la respuesta):
-Muy descontento -Descontento -Indiferente -Contento -Muy contento -NS/NC

- Consideras alguna propuesta para erradicar el dopaje. Enumera si fuera necesario diferentes propuestas de soluciones:

Si quieres conocer tus resultados respecto a la media de las demás respuestas, de forma anónima puedes añadir aquí un código o Nick que sólo tú debes conocer. Así podrás identificarte entre todas las respuestas y, si en el futuro repetimos la experiencia, podrás comprobar los posibles cambios. Por ejemplo los 4 últimos números de tu móvil, o el de tu mejor amigo/a... o cualquier palabra que puedas recordar fácilmente.* ***NICK*: _____

Tu aportación permitirá conocer mejor la situación del dopaje en el deporte, con el fin de actuar en consecuencia.
MUCHAS GRACIAS.
Para cualquier duda o aclaración puedes contactar con nosotros en el email:mikelz@ugr.es; jaimemorente@ugr.es;

"Doping in sport:ATTITUDES, BELIEFS AND KNOWLEDGES"

(version: Athletes)

Dear colleague, completing this questionnaire will take you no longer than 5 minutes and it will allow us to go in depth in the knowledge of the doping phenomenon. Your answers will help us to measure different attitudes to doping in the world of sport, contributing, clearly, to know and assess, objectively, the situation to act in consequence. This questionnaire is ***ANONYMUS*** *and* ***VOLUNTARY****, therefore, we expect you to answer it with* ***SINCERITY.*** *Without it, all will be in vain.*

¡Thank you for your participation!

- ***Age (years)**:
- ***Indicate your sex**: Male Female
- ***County/region**: _____ ***Country**: _____
- ***Encircle your socioeconomic status:** Low Middle Middle-HighHigh
- ***Encircle your academic level:**

-High school -College -University student -Associate´s degree -Graduate-Master

- ***If you are or were ATHLETE, underline the KIND OF SPORT PRACTICED:**

AnyoneIndividual sports (athletics, gymnastics,…)Team sports (football, basketball,…) Both equally

- ***Which sport do you particularly practice?**_____

-***How long have you been practicing this sport (YEARS OF EXPERIENCE)?:** _____

- ***As ATHLETE, what is your LEVEL of practice? :**

Amateur(sporadic) / Amateur (regular practice) / Professional (exclusive dedication) / Elite (máx. category) / I am not

- ***As SC, match the category where your athletes compete (encircle one)**:

Senior (circle category): - Elite - Professional - Amateur

Academy stage (circle category):

-Senior elite (max category) -Senior professional (exclusive education) -Under 16 -U 15 -U 14 -U 13 –U12 –U11 –U 10 –U 9 -U8 –U 7 –U 6 -Amateur (sporadic practice)

Amateur athletes (sporadic practice) ☐
I am SC but I do not work as it. ☐
I am not sport coach ☐

-***At the present time, how many hours do you spend training per week**: _____

- *¿Do you usually take/recommend any nutritional supplement or ergogenic aid to keep/increase performance, accelerate recovery, and so on? (Circle the answer): YES NO
-*If you answered yes, indicate which one/s _____

- *Self-assess your current knowledge about the list of substances and methods prohibited by World Anti-doping Agency, between 0 and 10, meaning 0= I have no idea and 10= I know perfectly the list. Sincerity (match the answer): 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10

- *¿Do you know what the acronym WADA mean?(encircle the answer): YES NO

-*If your answer was yes, write the definition of WADA:_____

- *¿Do you know the list of substances and methods prohibited by the World Anti-Doping Agency? (encircle the answer): YES NO

-*If your answer was yes, write the main categories of the list: _____

- * Clenbuterol is a … (encircle the correct answer)

-Anabolic effects substance -Cannabinoid -Masking agent -Glucocorticosteroid -DK/DA

- *The World Anti-doping Code established that a substance will be included in the substances and methods list when…

a) Enhancing performance.
b) Presenting a potential or confirmed risk on the athlete´s health
c) Threateningsporting spirit.
d) Meet with 2 of the 3 criteriaestablished in the options A, B and C.

*Below, then you have 17 statements. Read them carefully.You must indicate the score considered according to your own opinion, considering:

1= "TOTALLY DISAGREE" **2**= "STRONGLY DISAGREE"
3= "SOMEWHAT DISAGREE" **4**= "SOMEWHAT AGREE"
5= "AGREE" **6**= "TOTALLY AGREE"

1. Legalizing performance enhacements would be beneficial for sports.	1	2	3	4	5	6
2. Doping is necessary to be competitive.	1	2	3	4	5	6
3. The Risks related to doping are exaggerated.	1	2	3	4	5	6
4. Recreational drugs give the motivation to train and compete at the highest level.	1	2	3	4	5	6
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1	2	3	4	5	6
6. Athletes are pressed to take performance-enhancing drugs.	1	2	3	4	5	6
7. Health problems related to rigorous training and injuries are just as bad as from doping.	1	2	3	4	5	6
8. Media blows the doping issue out of proportion.	1	2	3	4	5	6
9. The media should talk less about doping.	1	2	3	4	5	6
10. Athletes have no alternative career choices, but sport.	1	2	3	4	5	6
11. Athletes who take recreational drugs, use them because they help them in sport situations.	1	2	3	4	5	6
12. Recreational drugs help to overcome boredome during training.	1	2	3	4	5	6
13. Doping is an unavoidable part of competitive sport.	1	2	3	4	5	6
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	1	2	3	4	5	6
15. Doping is not cheating since everyone does it.	1	2	3	4	5	6
16. Only the quality of performance should matter, not the way athletes achieve it.	1	2	3	4	5	6
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1	2	3	4	5	6

- *Indicate in order of importance the 3 first words which come to your mind related to doping:

1ª_____; 2ª_____; 3ª_____

- *Indicate in order of importance 3 reasons because an athlete could eventually use doping:

1ª_____
2ª_____
3ª_____

- *Indicate in orderof importance 3 agents responsible of doping in sport:

1º_____; 2º_____; 3º_____

- *¿Do you consider that there are differences between sports in doping? (Circle) YES NO

- *If your answer was yes, **¿which sports do you consider more and less persecuted?**:

-More persecuted:

-Less persecuted:

- *¿Have YOU ever been urged or suggested to take drugs? (Circle) YES NO

- *If the answer was yes, **¿Which kind of agent did suggest it to you?**:

-Sport mate -Doctor -Coach -Boy/Girlfriend -Friend/Acquaintance -Relative

-Other: _____

- *¿Have you ever seen OTHER/MATE being urged or suggested to take drugs (Circle)YES NO

- ***If theanswer was yes, **¿Which kind of agent have you seen urging or suggesting it?

-Sport mate -Doctor -Coach -Boy/Girlfriend -Friend /Acquaintance -Familia

-Other: _____

- *¿Do you know for sure if anyone which have taken any prohibited substance aware? (Encircle the answer): **-** YES -NO

- *¿Have you ever used any prohibited substance and/or method which break the rules of the World Anti-Doping Agency? (Circle): **-**YES -NO

- *Within your sport, ¿Which percentage (0 a 100%) of athletes do you think they use substances or methods prohibited? (indicate the %,multiple of 5): _____%

- *Imaging that, a prohibited substance which enhance significantly performance and it is undetectable, exists. ¿How many athletes of your sport do you think that would use it? (Encircle the answer):

-Everyone -Probably, most of them - Probably, some of them -Anyone-DK/DA

- *¿Would you use it?(encircle): **-**Yes -Probably, yes - Probably, no -No -DK/DA

- * If the absence of side effectswould be guaranteed ¿Would you use it? (Encircle the answer):
-Yes-Probably yes - Probablyno -No -DK/DA

- *If you would know that its side effects could shorten the life expectancy, ¿Would you use this substance to improve significantly performance and which is? (Encircle answer):
-Yes -Probably, yes - Probably, no -No -DK/DA

- *¿How satisfied are you with your body image?(Encircle the answer):
-Very dissatisfied -Dissatisfied -Indifferent -Satisfied -Very satisfied -DK/DA

- Do you consider any proposal to eradicate doping?Lists as necessary different solutions:

If you would like to know you results about the mean of the others answers, anonymously, you may add in here a code or Nick which only you must know. Indeed, you will be able to identify between all the answers and, if in the future, we repeat the experience, you will be able to check the changes. For example, the last 4 digits of your mobile phone, or your best friend´s… or any word which you can remember easily.* ***NICK*: _____

Tu aportación permitirá conocer mejor la situación del dopaje en el deporte, con el fin de actuar en consecuencia.
MUCHAS GRACIAS.
Para cualquier duda o aclaración puedes contactar con nosotros en el email: mikelz@ugr.es; jaimemorente@ugr.es

b) Difusión científica de los resultados en Congresos Nacionales e Internacionales.

[Scientific dissemination in National and International Congresses]

PROYECTO "PREVENIR PARA GANAR". UNA INTERVENCIÓN PARA ERRADICAR EL DOPAJE EN EL CICLISMO DESDE LA FORMACIÓN EN VALORES

Zabala M[1,2], Sanz L[1], Durán J.[3], Morente-Sánchez J[2], Sánchez-Sánchez E[2]

[1]Real Federación Española de Ciclismo, [2]Facultad de Ciencias de la AF y el Deporte (Universidad de Granada), [3]INEF de Madrid (Universidad Politécnica de Madrid). prevención.dopaje@rfec.com

INTRODUCCIÓN

El dopaje es un hecho asociado al hombre que a lo largo de su historia ha buscado un mayor rendimiento físico en la ingesta de plantas y sustancias de su entorno, ya fuese con el objeto de enfrentarse al medio y sus dificultades o a sus congéneres con distintas pretensiones. En la era moderna, la atención institucional hacia el dopaje se acentúa con la muerte en competición del ciclista inglés Tom Simpson quien fallece ante las cámaras de televisión en el Tour de Francia de 1967 ascendiendo el mítico "Mont Ventoux". Ya en 1988 con el escándalo del dopaje del velocista Ben Johnson en los JJOO de Seúl o los diferentes casos de dopaje de atletas (Caso Balco) o ciclistas (Caso Festina), en la década de los 90 el problema comienza a resultar de gran trascendencia y calado social [1]. Por ello, han proliferado desde las instituciones diferentes leyes específicas y organismos que pretenden velar por la salud de los deportistas y por la integridad de los valores intrínsecos al deporte (Agencia Mundial Antidopaje o Agencia Estatal Antidopaje -AEA-). La AEA postula como uno de sus objetivos iniciar planes "integrales" de actuación en materia de dopaje. Así, en línea con la demanda social e institucional tan evidente y ante el acuciante problema del dopaje en concreto en el ciclismo, que le ha hecho perder mucha credibilidad en los últimos años a nivel social, se hace necesario intervenir desde la prevención, abogando por la formación, la puesta en conocimiento del fenómeno, sus consecuencias y la implicación de todos los agentes del ciclismo [2].

Los recursos necesarios se distribuyen en: a) Material (trípticos, pegatinas, documentación varia, libros específicos, retroproyector portátil y ordenador personal para proyecciones); b) Infraestructura (carpas para presentaciones en competiciones, vehículos RFEC); c) recursos humanos (Coordinador General, Equipo formador de base -6 profesores-, Equipos de formación territorial -perfil de Maestro en Educación Física o Licenciado en CC del Deporte, psicólogos, ciclistas o exciclistas profesionales para aportar experiencias personales y punto de vista-), Monitores y 2 Becarios (uno en 2011 y 2012 y otro en 2012).

MÉTODO

Desde la Real Federación Española de Ciclismo (RFEC) se ha puesto en marcha un programa de intervención que contribuirá a la formación de deportistas, técnicos, familiares,… que además de informar y formar en conceptos específicos haga hincapié en lo relativo a los valores intrínsecos del deporte como el Deporte-salud, el *Fair play*… para tratar de concienciar al respecto, de tal manera que se consiga incidir en las actitudes y valores de todos los implicados; de ahí que se pretendan los siguientes objetivos:

1)Formar en conceptos relacionados con la práctica del doping y sus efectos a distintos niveles. 2) Concienciar de la importancia de un deporte libre de prácticas dopantes. 3) Cambiar los patrones de conocimiento y opinión acerca de la práctica dopante, así como determinados patrones de conducta observados, desde una actitud crítica
2)en base al "Juego Limpio" y el respeto a las normas de convivencia deportiva.

Para su consecución, en el periodo 2009-2012, las acciones que se han iniciado son: Creación de proyecto; Organización del grupo de trabajo de base (6 personas); Elaboración de contenidos específicos por rangos de edad; Propuesta a la comisión técnica de la reglamentación en materia de formación en competiciones de manera obligatoria; Confección de material específico para formadores y técnicos de territoriales; Elaboración de entrevistas-cuestionarios a técnicos, directores, federativos, padres y deportistas; Creación de un Link específico en la web www.rfec.com y de una línea telefónica de atención anónima; Desarrollo de encuesta de necesidades y opiniones de federaciones territoriales; Realización de Curso de formadores y talleres prácticos a técnicos de territoriales. Títulos de "Monitor en prevención de dopaje Niveles I y II"; Inclusión específica en el curso de Director Nacional de Ciclismo; Realización de seminarios específicos nacionales; Realización de un congreso ibérico específico; Realización de un congreso mundial específico; Difusión de avances en prensa, revistas especializadas y divulgativas, congresos, cursos y revistas científicas o tesis doctorales.

RESULTADOS Y DISCUSIÓN

Actualmente ya se han confeccionado contenidos específicos por edades y categorías, tanto en formato *Word* como en *Powerpoint,* para efectuar charlas y foros de trabajo, y se está finalizando el diseño de cuestionarios de opinión con metodología de escalas tipo Likert para su posterior validación. Por otro lado, se están elaborando índices para que los monitores realicen la observación sistemática de actitudes basadas en comportamientos ante determinadas situaciones presentadas. Próximamente se comenzará con la formación de formadores y posteriormente con la propia intervención territorial a nivel estatal.

CONCLUSIONES

Desde la RFEC se pretende velar por la salud de los deportistas y por el *Fair play*, siendo la prevención y la educación en valores una prioridad que conviva con los medios de control ya existentes. Esta intervención es una clara evidencia.

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BOOK OF ABSTRACTS

Edited by

Emin Ergen, Bülent Ülkar, Rüştü Güner

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* The abstracts in the Supplement were prepared by the authors. Their styles and formats were only edited by the Committee. The accuracy, form of citation, nomenclature, and the like, all remain the responsibility of the author.

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EDITORIAL

Dear Colleagues and Friends,

On behalf of Turkish Sports Medicine Association, we are proud to host 6th. EFSMA European Sports Medicine Congress in Antalya, Turkey; a country founded in Anatolia with a ten thousand year old cultural heritage, acting as a geographic and socio-cultural link between West and East.

The choice of Antalya as the venue of our Congress is to provide a unique ambiance with the incomparable historic presence, natural beauty and cultural charm of this part of Anatolia. We hope that this Congress in the land of pioneers of medicine such as Avicenna and Hipocrates inspires and stimulates you. Surrounded by amazing scenery of sharp contrasts, Antalya, Turkey's principal resort, is an attractive city with shady palm-lined boulevards and a prize-winning marina. Antalya has been continuously inhabited since its founding in 159 BC by Attalos II, a King of Pergamum, who named the city Attaleia after himself.

The Romans, Byzantines and Seljuks successively inhabited in Antalya before Ottomans ruled the territory.

Today, Antalya is a famous tourism center in Mustafa Kemal Ataturk's modern Turkish Republic, providing a premium touristic service mainly to Europe.

We would like to welcome you to share the recent scientific developments in the area of sports medicine. We believe this Congress provides a high quality scientific environment for the presentation of new research and exchange of information by all disciplines related to sports and medicine.

In recent years, the EFSMA has grown and developed into what is now a leading and dynamic force in Sports Medicine in Europe. It is with the same dynamism and expertise that are the hallmarks of a high calibre and carefully arranged scientific programme. A thorough discussion and critical evaluation of the latest advancements in sports medicine are key features of the scientific programme. The sessions, which will include educational courses, state-of-the-art lectures, panel and round table discussions and symposia, also provides an opportunity for all sports medicine health care providers to exchange views on current issues.

Besides the congress we assume that you would enjoy the land of sun, sea, history, culture, sports and humanity.

Abstract evaluation was a difficult task for referees. It showed that there was a great interest among sports medicine and sport science Family to the Congress. From over 400 abstract submissions, scientific commission has rejected 41 papers and sent 30 abstracts back for re-writing. 362 abstracts will be presented either orally or as posters during the Congress. This is the highest number of abstracts so far submitted for EFSMA Congresses.

We hope that the scientific level of the Congress, together with keynote speeches, panel discussions, workshops, courses and regular sessions, will be of satisfactory for all participants.

You will also find the texts of some invited speakers. We are grateful for the support of Scientific and Technological Research Council of Turkey for the publication of this supplement (abstract book) and Journal of Sports Science and Medicine for allowing it to be an indexed material. Our sincere thanks go to Pelin Adaylar for her meticulous desktop work.

Thanking for your interest and attendance.

On behalf of the Organizing Committee

Congress Chairman
Prof. Emin Ergen MD

Congress Secretary
Assoc. Prof. Bülent Ülkar MD

Scientific Program Coordinator
Prof. Rüştü Güner MD

DISCUSSION & CONCLUSION These findings revealed that swiss ball training may challenge the balance and control system. Also performing exercise on swiss ball may lead to improved recruitment of the core musculature and increased movement economy. Finally these findings suggest replacing swiss ball with conventional ones in sit-up exercise.
KEY WORDS swiss ball, abdominal strength, balance, EMG, running economy

The effects of regular aerobic training on blood paraoxonase and arylesterase activities and blood lipid and lipoprotein levels in women and the role of pon1-192 polymorphism on these effects

Gülbin Rudarli Nalcakan [1], S.Rana Varol [1], Faruk Turgay [1], Mesut Nalçakan [2] and Zeki Özkol [1]
[1] Ege Universitesi, Beden Egitimi ve Spor Yüksekokulu, [2] Izmir Karsiyaka Devlet Hastanesi, Izmir, Turkey

OBJECTIVE Regular aerobic training has positive effects on high density lipoprotein (HDL), of which antioxidant, antiatherogenic and protective effects for coronary heart disease (CHD) are well known. However, the effects of regular aerobic training on more recent risk factors of CHD such as blood paraoxonase (PON1) and arylesterase (AREST) that are associated with and responsible for the antioxidant potential of HDL, and the role of PON1-192 polymorphism on these potential effects in women are yet to be determined. The objective of this study was to determine the effects of regular aerobic training on blood PON1, AREST enzyme activities and lipid and lipoprotein profiles in premenopausal women and whether potential effects depended on the PON1-192 phenotype.
METHODS Subjects included 91 middle-aged, healthy, non-menopausal females who regularly performed aerobic exercise at least three times a week for a long period of time (EG, n=50) and those who did not do any exercise, to serve as controls (CG, n=41). Groups were analyzed for anthropometrical (body weight, height, body mass index, body fat ratio) and physiological (resting heart rate, blood pressure, maximal oxygen consumption) parameters. Activities of PON1, salt-stimulated paraoxonase (TSPON1), AREST and AREST activities of HDL and subgroups were determined in fasting venous blood by kinetic methods. Classical risk factors of CHD, including fasting serum triglyceride, total cholesterol (TC), HDL cholesterol (HDL-K) and its subgroups (HDL2-K, HDL3-K) levels were determined by standard enzymatic-colorimetric methods. Phenotyping of subjects for PON1-192 polymorphism were carried out based on TSPON1/AREST ratio. Subjects of aerobic exercise and control groups were classified as QQ with low activity, QR heterozygote, RR with high activity and R carriers [(RT)=(QR+RR)].
RESULTS No significant differences in serum PON1 and AREST activities and HDL and subgroups' AREST activities were found between EG and CG groups ($p>0.05$). However, with regard to PON1-192 polymorphism, PON1 ($p<0.01$) activity was significantly and HDL3-AREST activity (23%, $p>0.05$) was non-significantly higher in QQ phenotype in the exercise group, compared to the CG group. No significant differences in the serum total AREST activity were noted between the three phenotype groups. EG group's serum HDL-K ($p<0.05$), HDL3-K ($p<0.05$), TC ($p<0.001$), and LDL-K ($p<0.01$) measurements were significantly higher than the CG. Further, regarding PON1-192 polymorphism, TC ($p<0.01$) and LDL-K ($p<0.05$) levels in the exercise QQ group and TC ($p<0.05$) and HDL-K ($p<0.05$) parameters in the exercise RT (QR+RR) group were significantly higher in comparison to those of the CG. No significant differences in classical risk factors of CHD were found between the control phenotype groups ($p>0.05$).
DISCUSSION & CONCLUSION Significant beneficial effects of long-term aerobic exercise on serum lipids and lipoproteins and PON1 enzyme activity were demonstrated in middle-aged premenopausal women. However, these effects depend on the PON1-192 phenotype.
KEYWORDS Aerobic training, paraoxonase, arylesterase, PON1-192 polymorphism, HDLand subgroups' cholesterol and arylesterase values, middle aged premenopausal women

Doping and professional road cycling: Perspective of cyclists versus team managers

Mikel Zabala [1], Luis Sanz [3], Javier Durán [2] and Jaime Morente [1]
[1] Faculty of Physical Activity and Sport Sciences / University of Granada / Granada, Spain, [2] National Institute of Physical Education - INEF / Madrid, Spain, [3] Spanish Cycling Federation / Madrid, Spain

OBJECTIVE Doping has been a big problem in Sport in the last decades and especially in Cycling. Scandals related to doping have decreased the status and credibility of cycling for the spectators and fans. In the last decade national and international institutions have spent a lot of resources on fighting against doping, while press has been also really interested in informing about doping cases. But while the cyclist is seen as the only guilty in this issue, there is no information about what cyclists think in the matter comparing it with coaches' perspective.

METHODS A total of 55 subjects (20 Spanish Professional road Cyclists -PC- and 35 coaches or team managers -TM-) participated in this study. All of them were voluntarily and anonymously interviewed and recorded following a close protocol focused on their opinions about doping. All the records were written and analyzed by means of AQUAD Five software (Analyses of Qualitative Data) to obtain the different categories and importance.
RESULTS The categories were divided by group: for PC the main responsible agents that evoke doping were 1) Team Managers, 2) Doctors, and 3) the cyclists, while for the TM the responsible were the 1) pressure of sponsors, 2) cyclists, 3) team managers, and 4) doctors. Both groups pointed out that media was not impartial treating all the sports, and cycling was worse treated than specially football, swimming or athletics. Also, both groups suggested that at the begining the business was around pro-doping, and nowadays they feel it is in anti-doping. While for PC the most important way to change this tendency is to educate from the early ages, for TM it is to make a bigger effort in anti-doping control and tests. For both groups the way cyclists have been controlled is inhuman and much harder than in other sports. Both groups recognize doping has a large tradition in cycling, although both think that nowadays this issue is more controlled than ever before.
DISCUSSION & CONCLUSION Both PC and TM think similarly about doping issue in cycling. The main difference is that cyclists think that TM are more responsible than PC, and the opposite do TM. Also, both groups think that cycling has been badly treated by anti-doping agencies and media. To treat this problem PC believe in education from earliest ages, and TM believe in more repression and control. It can be argued that intervention programs are needed to educate the youngest cyclists, parents and their social environment, coaches and team managers, or doctors, at the same time control tests need to be increased but also humanized.
KEY WORDS doping, cycling, opinion, coaches, cyclists

Treatments for osteochondral lesions of the ankle: A long term follow up and retrospective clinical and radiographic evaluation of pre and postoperative factors influencing prognosis

Ron Arbel, Guy Morag, Michal Goldvirt and Nehemia Blumberg
Tel Aviv Surasky Medical Center, Center of Sports Medicine, Tel Aviv, Israel

OBJECTIVE Osteochondral lesions of the ankle result from rotational injuries of the ankle in athletes. The purpose of this study is to evaluate the results of arthroscopic treatment of ankle osteochondral lesions and to define the clinical and arthroscopic factors influencing prognosis.
METHODS From 1993 to 2002 a total of 108 patients underwent 132 arthroscopic procedures for diagnosis and treatment of osteochondral lesions of the ankle. The evaluations included a pre and postoperative clinical scoring, radiographic evaluation including pre and postoperative anterior- posterior, lateral and mortise view of the ankle, as well as CT and MRI of the ankle. Operative techniques included: microfractures technique (81 patients), fixation of the lesions using polylactic acid “Biofix” rods (17 patients), diagnostic arthroscopy followed by cartilage lesions shaving (16 patients), retrograde drilling of the lesion to the subchondral bone (12 patients), bone graft filling of subchondral cysts (4 patients), osteochondral autografts (OATS, 2 patients).
RESULTS Traumatic etiology of the lesions was found to be associated with postero-medial talar lesions ($p<0.012$). Significant clinical and radiographic improvements comparing pre and post operative CT scoring ($p<0.005$), plane radiographs ($p<0.01$) and clinical score ($p<0.003$). No correlation was found between the x-ray CT findings and arthroscopic grading. Clinical improvements where found to correlate directly with CT grading ($p<0.05$). Fixation technique with “Biofix” was found to be associated with postoperative subchondral cyst formation detected on plane radiographs and on CT ($p<0.0001$). Tibial and talar “kissing lesions” correlated with poor pre operative clinical score ($p<0.05$). Lesions with sclerosis and or cyst on x-ray or CT before operation, appeared to have less clinical improvement with surgery ($p<0.05$).
DISCUSSION & CONCLUSION Ankle x-rays and CT plays a limited role in planing the intra-operative procedure. Findings like sclerosis and subchondral cyst carry less favorable prognosis, which is not reflected in the current classifications. Arthroscopy is a valuable tool for evaluation and treatment of ankle osteochondral lesions. The operative technique should be selected according to arthroscopic findings and the surgeon should be prepared to tailor the different types of treatment to each lesion.
KEY WORDS cartilage, ankle, microfracture, arthroscopy

DO PREVIOUS STUDIES AND EXPERIENCE AFFECT THE PERSPECTIVE ABOUT DOPING IN THE NEWEST SPANISH CYCLING TEAM MANAGERS?

Morente-Sánchez, J.[1], Freire, C.[1], Femia-Marzo, P.[2], Sánchez-Muñoz, C.[3] & Zabala, M.[1,3]

[1] *Faculty of Physical Activity and Sport Sciences, University of Granada (Spain)*
[2] *Department of Biostatistics, University of Granada (Spain)*
[3] *Spanish Cycling Federation, Madrid (Spain)*

Introduction

Nowadays the terms "cycling" and "doping" are associated (1). Doping cases of some cyclists (2) or the recent "Contador Case" only emphasize this theory. The aim of this study was to know the perspective of the latest Spanish cycling team managers (highest level) in relation to the phenomenon of doping taking into account their previous level of technical formation and studies.

Methods

The study was composed by a total of 87 participants involved in the course of Cycling Team Manager (Spanish Cycling Federation) in 2009 and 2010. Of the total sample, 15 subjects were graduated in Sport Sciences (Sport Sciences Formation -SS-), 36 had previous federative certification (Federative Formation -FF-), and 36 did not have any technical formation or study but had been previously professional cyclists (No Formation -NF-). A descriptive design was carried out using a specific questionnaire consisting in 7 opened questions, and then answers were analyzed and categorized showing percentage (%) values.

Results

The data obtained (%), comparing the different groups (SSF, FF, NF), were, respectively (table 1):

1-Words associated with doping: Cheating (60%, 63.89%, 35.29%); Results/Performance (53.33%, 30.56%, 27.45%).
2- Responsible agents of doping: Laboratories (13.33%, 63.89%, 28%); Coach/Manager (60%, 77.78%, 43.14%).
3-Differences Cycling vs Other sports: Discriminatory treatment (73.33%, 75%, 47.06%); Hardness of cycling (6.67%, 41.67%, 3.92%); Number of controls (26.67%, 30.56%, 9.8%).
4-Reasons for the initiation in doping: Sport achievements (60%, 66.67%, 47.06%); Contract/money (60%, 19.44%, 25.49%); External pressures (33.3%, 47.72%, 37.25%).
5 - Have you been suggested to dope?: SSF (Yes 46.7%); FF (Yes 50%); NF (Yes 72.2%).
6 - Have you seen other people inciting others or being incited?: SFF (Yes 53.3%); FF (Yes 52.8%); NF (Yes 75%).
7 - Proposed solutions: Prevention at early ages (40%, 52.78%, 23.56%); Awareness (33.33%, 25%, 19.1%).

Table 1. Descriptive statistics of the different groups of the Spanish cycling team managers.

	SSF (n=15)		FF (n=36)		NF (n=36)	
	% n	% Total Frequency	% n	% Total Frequency	% n	% Total Frequency
Words associated with doping:						
Cheating	60	17,31	63,89	22,33	35,29	14,52
Results/Performance	53,33	15,38	30,56	10,68	27,45	11,29
Money	33,33	9,62	36,11	12,62	31,37	12,90
Others	-	57,69	-	54,37	-	61,29
Responsible agents of doping:						
Laboratories	13,33	3,85	63,89	16,43	54,9	23,53
Coach/manager	60	17,31	77,78	20	43,14	18,49
Cyclists	20	5,77	30,56	7,86	29,41	12,61
Others	-	73,07	-	55,71	-	45,37
Differences Cycling vs Other sports:						
Hardness of cycling	73,33	37,93	75	30,68	47,06	35,82
Numbers of controls	26,67	13,79	30,56	12,5	9,8	7,46
Repercusión mediática	46,67	21,14	47,22	19,32	27,45	20,9
Others	-	27,14	-	37,50	-	35,82
Reasons for the initiation in doping:						
Sport achievements	60	17,31	66,67	21,05	47,06	21,24
Contract/Money	60	17,31	19,44	6,14	25,49	11,5
External pressures	33,33	9,62	47,22	14,91	37,25	16,81
Others	-	55,76	-	57,90	-	50,45
Have you been suggested to dope?						
Yes	46,7	-	50	-	72,2	-
Have you seen other people inciting others or being incited?						
Yes	53,3	-	52,8	-	75	-
Proposed solutions						
Prevention early ages	40	22,22	52,78	31,15	23,53	20,69
Awareness	33,33	18,52	25	14,75	19,61	17,24
More Controls	13,33	7,41	25	14,75	25,49	22,41
Others	-	51,85	-	60,65	-	39,66

% n: percentage of total sample of each group (SSF, FF or NF).
% total frequency: percentage of total answers (100%).

Discussion

Results support the theory that doping is a recognized reality, especially by NF. The SSF group associates "doping" with "performance" may be related to get a "better contract", while FF does the same with "cheating" possibly caused by "outside pressures". Newest managers recognize the main responsible agents involved in the phenomenon of doping. Federative Formation group considers that the main difference between cycling vs others is its hardness, while surprisingly NF does not see the number of controls as a difference with other sports. "Preventing at early ages" and "Awareness of cyclists" by means of psychosocial programs seem to be the most proposed solutions, being SSF group the clearest in this position. In summary, we find different perspectives that suggest that prevention must be taken into account.

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EUROPEAN COLLEGE OF SPORT SCIENCE
SPORTS SCIENCES:
NEW HORIZONS FROM A WORLD HERITAGE CITY

ATTITUDE TOWARDS PERFORMANCE-ENHANCING DRUGS IN SPANISH ROAD CYCLING NATIONAL TEAMS

Morente-Sánchez, J.[1], Freire, C.[1], Femia-Marzo, P.[2], Sánchez-Muñoz, C.[3] & Zabala, M.[1,3]

[1] Faculty of Physical Activity and Sport Sciences, University of Granada (Spain)
[2] Department of Biostatistics, University of Granada (Spain)
[3] Spanish Cycling Federation, Madrid (Spain)

Introduction

Doping has stained the world of competitive sport in the last years, especially in sports like Cycling and Athletics. To alleviate and mitigate this problem it has become necessary the roll of prevention working around attitudes towards doping at different levels (1), defending the education and formation at the earliest ages (2). The aim of the present study was to know and compare the attitudes towards performance-enhancing drugs (PED) in the cyclists that form the Spanish National road cycling teams.

Methods

A sample of 34 cyclists of the Spanish national teams (Junior men -J-, Under-23 men -U23-, Junior Women -JW-, and Elite Women -EW- categories) took part in the study that was divided into groups according to the competing category (9 J, 9 U23, 10 JW, and 6 EW). The subjects were taking part in an official training camp in Segovia (Spain) in January 2011. Descriptive design was carried out by means of a validated questionnaire (1) of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that supported the use of PED in sport. Mean value ± Standard Deviation was obtained for each item and Mann Whitney test for independent variables with Bonferroni post hoc was carried out.

Results

In general, the score for the mean of all the items was 2.06±0.39 (2=Through Disagree -Table 1-). The lowest score was observed for the item *"Doping is not cheating since everyone does it"* with 1.09±0.38, and the highest for *"The media blows the doping issue out of proportion"* with 4.53±1.48 (4=Slightly Agree; 5=Agree). Just for two items (*"The risks related to doping are exaggerated" and" There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance")* significant differences were observed between J (3.00) and the other groups U23 (1.22), JW (2.40), and EW (1.17) -p=0.000-, and between J (2.22) and the other groups U23 (1.00), JW (1.10), and EW (2.00) -p=0.001-, for the two items respectively (Table 2). For the rest items no significant differences between groups were observed.

Table 1. Descriptive statistics and Total Score of the Performance Enhancement Attitude Scale (PEAS) items.

	Spanish National Cyclist (n= 34)	
PEAS (Performance Enhancement Attitude Scale)	**Mean**	**SD**
1. Legalizing performance enhancements would be beneficial for sports.	1,47	0,83
2. Doping is necessary to be competitive.	1,12	0,41
3. The risks related to doping are exaggerated.	2,03	1,14
4. Recreational drugs give the motivation to train and compete at the highest level.	1,56	0,96
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1,47	0,90
6. Athletes are pressured to take performance-enhancing drugs.	3,03	1,40
7. Health problems related to rigorous training and injuries are just as bad as from doping.	1,91	1,13
8. The media blows the doping issue out of proportion.	4,53	1,48
9. Media should talk less about doping.	3,79	1,81
10. Athletes have no alternative career choices, but sport	2,00	1,13
11. Athletes who take recreational drugs use them because they help them in sport situations.	2,15	1,10
12. Recreational drugs help to overcome boredom during training.	1,41	0,74
13. Doping is an unavoidable part of the competitive sport.	2,00	1,58
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2,47	1,35
15. Doping is not cheating since everyone does it.	1,09	0,38
16. Only the quality of performance should matter, not the way athletes achieve it.	1,41	0,82
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1,53	0,83
Total Score	**2,06**	**0,39**

SD (Standard Deviation)

Table 2. Descriptive statistics and comparison between different categories (Junior Men, Under-23 Men, Junior Women and Elite Women) for each PEAS item.

	Junior Men (n=9)	Under-23 Men (n=9)	Junior Women (n=15)	Elite Women (n=6)	
PEAS (Performance Enhancement Attitude Scale)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**p**
1. Legalizing performance enhancements would be beneficial for sports.	1,44 (0,73)	1,67 (1,12)	1,60 (0,84)	1 (0,00)	NS
2. Doping is necessary to be competitive.	1,22 (0,67)	1,11 (0,33)	1 (0,00)	1,17 (0,41)	NS
3. The risks related to doping are exaggerated.	3 (1,32)	1,22 (0,44)	2,40 (0,84)	1,17 (0,41)	0,001[1,2], 0,002 [1,4]
4. Recreational drugs give the motivation to train and compete at the highest level.	1,78 (1,39)	1,44 (0,88)	1,70 (0,82)	1,17 (0,41)	NS
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1,56 (0,73)	1,11 (0,33)	1,60 (1,26)	1,67 (1,03)	NS
6. Athletes are pressured to take performance-enhancing drugs.	3,89 (1,17)	2,11 (1,17)	2,80 (1,40)	3,50 (1,38)	NS
7. Health problems related to rigorous training and injuries are just as bad as from doping.	1,56 (1,01)	1,33 (0,50)	2,60 (1,07)	2,20 (1,64)	NS
8. The media blows the doping issue out of proportion.	4,56 (1,74)	4,89 (1,69)	4,10 (1,45)	4,67 (0,82)	NS
9. Media should talk less about doping.	3,78 (1,79)	4,11 (2,09)	3 (1,76)	4,67 (1,21)	NS
10. Athletes have no alternative career choices, but sport	2,67 (1,41)	1,89 (0,93)	1,50 (0,85)	2 (1,10)	NS
11. Athletes who take recreational drugs use them because they help them in sport situations.	1,67 (1,00)	2,44 (1,42)	2 (0,67)	2,67 (1,21)	NS
12. Recreational drugs help to overcome boredom during training.	1,22 (0,44)	1,44 (1,01)	1,40 (0,52)	1,67 (1,03)	NS
13. Doping is an unavoidable part of the competitive sport.	3,11 (2,37)	1,33 (0,71)	1,50 (0,97)	2,17 (1,17)	NS
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	3,33 (1,12)	2,11 (1,27)	2 (1,05)	2,50 (1,87)	NS
15. Doping is not cheating since everyone does it.	1,22 (0,67)	1,11 (0,33)	1 (0,00)	1 (0,00)	NS
16. Only the quality of performance should matter, not the way athletes achieve it.	1,44 (0,73)	1 (0,00)	1,80 (1,23)	1,33 (0,52)	NS
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	2,22 (0,97)	1 (0,00)	1,10 (0,32)	2 (0,89)	0,004[1,3], 0,008 [1,5]
Total Score	**2,33 (0,42)**	**1,84 (0,39)**	**1,95 (0,29)**	**2,15 (0,30)**	**NS**

[1,2] Junior Men vs. Under-23 Men
[1,3] Junior Men vs. Junior Women
[1,4] Junior Men vs. Elite Women

Discussion

Results of the present study show that road cyclists of the Spanish national teams are not permissive with PED. Just the younger cyclists (J) are a bit less contrary towards the use of PED than the rest of the groups but in two items. This empowers the idea that information and education is needed since the earliest ages and psychosocial intervention programs are needed to educate cyclists as well as all the people around them.

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ATTITUDE TOWARDS PERFORMANCE-ENHANCING DRUGS IN SPANISH SPORT SCIENCES UNIVERSITY STUDENTS

Freire, C.[1], Morente-Sánchez, J.[1], Femia-Marzo, P.[2], Sánchez-Muñoz, C.[3] & Zabala, M.[1,3]

[1] Faculty of Physical Activity and Sport Sciences, University of Granada (Spain)
[2] Department of Biostatistics, University of Granada (Spain)
[3] Spanish Cycling Federation, Madrid (Spain)

Introduction

To prevent the wrong use of prohibited substances to improve performance in sport it is important to study first the attitudes towards Doping in athletes, but also in coaches or sport managers and other professionals (1). These attitudes can be mediated by culture, studies, social environment, or the sport practiced (2). The aim of this study was to know the attitude towards performance-enhancing drugs (PED) in Sport Sciences students as well as if it could be any difference due to the sport practiced (individual, team, or both sports).

Table 1. Descriptive statistics and Total Score of the Performance Enhancement Attitude Scale (PEAS) items.

	Sport Sciences Students (n=271)	
PEAS (Performance Enhancement Attitude Scale)	**Mean**	**SD**
1. Legalizing performance enhancements would be beneficial for sports.	1,73	1,04
2. Doping is necessary to be competitive.	1,40	0,92
3. The risks related to doping are exaggerated.	1,92	1,17
4. Recreational drugs give the motivation to train and compete at the highest level.	1,74	1,15
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1,45	1,15
6. Athletes are pressured to take performance-enhancing drugs.	3,72	1,31
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2,86	1,43
8. The media blows the doping issue out of proportion.	2,34	1,31
9. Media should talk less about doping.	2,04	1,30
10. Athletes have no alternative career choices, but sport	2,17	1,31
11. Athletes who take recreational drugs use them because they help them in sport situations.	2,57	1,41
12. Recreational drugs help to overcome boredom during training.	1,80	1,09
13. Doping is an unavoidable part of the competitive sport.	2,04	1,36
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2,80	1,43
15. Doping is not cheating since everyone does it.	1,14	0,58
16. Only the quality of performance should matter, not the way athletes achieve it.	1,35	0,82
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1,82	1,20
Total Score	**2,04**	**0,55**

SD (Standard Deviation).

Table 2. Descriptive statistics and comparison between different groups for each Performance Enhancement Attitude Scale (PEAS) item.

	Team Sport (n=27)	Individual Sport (n=89)	Both Sport (n=154)	
PEAS (Performance Enhancement Attitude Scale)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**P**
1. Legalizing performance enhancements would be beneficial for sports.	1,96 (1,22)	1,78 (1,15)	1,67 (0,93)	NS
2. Doping is necessary to be competitive.	1,56 (1,31)	1,49 (1,03)	1,32 (0,76)	NS
3. The risks related to doping are exaggerated.	1,89 (1,05)	1,80 (1,02)	2 (1,26)	NS
4. Recreational drugs give the motivation to train and compete at the highest level.	1,52 (0,75)	1,85 (1,33)	1,70 (1,09)	NS
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1,41 (0,89)	1,56 (1,25)	1,40 (1,13)	NS
6. Athletes are pressured to take performance-enhancing drugs.	4 (1,27)	3,73 (1,33)	3,66 (1,31)	NS
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2,56 (1,68)	2,69 (1,43)	2,87 (1,38)	NS
8. The media blows the doping issue out of proportion.	2,37 (1,01)	2,38 (1,47)	2,29 (1,25)	NS
9. Media should talk less about doping.	1,67 (1,04)	2,10 (1,48)	2,05 (1,20)	NS
10. Athletes have no alternative career choices, but sport	2,07 (1,52)	2,48 (1,37)	2 (1,20)	0,006 [1-2]; 0,005 [2-3]
11. Athletes who take recreational drugs, use them because they help them in sport situations.	2,96 (1,65)	2,51 (1,42)	2,54 (1,36)	NS
12. Recreational drugs help to overcome boredom during training.	1,96 (1,02)	1,83 (1,13)	1,76 (1,08)	NS
13. Doping is an unavoidable part of the competitive sport.	2,15 (1,54)	2,09 (1,35)	1,99 (1,34)	NS
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2,89 (1,40)	2,74 (1,41)	2,82 (1,45)	NS
15. Doping is not cheating since everyone does it.	1,15 (0,36)	1,12 (0,50)	1,16 (0,65)	NS
16. Only the quality of performance should matter, not the way athletes achieve it.	1,44 (0,80)	1,33 (0,79)	1,34 (0,84)	NS
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1,81 (1,27)	1,96 (1,26)	1,74 (1,14)	NS
Total Score	**2,08 (0,43)**	**2,08 (0,61)**	**2,01 (0,53)**	**NS**

[1-2] Team sports vs. Individual sports.
[2-3] Individual sports vs. Both sports.

Methods

The sample was made of 270 students (22.09±3.26 years) of Sport Sciences degree -Faculty of Sport Sciences, University of Granada (Spain)-. Descriptive design was carried out by means of a validated questionnaire (1) of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that support the use of PED in sport. Three groups were made according to the practiced sport (n=27 Team Sports -TS-; n=89 Individual Sports -IS-; n= 154 Both Sports -BS-). Mean value ± Standard Deviation was obtained for each item and Mann Whitney test for independent variables was carried out.

Discussion

Sport Sciences University students in general disagree with the use of PED in competitive sport. In this kind of subjects that are not professionally involved in any of the sports there are no differences in attitudes towards PED due to the sport practiced (TS, IS, or BS), contrary to the hypothesis that argues that those subjects involved in IS are more likely to support the use of these substances (2). Different populations (sedentary, active, or professional) and sports (i.e. Cycling or Athletics Vs Soccer or Basketball) should be investigated in the future to get more patterns about attitudes towards doping in Sport, in relation to the specific sport practiced, frequency of practice, gender, etc.

Results

In general, the score for the mean of all the items was 2.04±0.55 (2=Through Disagree -Table 1-). The lowest score was observed for the item "*Doping is not cheating since everyone does it"* with 1.14±0.58, and the highest for "*Athletes are pressured to take PED"* with 3.72±1.31 (3=Slightly Disagree; 4=Slightly Agree). Just for one item ("*Athletes have no alternative career choices, but sport")* significant differences were observed between IS (2.48) and the other groups TS (2.07) and BS (2.00) -p=0.015- (Table 2). For the rest items no significant differences between groups were observed.

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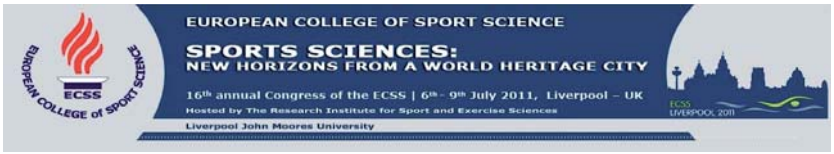

DOPING IN SPAIN FROM THE PERSPECTIVE OF THE PROFESSIONAL TEAM MANAGERS OF THE FUTURE: COMPARISON BETWEEN FORMER AMATEUR Vs PROFESSIONAL CYCLISTS

Freire, C.[1], Morente-Sánchez, J.[1], Femia-Marzo, P.[2], Sánchez-Muñoz, C.[3] & Zabala, M.[1,3]

[1] Faculty of Physical Activity and Sport Sciences, University of Granada (Spain)
[2] Department of Biostatistics, University of Granada (Spain)
[3] Spanish Cycling Federation, Madrid (Spain)

Introduction

Events occurred in recent years such as “Operation Puerto” in 2006 or the dispossession of the Tour of France to Floyd Landis in the same year made cycling lose much of its credibility from a social point of view (1). However, perspective about cycling is different depending on who, when and where is questioned (2). The objective of this study was to know the opinion of the future Spanish professional team managers in relation to the phenomenon of doping in cycling, discriminating according to their former cyclist experience (amateur vs professional).

Methods

The study included a total of 87 participants involved in the course to be professional Team Manager in Cycling (highest level) during 2009 and 2010 years (all of them passed and got the license). Of the total sample, 40 students had been “Professional” cyclists and 29 were cyclists until “Amateur” category. A descriptive design was carried out using a specific questionnaire consisting in 7 free-response questions, and then answers were analyzed and categorized.

Results

The data obtained, in percentage, comparing the responses of professional vs amateur categories, were:

1-Words associated with doping: Cheating (75.86% vs 45%), Money (34.4% vs 45%).
2- Responsible agents of Doping: Laboratories (62.07% vs 67.15%), Coach / Manager (86.21% vs 52.50%).
3- Differences Cycling vs Other sports: Media Impact (62.07% vs 30%), Discriminatory treatment (79.31% vs 67.5%).
4-Reasons for initiation in doping: Sport achievements (58.62% vs 37.5%), Contract / money (65.52% vs 35%), External pressure (44.83% vs 47.5%).
5 - Have you been suggested to dope?: Amateur (Yes 62.1%) vs Professional (Yes 67.5%).
6 - Have you seen another person inciting/being incited?: Amateur (Yes 62.1%) vs Professional (Yes 70%).
7- Proposed solutions: Prevention at early age (58.62% vs 30%), More controls and punishment (44.83% vs 27.15%).

Discussion

The results of this study show the problem of doping is recognized both by amateur and professional cyclists. The amateur relates it to "cheating" possibly motivated for getting a "better contract”, while professionals links it to "money" being "external pressures" towards achieving the "sporting achievement" (1). Coaches/managers are the main responsible for the amateur, while professionals focus their attention on the laboratories. Both believe there is a discriminatory treatment by media in relation to other sports. It is claimed prevention in early ages and an increase in punishment. It would be interesting to propose similar studies in other categories and sports to make comparisons.

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DEPORTE, ÉTICA Y VALORES: DOPAJE

Morente-Sánchez, J., Freire, C. y Zabala, M.

Departamento de Educación Física y Deportiva. Facultad de Ciencias del Deporte. Universidad de Granada.
Contacto: jaimemorente@ugr.es

INTRODUCCIÓN

Practicar el dopaje es morir. Morir fisiológicamente, al modificar de manera profunda y, a veces, irreversible los procesos normales, mediante manipulaciones indebidas. Morir físicamente, como lo han demostrado algunos casos trágicos en estos últimos años. Pero también, morir espiritual e intelectualmente, al aceptar la trampa y el enmascaramiento de las propias posibilidades, al reconocer la propia impotencia o la falta de voluntad para aceptarse a sí mismo o para sobrepasar los propios límites naturales. Morir moralmente, por último, al autoexcluirse de hecho de las reglas de comportamiento que exige toda sociedad humana (Samaranch, 1920-2010).

CAUSAS

Rodríguez Bueno y Rodríguez Cano (2008) y Morente-Sánchez y colaboradores (2011) señalan las siguientes causas de la existencia y extensión del dopaje:

✓ La *consecución del objetivo* principal del deportista: incremento del rendimiento, disminución de la fatiga, etc.
✓ El *consumo abusivo* aceptado por la sociedad en la que vivimos. Actualmente convivimos en la *cultura del medicamento* y/o del suplemento farmacológico. El uso del doping aparece como una errónea alternativa de solución mágica.
✓ Como respuesta a la *presión* a la que son sometidos los deportistas, pudiendo ser ésta de distinta índole: política (por parte de las mismas instituciones), económica (sponsor) y social (familiares, amigos o, el más usual, por parte de su mismo entorno deportivo: entrenadores, médicos, etc).

DEPORTE, DOPAJE Y AGENTES SOCIALIZADORES

La conducta dopante puede ser explicada a través del complejo proceso de socialización, mediante el cual la cultura deportiva es adquirida por el sujeto hasta incorporarla como parte de su personalidad. En el deporte debemos destacar: los siguientes agentes socializadores:

✓ La *familia*. Considerada el primer agente transmisor de cultura. El seno familiar es donde se producen los procesos más sólidos de socialización. Aquellos deportistas que utilizan sustancias prohibidas no presentan estabilidad emocional en ciertos aspectos tales como las relaciones familiares y la autoconfianza (Laure y cols. 2004).
✓ La *escuela/club deportivo*. Es considerado el segundo agente socializador en importancia. No sólo fija y refuerza determinados patrones de conducta sino que también consolida actitudes positivas frente a la práctica deportiva (Goldberg y cols, 2000).
✓ Los *medios de comunicación*. A día de hoy constituyen un factor de socialización deportiva extraordinario gracias a su accesibilidad (Morente-Sánchez y cols. 2011).

¿POR QUÉ ACABAR CON EL DOPAJE EN DEPORTE?

Debemos seguir luchando contra el dopaje, fundamentalmente *porque la gran mayoría son deportistas honestos* que quieren y defienden un deporte limpio, de acuerdo con los ideales y principios que originaron el deporte como tal.

La ética deportiva sería otra razón de peso para defender la lucha contra el fenómeno del dopaje. Esta lacra, actúa destruyendo los principios de la competición, pervirtiendo la función educativa del deporte, amenazando la salud pública e incluso sirviendo como negocio para la delincuencia organizada (Rodríguez y Rodríguez, 2008).

El dopaje convierte al deportista y al deporte en un objeto susceptible de poder ser manipulado por cualquiera, por eso debemos rechazarlo. Incluso hay estudios que presentan casos donde se demuestra que ganar una medalla utilizando sustancias prohibidas genera en el sujeto autodecepción porque no permite evaluar sus propias habilidades y limitaciones (Mroczkowska, 2009a).

El dopaje es contrario al concepto de bienestar y calidad de vida, pues rompe el equilibrio físico, psíquico y social. Esta práctica ilícita provoca multitud de efectos indeseados sobre el organismo del sujeto (WADA, 2011). A diferencia de los adultos, los jóvenes infravaloran aspectos relacionados con la salud y el respeto social anteponiendo el logro deportivo (Mroczkowska, 2009b; Mroczkowska, 2011).

Desde una perspectiva jurídica, el Título III de la Ley Orgánica 7/2006, de 21 de Noviembre, de protección de la salud y de lucha contra el dopaje en el deporte, contiene en su artículo 44, el nuevo artículo 361 *bis* de la Ley Orgánica 10/1995, de 23 de noviembre del Código penal, con el que el nuevo delito de dopaje deportivo entra/entró en vigor el 22 de febrero de 2007.

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DOPAJE Y DEPORTE: INTERVENIR PARA PREVENIR

Morente-Sánchez, J., Freire, C. y Zabala, M.

Departamento de Educación Física y Deportiva. Facultad de Ciencias del Deporte. Universidad de Granada.
Contacto: jaimemorente@ugr.es

DEPORTE: VEHÍCULO INSTAURADOR DE VALORES

El deporte, como contenido educativo, tiene mayores posibilidades que cualquier otro tipo de práctica y/o materia para poder llegar a lo más profundo de la personalidad, lugar donde radica la base de la inadaptación social (Blanco, 1979).

La actividad físico-deportiva favorece el desarrollo de mecanismos y hábitos que enlazan inteligencia, motivación y acción, desarrollando de un modo equilibrado cuerpo y mente. Por todo ello, la actividad deportiva constituye una potente herramienta para la prevención del consumo de sustancias prohibidas (Gil, 2007; Morente-Sánchez, 2010).

EDUCACIÓN EN VALORES

La filosofía olímpica debe ser el modelo a seguir en relación con lo que queremos conseguir y desarrollar, ya que considera al deporte como una actividad formativa y de desarrollo tanto a nivel individual como social. *El Olimpismo es una filosofía de vida, que exalta y combina en un conjunto armónico las cualidades del cuerpo, la voluntad y el espíritu. Al asociar el deporte con la cultura y la formación, el Olimpismo se propone crear un estilo de vida basado en la alegría generada por el esfuerzo, el valor educativo del buen ejemplo y el respeto por los principios éticos fundamentales universales* (Artículo 1 de la Carta Olímpica, 2004).

Desde el Consejo Superior de Deportes (2005) se desarrolló el Código de Ética Deportiva, en el que se establecen cuáles deben ser los comportamientos desde un punto de vista ético y moral de los diferentes agentes implicados en la actividad deportiva: deportista, entrenadores o técnicos, médicos, federaciones u otros organismos, padres y madres, etc.

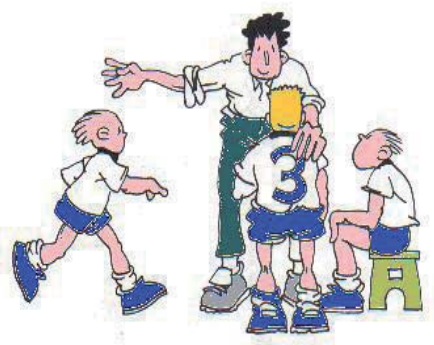
Como indicaba Coubertain en los albores del Olimpismo de la era moderna (1896), a través de una buena educación en valores se volverá a la esencia del deporte. Universalidad, paz, multiculturalidad, igualdad, respeto, juego limpio, justicia, deportividad, honestidad, superación, solidaridad, fraternidad, compañerismo, coraje, esfuerzo, constancia y colaboración, son, entre otros, valores que emanan del Olimpismo y que, como tales, hemos de utilizar como guía a la hora de monitorizar, preparar o realizar cualquier tipo de práctica deportiva (Cerrillo, 2003).

PAUTAS DE INTERVENCIÓN

No basta con la realización de controles antidoping para erradicar este tipo de práctica ilícita. Por el contrario, sí que se necesita un importante cambio a nivel de actitudes hacia el dopaje (Alaranta y cols. 2006)

Pensar que la solución ante un resultado de doping positivo es solamente la sanción disciplinaria, es un pensamiento obsoleto a esta altura de la ciencia deportiva. Es necesario diseñar y aplicar medidas de carácter preventivo que tengan en consideración a los más pequeños los cuales aún poseen una actitud de dopaje maleable (Lentillon-Kaestner y cols, 2010; Morente-Sánchez y cols, 2011; Goulet y cols, 2010;).

Hardie (2009), también hace referencia a la importancia de la prevención como medio eficaz en la lucha contra el dopaje: *¿No ha llegado el momento de entrar en acción? Ya basta. ¿Cuándo empezaremos a atacar el problema de raíz en vez de reaccionar con una caza de brujas sobre aquellos que hicieron lo que vosotros queríais y que dieron sus vidas por tan bello deporte como el ciclismo? ¿No sabéis que el problema no reside en las elecciones efectuadas por los ciclistas de forma individual? ¿No estáis al tanto de que estos chavales crecen institucionalizados desde niños y se les enseña que sólo hay un objetivo, el de ganar a toda costa?*



El entrenador desde su posición tiene que ser el mentor de sus pupilos e intervenir y educar, enseñando los peligros que su uso conlleva. La metodología de trabajo en términos de hacia dónde orientar el éxito también tiene relación con las actitudes que presentarán los chicos hacia el dopaje. Aquellos que sean orientados hacia el ego, tratar de conseguir el objetivo para ser superior a los demás presentarán a largo plazo una actitud hacia el dopaje más preocupante que aquellos que son orientados hacia la tarea, es decir, aquellos cuyo objetivo intrínseco busca la autosuperación y competir consigo mismos (Sas-Nowosielski, K. y cols, 2008).

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PROPUESTAS DE INTERVENCIÓN PARA LA PREVENCIÓN DEL DOPAJE DESDE EDADES TEMPRANAS

Morente-Sánchez, J., Freire, C. y Zabala, M.

Departamento de Educación Física y Deportiva. Facultad de Ciencias del Deporte. Universidad de Granada.
Contacto: jaimemorente@ugr.es

INTRODUCCIÓN

La intervención debe estar orientada hacia la información y la formación personal de los participantes, tanto jóvenes deportistas como entrenadores, tanto alumnos como profesores pues en la desinformación y en la falta de concienciación acerca de esta lacra subyace el origen del problema (Ozdemir y cols, 2005; Dunn, 2010). Diferentes estudios concluyen que la prevención desde edades tempranas debe ser nuestra principal baza en la lucha contra el dopaje (Goulet y cols, 2010; Lentillon-Kaestner y Carstairs, 2010). A continuación se presentan varios ejemplos de modelos de intervención encaminados a fomentar las actitudes hacia el dopaje que han sido aplicados con éxito en diferentes países:

MODELOS DE INTERVENCIÓN

La Comisión Europea ha financiado en los últimos años dos programas específicos para la prevención del uso de sustancias y métodos prohibidos en ambos géneros (chicos y chicas, respectivamente): ATLAS y ATHENA. Su programa de intervención está dirigido por el entrenador y orientado a deportistas estudiantes. Está dividido en 10 sesiones para ATLAS y 8 sesiones para ATHENA cada una de 45 minutos de duración. Las sesiones incluyen un supuesto práctico improvisado, campañas creadas por y para estudiantes, anuncios publicitarios preventivos y juegos educacionales y de rol interactivos. Los sujetos aprenden a ajustar sus propias metas potenciando su autocontrol y adquiriendo actitudes y destrezas que les ayudarán a la hora de tomar decisiones sanas.

Goldberg y cols. (2000), dentro del mencionado proyecto ATLAS, con una muestra amateur de 2516 deportistas, demostraron cómo al finalizar la intervención la actitud hacia el consumo de esteroides anabolizantes, suplementos, tabaco y alcohol fue significativamente menor en el grupo experimental. Del mismo modo, el nivel de autoconfianza de este grupo aumentó. Un año después, se comprobó la retención de dichas actitudes y conductas. Las atletas de sexo femenino que participaban en el programa ATHENA redujeron el uso de píldoras adelgazantes, esteroides, anfetaminas y suplementos nutricionales, mejoraron su alimentación y redujeron su número de lesiones (Michna y cols., 2006).

James y colaboradores (2010) con una muestra de 236 deportistas ingleses, usuarios habituales de salas de musculación, demostraron que informando (a través de sencillos folletos) acerca de los efectos positivos de ciertos alimentos, que para muchos eran desconocidos (remolacha, ternera, etc.), se podía revertir la actitud hacia el dopaje. Instruyendo y haciendo partícipe al sujeto de los efectos que pueden llegar a producir ciertos alimentos que están a su alcance (alimentación funcional), consiguieron pasar de 73/115 sujetos (pretest) que creían que la alimentación funcional jamás conseguiría alcanzar los efectos producidos por las sustancias prohibidas a 78/115 (postest) que sí confiaban en mejorar su rendimiento aplicando los conocimientos adquiridos durante la intervención y, por tanto, rechazando la posibilidad de cualquier práctica ilícita.

En España, la Real Federación Española de Ciclismo (RFEC), en colaboración con la Agencia Estatal Antidopaje (AEA), puso en marcha en 2009 el proyecto "*Prevenir para ganar*" (Zabala y cols, 2009) orientado al deportista y a su entorno próximo (técnicos y familiares). El proyecto se encuentra en fase de desarrollo hasta 2012. Actualmente, se han confeccionado contenidos específicos por edades y categorías, aplicados en charlas y foros de trabajo y cuestionarios de opinión con metodología de escalas tipo Likert para su posterior validación. Por otro lado, se han elaborado índices para que los monitores realicen la observación sistemática de actitudes basadas en comportamientos ante determinadas situaciones presentadas. Recientemente, la WADA (World Anti-Doping Agency) ha calificado con un 10 el compromiso de España con el Código Mundial Antidopaje.

CONCLUSIÓN

Es sabido uno de los temas principales a tratar por cualquier sistema de salud es la prevención. Desafortunadamente, en la lucha contra el dopaje, las actividades se han centrado en el desarrollo de nuevas técnicas para la identificación de sustancias prohibidas, dejando en un segundo plano el aspecto preventivo. Los controles antidopaje deben considerarse como una forma de garantizar una competición libre de sustancias y métodos prohibidos. Pero la mejor manera de combatir el dopaje es a través de la educación, la formación y la información. Generalmente, la mayor parte de los esfuerzos intentan descubrir a los culpables, mientras que se descuidan otras acciones que a largo plazo serían eficientes.

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ATTITUDES TOWARDS DOPING IN PARTICIPANTS OF A POPULAR LONG-DISTANCE ROAD CYCLING EVENT ACCORDING TO THEIR DOPING BEHAVIOR: USERS vs NON-USERS.

Morente-Sánchez, J.[1], Freire, C.[1], Ramírez-Lechuga, J[2]. & Zabala, M.[1,3]

[1] Faculty of Sport Sciences, University of Granada (Spain)
[2] Faculty of Sport, University Pablo Olavide (Seville-Spain)
[3] Spanish Cycling Federation, Madrid (Spain)

Introduction

Doping estimations, even those made by non-users, and self-admitted use are often considerably higher than the average rate of positive results in doping tests (Uvacsek et al. 2011). The purpose of this study was to know the attitudes towards doping of participants of a popular long-distance road cycling event taking into account if they had used doping substances or not in the past.

Methods

A sample of 2022 amateur cyclists (40.95±9.42 years) who participated in a long-distance (205 km) Spanish road cyclist event called "Quebrantahuesos" (UCI Golden Bike), was divided into two groups: users of doping substances (G1=164) and non-users (G2= 1858). On the other hand, in order to contrast similar and balanced samples, data from users was also compared with an equivalent group of non-users (G3=157). Descriptive design was carried out by means of a validated questionnaire (Petroczi & Aidman, 2009) of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that supported the use of doping in sport. Mean value ± Standard Deviation was obtained for each item and Mann Whitney test for independent variables with Bonferroni post hoc was carried out.

Results

Mean score (1 to 6) and overall score (17 to 102) for different groups were, respectively: G1=2.88±0.94, 48.87±15.98; G2=2.41±0.70, 40.98±11.95; G3=2.30±0.66, 39.14±11.76, (G1 vs G2 & G3, $p<0.001$). For users, the highest score was observed for the item "*The media blows the doping issue out of proportion"* (4.36±1.76) and for non-users, "*Athletes are pressured to take performance-enhancing drugs*" (4.16±1.63) -4=Slightly Agree; 5=Agree-. For almost all the items significant differences were observed between G1 vs G2 and G3 ($p<0.05$), being higher in G1 than in G2 and G3. Between G1 and G2 only there were not significant differences for four items ("*Athletes are pressured to take performance-enhancing drugs", "Athletes who take recreational drugs, use them because they help them in sport situations", "Athletes have no alternative career choices, but sport" and "Recreational drugs help to overcome boredom during training*"). Between G1 and G3 there were not significant differences just for four items: *"Recreational drugs give the motivation to train and compete at the highest level" "Athletes have no alternative career choices, but sport", "Athletes who take recreational drugs, use them because they help them in sport situations".*

Discussion

Confessed doping users scored significantly higher on the scale compared with those who reported not to use of banned substances. Similar results were obtained by Uvacsek et al. (2011) for users` overall score (46.8±13.32) while that non-users` overall score was lower (34.43±8.74).

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ATTITUDES TOWARDS DOPING IN PARTICIPANTS OF A POPULAR LONG-DISTANCE ROAD CYCLING EVENT ACCORDING TO COMPETING CATEGORY

Zabala, M.[1-3], Freire, C.[1], Ramírez-Lechuga, J.[2] & Morente-Sánchez, J.[1]

[1] Faculty of Physical Activity and Sport Sciences, University of Granada (Spain); [2] Faculty of Sport, University Pablo Olavide (Seville-Spain); [3] Spanish Cycling Federation, Madrid (Spain)

Introduction

Doping in sport has been studied by medical, physiological and social science researchers in recent years (Petroczi & Aidman, 2009). The purpose of this study was to know the attitudes towards doping of participants of a popular long-distance road cycling event according to their competing category (Junior, U23, Elite, Master, Cycle-tourist, One-day License).

Methods

A sample of 2022 amateur cyclists (40.95±9.42 years) who participated in a long-distance (205 km) Spanish road cyclist event called "Quebrantahuesos" (UCI Golden Bike), was divided into groups according to the competing category (30 Junior -G1-, 9 U23 -G2-, 32 elite -G3-, 546 Master -G4-, 1013 Cycle-tourist -G5-, 392 One-day License -G6-). Descriptive design was carried out by means of a validated questionnaire (Petroczi & Aidman, 2009) of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that supported the use of doping in sport. Mean value ± Standard Deviation was obtained for each item and Mann Whitney test for independent variables with Bonferroni post hoc was carried out.

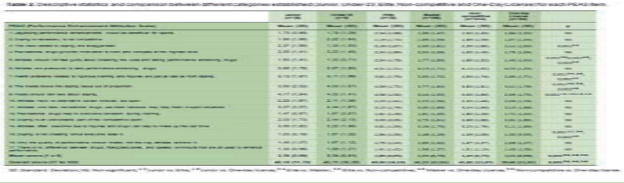
Results

The lowest overall score was observed for G6 (39.46±11.62) and G1 (40.07±11.61), and the highest was showed by G3 (49.06±14.10). For the mean score and overall score were observed significant differences between G6 vs G3, G4, G5 (p<0.001). For certain items there were significant differences between different groups: *The risks related to doping are exaggerated* (G3 vs G6, p<0.001); *Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs* (G3 vs G6, p<0.001; G4 vs G6, p<0.002; G3 vs G5, p<0.003); *Health problems related to rigorous training and injuries are just as bad as from doping* (G3 vs G4 & G5 vs G6, p<0.001; G3 vs G5, p<0.002); *The media blows the doping issue out of proportion* (G3 vs G5 & G4 vs G5, p<0.001; G4 vs G6, p<0.002); *Media should talk less about doping* (G5 vs G1, G3, G4, G5. P<0.001). Just for one item ("*Doping is not cheating since everyone does it*") significant differences (P<0.001) were found between G1 (1.03±0.18) and G3 (1.84±1.35). Despite of not having significant differences, mean scores of G1, G2 and G3 were 2.36±0.69, 2.54±0.61 and 2.89±0. 83, increasing respectively.

Table 1. Descriptive statistics Mean Score and Overall Score of the Performance Enhancement Attitude Scale (PEAS) items*

	Cyclists (n=2022)	
PEAS (Performance Enhancement Attitudes Scale)	Mean	SD
1. Legalizing performance enhancements would be beneficial for sports.	1.52	1.42
2. Doping is necessary to be competitive.	1.69	1.87
3. The risks related to doping are exaggerated.	2.01	1.82
4. Recreational drugs give the motivation to train and compete at the highest level.	1.53	1.40
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1.62	1.38
6. Athletes are pressured to take performance enhancing drugs.	4.17	1.63
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2.31	1.74
8. The media blows the doping issue out of proportion.	3.75	1.82
9. Media should talk less about doping.	2.42	1.89
10. Athletes have no alternative career choices, but sport.	2.19	1.49
11. Athletes who take recreational drugs, use them because they help them in sport situations.	3.24	1.87
12. Recreational drugs help to overcome boredom during training.	1.79	1.24
13. Doping is an unavoidable part of the competitive sport.	2.69	1.89
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	3.22	1.74
15. Doping is not cheating, since everyone does it.	1.40	1.11
16. Only the quality of performance should matter, not the way athletes achieve it.	1.71	1.42
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1.82	1.18
Mean score (1 to 6)	2.45	0.74
Overall score (17 a 102)	41.62	12.51

SD: Standard Deviation; *1= Strongly Disagree, 2=Disagree, 3= Slightly disagree, 4=Slightly Agree, 5=Agree, 6= Strongly Agree



Discussion

In general, results of the present study suggest that the world of cycling is not permissive with doping, but there are certain differences on the topic of attitudes taking into account the competitive category. This results contrast with others studies (Morente-Sánchez et al. 2011) which also used PEAS and where a sample of elite cyclists (Spanish cycling national team) showed a lower mean score (2.06±0,39). So, it seems that the higher age, the higher score; although professionals seem to be more sensitive toward doping. In addition, due to the fact that overall scores are lower in Junior and U23 than elite, we consider that a psychosocial intervention since the earliest ages is needed to keep attitudinal levels of younger cyclist avoiding negative influences.

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ATTITUDES TOWARDS DOPING IN PARTICIPANTS OF A POPULAR LONG-DISTANCE ROAD CYCLING EVENT ACCORDING TO THEIR PERFORMANCE

Zabala, M.[1-3], Freire, C.[1], Ramírez-Lechuga, J.[2] & Morente-Sánchez, J.[1]

[1] Faculty of Physical Activity and Sport Sciences, University of Granada (Spain); [2] Faculty of Sport, University Pablo Olavide (Seville-Spain); [3] Spanish Cycling Federation, Madrid (Spain)

Introduction

Social science researchers strive to better understand psycho-social variables of doping (attitudes or beliefs) that may be salient in educational programs directed towards the prevention of such behavior (Gucciardi et al. 2011). The purpose of this study was to know the attitudes towards doping of participants of a popular long-distance road cycling event according to their performance.

Methods

A sample of 2022 amateur cyclists (40.95±9.42 years) who participated in a long-distance (205 km) Spanish road cyclist event called "Quebrantahuesos" (UCI Golden Bike), was divided into groups according to their performance (<6hours -G1-, 6-7 hours -G2-, 7-8 hours -G3-, 8-9 hours -G4-, 9-10 hours -G5-, >10 hours -G6-). Sample size for each group was: G1=321; G2=495; G3=618; G4=365; G5=157; G6=66). Descriptive design was carried out by means of a validated questionnaire (Petroczi & Aidman, 2009) of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that supported the use of doping in sport. Mean value ± Standard Deviation was obtained for each item and Mann Whitney test for independent variables with Bonferroni post hoc was carried out.

Results

Analyzing the total sample, the overall score was 41.61±12.51 (from 17 to 102) and the mean score was 2.45±0.74 (2=Through Disagree*)*. In addition, the lowest score was observed for the item "*Doping is not cheating since everyone does it"* with 1.40±1.11, and the highest for "Athletes are pressured to take performance-enhancing substances*"* with 4.17±1.63 (4=Slightly Agree; 5=Agree). For the mean score and the overall score significant differences were observed in G1 vs G2 (p<0.001), and G1 vs G3 (p<0.002), respectively. Furthermore, there were significant differences for certain items in different groups: *legalizing performance-enhancing substances would be beneficial for sports* (G1 vs G2, p<0.002); *The media blows the doping issue out of proportion* (G1 vs G2 & G2 vs G5, p<0.001; G2 vs G4, p<0.002); *Media should talk less about doping* (G2 vs, G1, G4, G5. P<0.001).

Table 1. Descriptive statistics, Mean Score and Overall Score of the Performance Enhancement Attitude Scale (PEAS) items*.

	Cyclists (n=2022)	
PEAS (Performance Enhancement Attitudes Scale)	**Mean**	**SD**
1. Legalizing performance enhancements would be beneficial for sports.	1,92	1,42
2. Doping is necessary to be competitive.	1,89	1,57
3. The risks related to doping are exaggerated.	2,31	1,82
4. Recreational drugs give the motivation to train and compete at the highest level.	1,93	1,48
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1,62	1,35
6. Athletes are pressured to take performance enhancing drugs.	4,17	1,63
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2,91	1,74
8. The media blows the doping issue out of proportion.	3,75	1,82
9. Media should talk less about doping.	3,42	1,88
10. Athletes have no alternative career choices, but sport.	2,18	1,49
11. Athletes who take recreational drugs, use them because they help them in sport situations.	3,24	1,87
12. Recreational drugs help to overcome boredom during training.	1,78	1,24
13. Doping is an unavoidable part of the competitive sport.	2,68	1,89
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	3,22	1,74
15. Doping is not cheating since everyone does it.	1,40	1,11
16. Only the quality of performance should matter, not the way athletes achieve it.	1,71	1,42
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1,52	1,18
Mean score (1 to 6)	2,45	0,74
Overall score (17 a 102)	41,62	12,51

SD: Standard Deviation; *1= Strongly Disagree; 2=Disagree; 3= Slightly disagree; 4=Slightly agree; 5=Agree; 6= Strongly agree

Table 2. Descriptive statistics and comparison between participants' performance (<6 hours (h), 6-7 h., 7-8 h., 8-9 h., 9-10 h. and >10 h.) for each PEAS item.

	<6 hours (n=321)	6 to 7 h. (n= 495)	7 to 8 h. (n= 618)	8 to 9 h. (n=365)	9 to 10 h. (n=157)	>10 hours (n=66)	
PEAS (Performance Enhancement Attitudes Scale)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**p**
1. Legalizing performance enhancements would be beneficial for sports.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Doping is necessary to be competitive.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
3. The risks related to doping are exaggerated.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
4. Recreational drugs give the motivation to train and compete at the highest level.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
6. Athletes are pressured to take performance-enhancing drugs.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
7. Health problems related to rigorous training and injuries are just as bad as from doping.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
8. The media blows the doping issue out of proportion.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9. Media should talk less about doping.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10. Athletes have no alternative career choices, but sport.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
11. Athletes who take recreational drugs, use them because they help them in sport situations.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
12. Recreational drugs help to overcome boredom during training.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
13. Doping is an unavoidable part of the competitive sport.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
15. Doping is not cheating since everyone does it.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
16. Only the quality of performance should matter, not the way athletes achieve it.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ns
Mean score (1 a 6)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Overall score (17 to 102)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SD: Standard Deviation; NS: Non-significant; [illegible]

Discussion

The G1 (<6 hours), which should be composed by the best cyclists, showed the lowest values regarding attitudes towards doping. Despite of having the best performance, G1 showed the highest disagreement towards doping. In addition, media is considered as one of the responsible agents of spreading the phenomenon of doping.

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RELATIONSHIP BETWEEN ATTITUDES TOWARDS DOPING AND SELF-ESTEEM IN PARTICIPANTS OF A POPULAR LONG-DISTANCE ROAD CYCLING EVENT

Morente-Sánchez, J.[1] , Freire, C.[1], Ramírez-Lechuga, J.[2] & Zabala, M.[1, 3]

[1] Faculty of Physical Activity and Sport Sciences, University of Granada (Spain); [2] Faculty of Sport, University Pablo Olavide (Seville-Spain); [3] Spanish Cycling Federation, Madrid (Spain)

Introduction

In view of the lack of scientific literature investigating the association between attitudes towards doping and other factors, the purpose of this study was to know the relationship between the attitudes towards doping and the self-esteem of participants in a popular long-distance road cycling event.

Methods

The sample was composed by 2022 amateur cyclists (40.95±9.42 years) who participated in a long-distance (205 km) Spanish road cyclist event called "Quebrantahuesos" (UCI Golden Bike). Descriptive design was carried out by means of two validated questionnaires: Performance Enhancement Attitude Scale -PEAS- (Petroczi & Aidman, 2009) and Rosenberg Self-Esteem Scale -PSES- (Fleming & Courtney, 1984; Rosenberg, 1965). The PEAS has 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that supported the use of doping in sport. In other hand, Rosenberg's scale - 4-point scale ranging from 1 *(strongly disagree)* to 4 *(strongly agree)*- was originally developed as a Guttman scale scored dichotomously (yes/no). The correlation coefficient of Spearman was used to analyze the relationship between Self-Esteem and attitudes towards doping.

Results

The correlation coefficient of Spearman showed a negative value of r=-0.140; p<0.001-. Consequently, the higher score in "Performance Enhancement Attitude Scale", the lower score in "Rosenberg Self-Esteem Scale".

Table 1. Descriptive statistics Mean Score and Overall Score of the Performance Enhancement Attitude Scale (PEAS) items*

	Cyclists (n=2022)	
PEAS (Performance Enhancement Attitudes Scale)	**Mean**	**SD**
1. Legalizing performance enhancements would be beneficial for sports.	1,92	1,42
2. Doping is necessary to be competitive.	1,88	1,57
3. The risks related to doping are exaggerated.	2,31	1,62
4. Recreational drugs give the motivation to train and compete at the highest level.	1,93	1,48
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1,62	1,35
6. Athletes are pressured to take performance-enhancing drugs.	4,17	1,63
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2,91	1,74
8. The media blows the doping issue out of proportion.	3,75	1,82
9. Media should talk less about doping.	3,42	1,86
10. Athletes have no alternative career choices, but sport	2,18	1,49
11. Athletes who take recreational drugs, use them because they help them in sport situations.	3,24	1,87
12. Recreational drugs help to overcome boredom during training.	1,78	1,24
13. Doping is an unavoidable part of the competitive sport.	2,68	1,89
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	3,22	1,74
15. Doping is not cheating since everyone does it.	1,40	1,11
16. Only the quality of performance should matter, not the way athletes achieve it.	1,71	1,42
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1,52	1,16
Mean score (1 to 6)	**2,45**	**0,74**
Overall score (17 a 102)	**41,62**	**12,51**

SD: Standard Deviation; *1= Strongly Disagree; 2=Disagree; 3= Slightly disagree; 4=Slightly Agree; 5=Agree; 6= Strongly Agree

Discussion

According to Van Amsterdam et al. (2010), the typical banned drugs abuser is a male poly-substance user who has a low self-esteem due to a poor body image. In our study, unsurprisingly, a relation between attitudes towards doping and self-esteem existed, but despite of the fact that there were significant differences, the relationship between both factors was very weak. It could be because this type of sample (amateur cyclists) looked for other aims such as performance improvement instead of changing their body image. In this way, we recommend further research in this field because there is a significant dearth in this matter.

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EUROPEAN COLLEGE OF SPORT SCIENCE
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ACTITUDES HACIA EL DOPAJE EN EL EQUIPO NACIONAL DE CICLISMO DE BMX

Morente-Sánchez, J.[1], Freire, C.[1], Rosa-Bastida, JB. [1], Mateo-March, M. [2] & Zabala, M.[1,3]

[1] Facultad de Ciencias del Deporte, Universidad de Granada (España)
[2] Facultad Miguel Hernández, Universidad de Elche (Valencia, España)
[3] Federación Española de Ciclismo, Madrid (España)
Contacto: jaimemorente@ugr.es

Introducción

El objetivo de este estudio fue conocer las actitudes hacia el dopaje en ciclistas pertenecientes al equipo nacional español de BMX.

Método

Se llevó a cabo un estudio descriptivo con 12 ciclistas españoles pertenecientes al equipo nacional de BMX a través de la utilización de un cuestionario validado-PEAS- (Petroczi & Aidman, 2009) que usa una escala Likert de 1 (muy en desacuerdo) a 6 (muy de acuerdo) para mostrar el acuerdo o disconformidad para 17 declaraciones que apoyan el uso de sustancias prohibidas para la mejora del rendimiento. Complementariamente, contestaron a un cuestionario de respuesta abierta de carácter cualitativo.

	Equipo Nacional BMX (n=12)	
PEAS (Escala de Actitudes hacia el Consumo de Sustancias que mejoran el Rendimiento)	**Media**	**DT**
1. Legalizar productos para mejorar el rendimiento sería beneficioso para el deporte	1,62	1,45
2. Doparse es necesario para ser competitivo.	2,00	1,65
3. Se exageran los riesgos relacionados con el dopaje	3,31	1,84
4. Las drogas recreacionales motivan a entrenar y competir al más alto nivel.	1,92	1,32
5. Los deportistas no deberían sentirse culpables por saltarse las reglas y tomar fármacos para mejorar el rendimiento	2,00	1,68
6. Los deportistas son presionados para tomar fármacos que mejorar el rendimiento.	3,54	1,90
7. Los problemas de salud y las lesiones derivados del entrenamiento riguroso son tan perjudiciales como las repercusiones del dopaje.	3,15	1,91
8. Los medios de comunicación exageran el asunto del dopaje.	3,54	1,98
9. Los medios de comunicación deberían hablar menos de dopaje	3,08	1,66
10. El deporte es la única alternativa profesional de los deportistas.	2,92	2,15
11. Los deportistas que toman drogas recreacionales lo hacen porque les ayudan en situaciones deportivas.	3,15	1,99
12. Las drogas recreacionales ayudan a superar el aburrimiento durante los entrenamientos.	1,69	1,25
13. El dopaje es una parte inevitable del deporte competitivo.	2,00	1,68
14. Los deportistas suelen perder tiempo debido a lesiones y los fármacos pueden ayudarles a recuperar el tiempo perdido	3,69	1,80
15. Doparse no es hacer trampas ya que todo el mundo lo hace.	1,38	0,65
16. Sólo debería valorarse la calidad del rendimiento, no la manera en que los deportistas lo consigan.	2,00	1,47
17. No hay diferencia entre utilizar fármacos, formas aerodinámicas o bañadores especiales, ya que todos sirven para mejorar el rendimiento.	1,69	0,95
Puntuación total (17-102)	**42,46**	**10,74**
Puntuación media por ítem (1-6)	**2,50**	**0,62**

DT: Desviación típica

Resultados

Se obtuvo una puntuación media por ítem (1-6) de 2.50±0.62 y una puntuación total (17-102) de 42.46±10.74. Las respuestas más repetidas en el cuestionario cualitativo abierto fueron: palabra asociada a dopaje: *trampa* (33.3% de los ciclistas); principal agente responsable del dopaje: *el propio ciclista* (41.7%); principal razón para recurrir al doping: *mejores resultados* (75%); propuesta para erradicar el dopaje: *aumentar número de controles* (41.7%), *sin solución* (33.3%); diferencias entre ciclismo y otros deportes: *mayor dureza del ciclismo* (33.33%).

Discusión

De acuerdo con esta escala (PEAS), cuanto mayor es la puntuación del test, más permisivo es el sujeto hacia el dopaje. Los ciclistas de BMX presentan una actitud, en cierto modo, permisiva (42.46±10.74) en comparación con el equipo nacional de carretera (34.91±6.62; Morente-Sánchez et al., 2011). Cicloturistas usuarios de doping confesos también han sido evaluados (48.87±15.98; Morente-Sánchez et al., 2012). Una valoración y seguimiento de esta muestra se antoja necesaria.

	Equipo Nacional BMX (n=12)	
	% n	**% Frecuencia Total**
Palabras asociadas a dopaje:		
Trampa	33,33	11,43
Dinero	25,00	8,57
Anti-deportivo	25,00	8,57
Otros		70,43
Agentes responsables de dopaje:		
Propio ciclista	41,67	27,78
Equipo deportivo	25,00	16,67
Entrenador/Director	16,67	11,11
Otros		44,44
Diferencias entre ciclismo y otros deportes:		
Dureza del ciclismo	25,00	25,00
Tratamiento diferente a otros deportes	16,67	16,67
Presión mediática	16,67	16,67
Otros		41,67
Motivos para doparse:		
Mejores resultados	75,00	42,86
Logros deportivos	25,00	14,29
Contrato y dinero	25,00	14,29
Otros		28,57
¿Te han sugestionado para doparte?		
SI	8,33	8,33
¿Quién?		
Amigos	8,33	8,33
Soluciones propuestas		
Más controles	41,67	41,67
Sin solución	33,33	33,33
Otros		25,00

%n: respuestas totales en función de la n
% Frecuencia total: respuestas en función de las respuestas dadas.

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ACTITUDES HACIA EL DOPAJE: COMPARATIVA ENTRE ESTUDIANTES, JÓVENES CICLISTAS, TÉCNICOS CICLISTAS Y CICLISTAS DE ÉLITE

Morente-Sánchez, J.[1], Freire, C.[1], Garrido-Blanca, G. [1], Úbeda-Durán, E. [1], Rosa-Bastida, JB. [1], Martínez-Téllez, B. [1] Mateo-March, M. [2] & Zabala, M.[1,3]

[1] Facultad de Ciencias del Deporte, Universidad de Granada (España)
[2] Facultad Miguel Hernández, Universidad de Elche (Valencia, España)
[3] Federación Española de Ciclismo, Madrid (España)
Contacto: jaimemorente@ugr.es

Introducción

El objetivo de este estudio fue conocer y comparar las actitudes hacia el dopaje entre estudiantes de Ciencias del Deporte, ciclistas de elite, jóvenes ciclistas y directores nacionales de ciclismo.

Método

Se llevó a cabo un estudio descriptivo con una muestra de 424 participantes la cual fue dividida en 4 grupos (G1: 271 estudiantes de Ciencias del Deporte, 22±3.3 años; G2: 65 ciclistas del equipo nacional, 18.4±2.9 años; G3: 44 jóvenes ciclistas del Plan Nacional de escuelas de ciclismo de la Real Federación Española de Ciclismo, 13±0.8 años; G4: 44 directores nacionales de ciclismo, 33.2±7.16 años). Se utilizó un cuestionario validado (Escala de Actitudes hacia el Consumo de Sustancias que mejoran el Rendimiento; PEAS; Petroczi & Aidman, 2009) de escala Likert de 1 (muy en desacuerdo) a 6 (muy de acuerdo) para mostrar el acuerdo o disconformidad en 17 declaraciones que apoyan el uso de sustancias prohibidas para la mejora del rendimiento. Se aplicó el test de Mann Whitney para variables independientes con la corrección de Bonferroni.

Resultados

La puntuación media por ítem (1-6) y total (17-102), para los distintos grupos fue, respectivamente: G1 (2.04±0.55; 34.69±9.31); G2 (2.07±0.51; 35.14±8.64); G3 (2.24±0.68; 37.82±11.30) y G4 (2.47±0.64; 41.59±10.85).Se encontraron diferencias estadísticamente significativas entre G1 y G4 (p=0.0001) y G2 y G4 (p=0.002) tanto en puntuación media por ítem como en puntuación general.

Discusión

De acuerdo con esta escala (PEAS), cuanto mayor es la puntuación, más permisivo es el sujeto hacia el dopaje. El grupo 4 presentó una actitud más permisiva que el resto y cercana a deportistas usuarios de doping confesos (46.8±13.32; Uvacsek et al., 2011), todo ello quizás influenciado por la época ciclista en la que se formaron. El resto de grupos, por lo general más jóvenes, presentaron puntuaciones relativamente más bajas. Sugerimos, que "algo está cambiando" a nivel de actitudes hacia el dopaje en España siendo los más jóvenes los más sensibilizados, por tanto, el efecto se notará a medio-largo plazo, no de inmediato. Estudios longitudinales se hacen necesarios.

	Estudiantes CCAFD (n=271)		Corredores Elite (n=65)		Escuela deportiva (n=44)		Técnicos Nivel III (n=44)		
PEAS (Escala de Actitudes hacia el Consumo de Sustancias que mejoran el Rendimiento)	Media	DT	Media	DT	Media	DT	Media	DT	p
1. Legalizar productos para mejorar el rendimiento sería beneficioso para el deporte.	1,73	1,04	1,40	0,90	1,57	1,11	2,00	1,41	$0,005^{1-3}$
2. Doparse es necesario para ser competitivo.	1,40	0,92	1,26	0,87	1,30	0,88	1,50	1,09	NS
3. Se exageran los riesgos relacionados con el dopaje.	1,92	1,17	2,11	1,39	2,20	1,49	2,30	1,66	NS
4. Las drogas recreacionales motivan a entrenar y competir al más alto nivel.	1,74	1,15	1,52	0,95	1,57	1,28	2,16	1,56	NS
5. Los deportistas no deberían sentirse culpables por saltarse las reglas y tomar fármacos para mejorar el rendimiento.	1,45	1,15	1,54	1,09	1,50	1,21	1,67	1,19	NS
6. Los deportistas son presionados para tomar fármacos que mejoran el rendimiento.	3,72	1,31	3,14	1,49	3,07	1,72	3,93	1,40	$0,008^{1-3}$
7. Los problemas de salud y las lesiones derivados del entrenamiento riguroso son tan perjudiciales como las repercusiones del dopaje.	2,66	1,43	2,20	1,42	2,38	1,56	2,77	1,61	$0,007^{1-2}$
8. Los medios de comunicación exageran el asunto del dopaje.	2,34	1,31	3,84	1,76	3,42	1,91	4,93	1,32	$0,0001^{1-2;1-4;3-4}$; $0,001^{1-3;2-4}$
9. Los medios de comunicación deberían hablar menos de dopaje	2,04	1,30	3,37	1,81	2,93	1,55	4,59	1,47	$0,0001^{1-2;1-3;1-4;3-4}$; $0,002^{2-4}$
10. El deporte es la única alternativa profesional de los deportistas.	2,17	1,31	2,30	1,50	2,57	1,70	2,02	1,37	NS
11. Los deportistas que toman drogas recreacionales lo hacen porque les ayudan en situaciones deportivas.	2,57	1,41	2,51	1,49	2,32	1,79	2,55	1,50	NS
12. Las drogas recreacionales ayudan a superar el aburrimiento durante los entrenamientos.	1,80	1,09	1,60	0,98	1,75	1,51	1,98	1,53	NS
13. El dopaje es una parte inevitable del deporte competitivo.	2,04	1,36	1,82	1,42	2,16	1,64	2,07	1,37	NS
14. Los deportistas suelen perder tiempo debido a lesiones y los fármacos pueden ayudarles a recuperar el tiempo perdido.	2,80	1,43	2,58	1,50	3,70	1,92	3,07	1,53	$0,003^{1-3}$
15. Dopense no es hacer trampas ya que todo el mundo lo hace.	1,14	0,58	1,12	0,41	1,27	1,00	1,28	0,85	NS
16. Sólo debería valorarse la calidad del rendimiento, no la manera en que los deportistas lo consigan.	1,35	0,82	1,52	1,00	2,25	1,78	1,48	0,90	$0,0001^{1-3}$
17. No hay diferencia entre utilizar fármacos, formas aerodinámicas o bañadores especiales, ya que todos sirven para mejorar el rendimiento.	1,82	1,20	1,48	0,79	2,09	1,32	1,61	1,19	NS
Puntuación total (17 – 102)	34,69	9,31	35,14	8,63	37,82	11,30	41,59	10,85	$0,0001^{1-4}$; $0,002^{2-4}$
Puntuación media por ítem (1-6)	2,04	0,55	2,07	0,51	2,24	0,68	2,47	0,64	$0,0001^{1-4}$; $0,002^{2-4}$

DT: Desviación Típica
Estudiantes CCAFD vs. Ciclista de Élite: 1-2;
Estudiantes CCAFD vs. Escuela de ciclismo: 1-3
Estudiantes CCAFD vs. Técnicos Nivel 3: 1-4;
Ciclistas de Élite vs. Técnicos Nivel 3: 2-4;
Escuela de Ciclismo vs Técnicos Nivel 3: 3-4

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ACTITUDES HACIA EL DOPAJE DE LAS FUTURAS GENERACIONES CICLISTAS EN ESPAÑA

Freire, C.[1], Morente-Sánchez, J.[1], Garrido-Blanca, G.[1], Úbeda-Durán, E.[1], Martínez-Téllez, B.[1] Mateo-March, M.[2] & Zabala, M.[1,3]

[1] *Facultad de Ciencias del Deporte, Universidad de Granada (España)*
[2] *Facultad Miguel Hernández, Universidad de Elche (Valencia, España)*
[3] *Federación Española de Ciclismo, Madrid (España)*
Contacto: carmen_fs@hotmail.es

Introducción

El objetivo de este estudio fue conocer las actitudes hacia el dopaje de las nuevas generaciones ciclistas en España.

Método

Se llevó a cabo un estudio descriptivo con 44 niños (13±0.82 años) ciclistas dentro del programa nacional de escuelas deportivas de la Real Federación Española de Ciclismo. Se utilizó un cuestionario validado -PEAS- (Petroczi & Aidman, 2009) de escala Likert de 1 (muy en desacuerdo) a 6 (muy de acuerdo) para mostrar el acuerdo o disconformidad en 17 declaraciones que apoyan el uso de sustancias prohibidas para la mejora del rendimiento.

	Escuela de ciclismo (n=44)	
PEAS (Escala de Actitudes hacia el Consumo de Sustancias que mejoran el Rendimiento)	**Media**	**DT**
1. Legalizar productos para mejorar el rendimiento sería beneficioso para el deporte	1,57	1,11
2. Doparse es necesario para ser competitivo.	1,30	0,88
3. Se exageran los riesgos relacionados con el dopaje	2,20	1,49
4. Las drogas recreacionales motivan a entrenar y competir al más alto nivel.	1,57	1,28
5. Los deportistas no deberían sentirse culpables por saltarse las reglas y tomar fármacos para mejorar el rendimiento	1,80	1,21
6. Los deportistas son presionados para tomar fármacos que mejoran el rendimiento.	3,07	1,72
7. Los problemas de salud y las lesiones derivados del entrenamiento riguroso son tan perjudiciales como las repercusiones del dopaje.	2,38	1,56
8. Los medios de comunicación exageran el asunto del dopaje.	3,42	1,91
9. Los medios de comunicación deberían hablar menos de dopaje	2,93	1,55
10. El deporte es la única alternativa profesional de los deportistas.	2,57	1,70
11. Los deportistas que toman drogas recreacionales lo hacen porque les ayudan en situaciones deportivas.	2,32	1,79
12. Las drogas recreacionales ayudan a superar el aburrimiento durante los entrenamientos.	1,75	1,51
13. El dopaje es una parte inevitable del deporte competitivo.	2,16	1,64
14. Los deportistas suelen perder tiempo debido a lesiones y los fármacos pueden ayudarles a recuperar el tiempo perdido.	3,70	1,92
15. Doparse no es hacer trampas ya que todo el mundo lo hace.	1,27	1,00
16. Sólo debería valorarse la calidad del rendimiento, no la manera en que los deportistas lo consigan.	2,26	1,78
17. No hay diferencia entre utilizar fármacos, formas aerodinámicas o bañadores especiales, ya que todos sirven para mejorar el rendimiento.	2,09	1,32
Puntuación total [17-102]	**37,82**	**11,30**
Puntuación media por ítem [1-6]	**2,24**	**0,68**

DT: Desviación típica

Resultados

En relación al cuestionario validado, se obtuvo una puntuación media por ítem (1-6) de 2.24±0.68 y una puntuación total (17-102) de 37.82±11.30.

Discusión

De acuerdo con esta escala (PEAS), cuanto mayor es la puntuación, más permisivo es el sujeto hacia el dopaje. No existen estudios con niños usando esta herramienta. La muestra presenta una actitud semejante (37.82±11.30) a la estudiada por Petroczi & Aidman, (2009) en estudiantes de Ciencias del Deporte británicos (36.23±13.00; edad: 21.47±5.53), canadienses (37.94±11.25; edad: 20.9±2.04), norteamericanos (37.57±12.60; edad: 20.12±2.18); y algo más permisiva que estudiantes españoles (34.69±9.31; edad: 22.09±3.26; Freire et al., 2011). Las puntuaciones de ciclistas de categoría junior (16-18 años) del equipo nacional de ciclismo de carretera fueron 39.61±7.07 (chicos) y 33.15±9.29 (chicas) (Morente-Sánchez et al., 2011). Podemos concluir que la muestra (nuevas generaciones ciclistas) no presenta una actitud permisiva. Un programa de prevención resultaría interesante para mantener esta actitud a lo largo de sus carreras deportivas.

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ACTITUDES HACIA EL DOPAJE DE LOS CICLISTAS DEL EQUIPO NACIONAL DE MOUNTAIN BIKE

Morente-Sánchez, J.[1], Freire, C.[1], Rosa-Bastida, JB.[1], Mateo-March, M.[2] & Zabala, M.[1,3]

[1] *Facultad de Ciencias del Deporte, Universidad de Granada (España)*
[2] *Facultad Miguel Hernández, Universidad de Elche (Valencia, España)*
[3] *Federación Española de Ciclismo, Madrid (España)*
Contacto: jaimemorante@ugr.es

Introducción

El objetivo de este estudio fue conocer las actitudes hacia el dopaje en ciclistas pertenecientes al equipo nacional español de *Mountain Bike* (MTB).

Método

Se llevó a cabo un estudio descriptivo con 18 ciclistas españoles pertenecientes al equipo nacional de MTB a través de la utilización de un cuestionario validado-PEAS- (Petroczi & Aidman, 2009) que usa una escala Likert de 1 (muy en desacuerdo) a 6 (muy de acuerdo) para mostrar el acuerdo o disconformidad para 17 declaraciones que apoyan el uso de sustancias prohibidas para la mejora del rendimiento. Complementariamente, contestaron a un cuestionario de respuesta abierta de carácter cualitativo.

	Equipo Nacional MTB (n=18)	
PEAS (Escala de Actitudes hacia el Consumo de Sustancias que mejoran el Rendimiento)	**Media**	**DT**
1. Legalizar productos para mejorar el rendimiento sería beneficioso para el deporte	1,11	0,32
2. Doparse es necesario para ser competitivo.	1,00	0,00
3. Se exageran los riesgos relacionados con el dopaje	1,39	0,85
4. Las drogas recreacionales motivan a entrenar y competir al más alto nivel.	1,17	0,38
5. Los deportistas no deberían sentirse culpables por saltarse las reglas y tomar fármacos para mejorar el rendimiento	1,33	0,84
6. Los deportistas son presionados para tomar fármacos que mejoran el rendimiento.	3,06	1,35
7. Los problemas de salud y las lesiones derivados del entrenamiento riguroso son tan perjudiciales como las repercusiones del dopaje.	2,06	1,26
8. Los medios de comunicación exageran el asunto del dopaje.	2,71	1,49
9. Los medios de comunicación deberían hablar menos de dopaje	2,78	1,80
10. El deporte es la única alternativa profesional de los deportistas.	2,44	1,54
11. Los deportistas que toman drogas recreacionales lo hacen porque les ayudan en situaciones deportivas.	2,72	1,60
12. Las drogas recreacionales ayudan a superar el aburrimiento durante los entrenamientos.	1,89	1,13
13. El dopaje es una parte inevitable del deporte competitivo.	1,33	0,69
14. Los deportistas suelen perder tiempo debido a lesiones y los fármacos pueden ayudarles a recuperar el tiempo perdido	2,00	1,14
15. Doparse no es hacer trampas ya que todo el mundo lo hace.	1,00	0,00
16. Sólo debería valorarse la calidad del rendimiento, no la manera en que los deportistas lo consigan.	1,39	0,85
17. No hay diferencia entre utilizar fármacos, formas aerodinámicas o bañadores especiales, ya que todos sirven para mejorar el rendimiento.	1,22	0,55
Puntuación total [17-102]	**30,28**	**6,92**
Puntuación media por ítem [1-6]	**1,80**	**0,43**

DT: Desviación Típica

Resultados

Se obtuvo una puntuación media por ítem (1-6) de 1.80±0.43 y una puntuación total (17-102) de 30.28±6.92. Respecto, al cuestionario cualitativo las respuestas más repetidas para las cuestiones planteadas fueron las siguientes: palabra asociada a dopaje: *mentira* (55.6% de los ciclistas); principal agente responsable del dopaje: *el propio ciclista* (55.6%); principal razón para recurrir al doping: *búsqueda del éxito deportivo* (44.4%); propuesta para erradicar el dopaje: *aumentar el número de controles* (72.2%); diferencias entre ciclismo y otros deportes: *tratamiento mediático diferente* (33.33%) y *número de controles mayor* (27.8%).

Discusión

De acuerdo con esta escala (PEAS), cuanto mayor es la puntuación del test, más permisivo es el sujeto hacia el dopaje. Los ciclistas de MTB presentan una actitud poco permisiva (30.28±6.92) en comparación con el equipo nacional de carretera (34.91±6.62; Morente-Sánchez et al., 2011). Deportistas usuarios de doping confesos también han sido evaluados (46.8±13.32; Uvacsek et al., 2011). Los resultados del cuestionario cualitativo arrojaron información específica muy interesante.

	Equipo Nacional MTB (n=18)	
	% n	**% Frecuencia total**
Palabras asociadas a dopaje:		
Mentira	55,56	20,83
Trampa	50,00	18,75
Salud	22,22	8,33
Traición	22,22	8,33
Otros		43,75
Agentes responsables de dopaje:		
Propio ciclista	55,56	27,78
Médico	50,00	25,00
Entrenador/Director	22,22	11,11
Otros		36,11
Diferencias entre ciclismo y otros deportes:		
Repercusión mediática	33,33	26,09
Tratamiento diferente a otros deportes	27,78	21,74
Número de controles	27,78	21,74
Otros		30,43
Motivos para doparse:		
Logros deportivos	44,44	22,22
Presiones externas	38,89	19,44
Mejores resultados	33,33	16,67
Otros		41,67
Soluciones propuestas:		
Más control y castigo	72,22	40,63
Prevención en edades tempranas	27,78	15,63
Controles sorpresas	27,78	15,63
Otros		28,13

%n: respuestas totales en función de la n
% Frecuencia total: respuestas en función de las respuestas dadas.

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ACTITUDES HACIA EL DOPAJE DE LOS FUTUROS DIRECTORES NACIONALES DE CICLISMO

Freire, C.[1], Morente-Sánchez, J.[1], Garrido-Blanca, G.[1], Mateo-March, M.[2] & Zabala, M.[1,3]

[1] Facultad de Ciencias del Deporte, Universidad de Granada (España)
[2] Facultad Miguel Hernández, Universidad de Elche (Valencia, España)
[3] Federación Española de Ciclismo, Madrid (España)
Contacto: carmen_fs@hotmail.es

Introducción

El objetivo de este estudio fue conocer las actitudes hacia el dopaje de los futuros directores nacionales de ciclismo

Método

Se llevó a cabo un estudio descriptivo con 44 futuros directores nacionales de ciclismo (máximo nivel). Se utilizó un cuestionario validado -PEAS-(Petroczi & Aidman, 2009) de escala Likert de 1 (muy en desacuerdo) a 6 (muy de acuerdo) para mostrar el acuerdo o disconformidad en 17 declaraciones que apoyan el uso de sustancias prohibidas para la mejora del rendimiento. Complementariamente, contestaron a un cuestionario abierto de carácter cualitativo.

	Directores nacionales (n=44)	
PEAS (Escala de Actitudes hacia el Consumo de Sustancias que mejoran el Rendimiento)	**Media**	**DT**
1. Legalizar productos para mejorar el rendimiento sería beneficioso para el deporte	2,00	1,41
2. Doparse es necesario para ser competitivo.	1,50	1,09
3. Se exageran los riesgos relacionados con el dopaje	2,30	1,66
4. Las drogas recreacionales motivan a entrenar y competir al más alto nivel.	2,16	1,56
5. Los deportistas no deberían sentirse culpables por saltarse las reglas y tomar fármacos para mejorar el rendimiento	1,67	1,19
6. Los deportistas son presionados para tomar fármacos que mejoran el rendimiento.	3,93	1,40
7. Los problemas de salud y las lesiones derivados del entrenamiento riguroso son tan perjudiciales como las repercusiones del dopaje.	2,77	1,61
8. Los medios de comunicación exageran el asunto del dopaje	4,93	1,32
9. Los medios de comunicación deberían hablar menos de dopaje	4,59	1,47
10. El deporte es la única alternativa profesional de los deportistas.	2,02	1,37
11. Los deportistas que toman drogas recreacionales lo hacen porque les ayudan en situaciones deportivas.	2,86	1,60
12. Las drogas recreacionales ayudan a superar el aburrimiento durante los entrenamientos.	1,98	1,63
13. El dopaje es una parte inevitable del deporte competitivo.	2,07	1,37
14. Los deportistas suelen perder tiempo debido a lesiones y los fármacos pueden ayudarles a recuperar el tiempo perdido	3,07	1,63
15. Doparse no es hacer trampas ya que todo el mundo lo hace.	1,28	0,85
16. Sólo debería valorarse la calidad del rendimiento, no la manera en que los deportistas lo consigan.	1,40	0,90
17. No hay diferencia entre utilizar fármacos, formas aerodinámicas o bañadores especiales, ya que todos sirven para mejorar el rendimiento.	1,61	1,19
Puntuación total [N+44]	41,59	10,85
Puntuación media por ítem [1-6]	2,47	0,64

DT: Desviación típica

Resultados

Se obtuvo una puntuación media por ítem (1-6) de 2.47±0.64 y una puntuación total (17-102) de 41.59±10.85. Respecto al cuestionario cualitativo las respuestas más repetidas para las cuestiones planteadas fueron: palabra asociada a dopaje: *trampa* (38.64% de los participantes); agente responsable del dopaje: *doctor* (56.8%); razón para recurrir al doping: *contrato-dinero* (31.82%); ¿te han instado/sugerido al dopaje?: sí (38.64%); diferencias entre ciclismo y otros deportes: *tratamiento diferente* (63.64%) y *mayor número de controles* (18.8%); propuestas para erradicar el dopaje: *concienciación* (40.91%), *prevención edades tempranas* (29.55%).

Discusión

De acuerdo con esta escala (PEAS), cuanto mayor es la puntuación, más permisivo es el sujeto hacia el dopaje. La muestra presenta una actitud más permisiva (41.59±10.85) que *coaches* norteamericanos (30.26±9.28; Petroczi & Aidman, 2009), ciclistas equipo nacional español de carretera (34.91±6.62; Morente-Sánchez et al., 2011) y cercana a deportistas usuarios de doping confesos (46.8±13.32; Uvacsek et al., 2011); probablemente fruto de la época ciclista en la que se formaron (década de los 90). Los resultados del cuestionario cualitativo arrojaron información específica interesante.

	Directores Nacionales Hombres (n=44)	
	N n	% Frecuencia Total
Palabras asociadas a dopaje:		
Trampa	38,64	15,40
EPO	25,00	10,00
Mentira	13,64	5,45
Otros		69,09
Agentes responsables de dopaje:		
Médicos	56,82	22,73
Directores	38,64	15,45
Deportes	25,00	10,00
Otros		51,82
Diferencias entre ciclismo y otros deportes		
Tratamiento diferente a otros deportes	63,64	43,08
Repercusión mediática	22,73	15,38
Controles	18,18	12,31
Otros		29,23
Motivos para doparse:		
Autoexigencias	36,36	18,39
Mejores resultados	31,82	16,09
Contrato y dinero	31,82	16,09
Logros deportivos	25,00	12,64
Otros		36,78
¿Te han sugestionado para doparte?		
SI	38,64	8,33
¿Quién?		
Compi ciclista	29,55	38,24
Directores	18,18	23,53
Médicos	15,91	20,59
Soluciones propuestas:		
Concienciación	40,91	30,00
Prevención edades tempranas	29,55	21,67
Más control y castigo	13,64	10,00
Otros		38,33

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ACTITUDES HACIA EL DOPAJE EN EL CLICLISMO DE ELITE ESPAÑOL: BMX vs MTB

MORENTE-SÁNCHEZ, J.[1], FREIRE, C.[1,] MATEO, M.[2] & ZABALA, M.[1,3]
[1] Facultad de Ciencias del Deporte. Universidad de Granada
[2] Universidad Miguel Hernández. Elche.
[3] Federación Española de Ciclismo. Madrid

Introducción
El dopaje ha salpicado el mundo del deporte en los últimos años, especialmente en deportes como el ciclismo y el atletismo. Para mitigar esta problemática se hace necesario actuar a nivel de actitudes hacia consumo de sustancias prohibidas a diferentes niveles (1). Cada vez son más quienes se decantan por la intervención a edades tempranas para disuadir el dopaje (2). El objetivo de este estudio fue conocer y comparar las actitudes hacia el dopaje en ciclistas pertenecientes al equipo nacional español de MTB y BMX.

Métodos
Un total de 31 ciclistas españoles pertenecientes al equipo nacional participaron en el estudio. La muestra se dividió en 2 grupos atendiendo a la modalidad ciclista (G1: Mountain Bike -MTB- n=18; G2: BMX, n=12). Se llevó a cabo un estudio descriptivo a través de la utilización de un cuestionario validado (1) de 17 ítems usando una escala Likert de 1 (muy en desacuerdo) a 6 (muy de acuerdo) para mostrar su apoyo o disconformidad acerca de una serie de declaraciones que apoyan el uso de sustancias prohibidas para la mejora del rendimiento. Media y desviación típica fueron calculadas para cada ítem en general y para cada grupo, así como se utilizó el test de Mann Whitney para contrastar resultados intergrupo aplicando la corrección de Bonferroni.

Resultados
El grupo de MTB, obtuvo una puntuación media por ítem (1-6) de 1.80±0.43 (2= bastante en desacuerdo)y total (17-102) de 30.28±6.92. El grupo de BMX, obtuvo una puntuación media por ítem de 2.50±0.62 (3= en desacuerdo)y total (17-102) de 42.46±10.74. Se encontraron diferencias estadísticamente significativas entre MTB y BMX en puntuación media por ítem (0.003), puntuación general (0.002) así como para 4de 17.

Discusión
De acuerdo con esta escala, cuanto mayor es la puntuación del test, más permisivo es el sujeto hacia el dopaje. En este sentido, los ciclistas de BMX presentan una actitud más permisiva en comparación con los ciclistas de MTB. Estudios previos con el equipo nacional de carretera (3) obtuvieron los siguientes resultados: Junior masculino: 39.61±7.07; Sub 23 masculino: 31.33±6.67. Hay estudios que han aplicado el cuestionario a usuarios de doping confesos, uno constituido por cicloturistas (4) cuya puntuación fue la siguiente 48.87±15.98; y otro formado por "deportistas de elite" (5) que obtuvo una puntuación de 46.8±13.32.
Se puede concluir que los ciclistas españoles de élite no son permisivos ante el fenómeno del dopaje. No obstante, el grupo de BMX presenta unos valores, en cierto modo,elevados, llegando a aproximarse a puntuaciones propias de usuarios, por tanto, un seguimiento cercano sería interesante.

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ATTITUDES TOWARDS DOPING: A COMPARISON AMONG DIFFERENT SPANISH OLYMPIC CYCLING NATIONAL TEAMS

Morente-Sánchez, J.[1-2], Freire, C.[1]& Zabala, M.[1, 2]

[1] Faculty of Sport Sciences, University of Granada (Spain); [2] Spanish Cycling Federation, Madrid (Spain

mail: jaimemorente@ugr.es

Introduction

There were no previous specific studies that assessed attitudes towards doping in elite athletes by means a validated scale [1], The aim of this study was to know and compare the attitudes towards doping among different Spanish Olympic cycling national teams using a validated tool.

Methods

A total of 72 Spanish national team cyclists, (mean age: 19.67±4.72 years) participated in the study. The gender distribution was 70.1% males (n=51) and 29.9 % females (n=21). The total sample was divided into four groups according to the 4 different Olympic cycling disciplines: Mountain bike -MTB- (n = 18; 83.3% men), Bicycle Moto Cross -BMX- (n = 12; 100% men), Track -TRA- (n = 9; 77.8% men) and Road -ROA- (n = 33; 54.5% men). Descriptive design was carried out by means of a validated questionnaire, Performance Enhancement Attitudes Scale (PEAS) [2] of 17 questions using a Likert scale from 1 (Strongly Disagree) to 6 (Strongly Agree) for different statements that supported the use of doping in sport. Mean value ± Standard Deviation was obtained for each item and Mann Whitney test for independent variables with Bonferroni post hoc was carried out.

Results

Regarding results from PEAS for the whole sample, mean score (1-6) was 2.13±0.55 and a overall score (17-102) was 36.12±9.39. For different groups, respectively: MTB: 1.80±0.43, 30.28±6.92; BMX: 2.50±0.62, 42.46±10.74; TRA: 2.54±0.71, 43.22±12.00; ROA: 2.06±0.39, 34.91±6.62. Regarding mean score and overall score significant differences were observed between MTB and BMX (p=0.001; p=0.002, respectively) and between MTB and TRA (p=0.002; p=0.003, respectively).

Table 1. Descriptive statistics and comparisons between different Olympic cycling disciplines (Total sample, Road, MTB, BMX and Track) for each PEAS item*.

	Total sample (n=72)	MTB team (n=18)	BMX team (n=12)	Track team (n=9)	Road team (n=33)	
PEAS (Performance Enhancement Attitude Scale)	Mean (SD)		Mean (SD)	Mean (SD)	Mean (SD)	P
1. Legalizing performance enhancements would be beneficial for sports.	1.51 (0.97)	1.11 (0.32)	1.62 (1.45)	2.33 (1.12)	1.47 (0.83)	p=0.009 [3-4]
2. Doping is necessary to be competitive.	1.27 (0.85)	1.00 (0.00)	2.00 (1.68)	1.33 (0.71)	1.12 (0.41)	NS
3. The risks related to doping are exaggerated.	2.12 (1.34)	1.39 (0.85)	3.31 (1.84)	2.22 (0.97)	2.03 (1.14)	p=0.001 [1-2]
4. Recreational drugs give the motivation to train and compete at the highest level.	1.53 (0.97)	1.17 (0.38)	1.92 (1.32)	1.56 (1.13)	1.56 (0.96)	NS
5. Athletes should not feel guilty about breaking the rules and taking performance enhancing drugs.	1.53 (1.08)	1.33 (0.84)	2.00 (1.68)	1.44 (1.01)	1.47 (0.90)	NS
6. Athletes are pressured to take performance-enhancing drugs.	3.00 (1.53)	3.06 (1.35)	3.54 (1.90)	2.00 (1.50)	3.03 (1.40)	NS
7. Health problems related to rigorous training and injuries are just as bad as from doping.	2.30 (1.43)	2.06 (1.26)	3.15 (1.91)	3.00 (1.41)	1.91 (1.13)	NS
8. The media blows the doping issue out of proportion.	4.03 (1.75)	2.71 (1.49)	3.54 (1.98)	5.33 (1.00)	4.53 (1.48)	p=0.001 [1-4]; p<0.001 [2-3] ;p=0.001 [2-4]
9. Media should talk less about doping.	3.61 (1.83)	2.78 (1.80)	3.08 (1.66)	5.33 (0.87)	3.79 (1.81)	p=0.001 [1-4]; P=0.003 [2-4]
10. Athletes have no alternative career choices but sport	2.37 (1.54)	2.44 (1.54)	2.92 (2.15)	2.89 (1.83)	2.00 (1.13)	NS
11. Athletes who take recreational drugs use them because they help them in sport situations.	2.50 (1.53)	2.72 (1.60)	3.15 (1.99)	2.44 (1.88)	2.15 (1.10)	NS
12. Recreational drugs help to overcome boredom during training.	1.62 (1.03)	1.89 (1.13)	1.69 (1.25)	1.78 (1.39)	1.41 (0.74)	NS
13. Doping is an unavoidable part of the competitive sport.	1.89 (1.54)	1.33 (0.69)	2.00 (1.68)	2.44 (2.24)	2.00 (1.58)	NS
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2.73 (1.66)	2.00 (1.14)	3.69 (1.80)	3.78 (2.05)	2.47 (1.35)	p=0.008 [3-4]
15. Doping is not cheating since everyone does it.	1.11 (0.39)	1.00 (0.00)	1.38 (0.65)	1.00 (0.00)	1.09 (0.38)	NS
16. Only the quality of performance should matter, not the way athletes achieve it.	1.64 (1.19)	1.39 (0.85)	2.00 (1.47)	2.44 (2.01)	1.41 (0.82)	NS
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.	1.53 (0.86)	1.22 (0.55)	1.69 (0.95)	1.89 (1.27)	1.53 (0.83)	NS
Mean Score	2.13 (0.55)	1.80 (0.43)	2.50 (0.62)	2.54 (0.71)	2.06 (0.39)	p=0.001 [1-2]; p=0.002 [1-3]
Overall Score	36.12 (9.39)	30.28 (6.92)	42.46 (10.74)	43.22 (12.00)	34.91 (6.62)	p=0.002 [1-2]; p=0.003 [1-3]

*1= Strongly Disagree; 2=Disagree; 3= Slightly disagree; 4=Slightly Agree; 5=Agree; 6= Strongly Agree.

[1-2] MTB vs. BMX
[1-3] MTB vs. Track
[1-4] MTB Men vs. Road
[3-4] BMX Men vs. Road

Discussion

According to PEAS, higher scores represent a more lenient attitude toward doping. Cyclists of the Spanish Olympic national teams, in general, are not tolerant in relation to doping, though BMX and Track riders were little more permissive attitudes towards doping than MTB and road. These scores are relatively far from non-elite confessed doping users have also been assessed (46.8±13.32, [3]; 46.8±13.32, [4]) however, a deep analysis and monitoring of this sample appears necessary.

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THE PHENOMENON OF DOPING FROM THE PERSPECTIVE OF THE SPANISH OLYMPIC CYCLING NATIONAL TEAMS

Morente-Sánchez, J.[1-2] , Freire, C.[1]& Zabala, M.[1, 2]

[1] Faculty of Sport Sciences, University of Granada (Spain); [2] Spanish Cycling Federation, Madrid (Spain

mail: jaimemorente@ugr.es

Introduction

Recent events such as "Operation Puerto" in 2006 or the dispossessions of the 7 Tours of France to Lance Armstrong in 2012 have made cycling lose much of its credibility from a social point of view [1]. The aim of this study was to know and compare the opinion of the Spanish cyclists about doping discriminating according to Olympic disciplines.

Methods

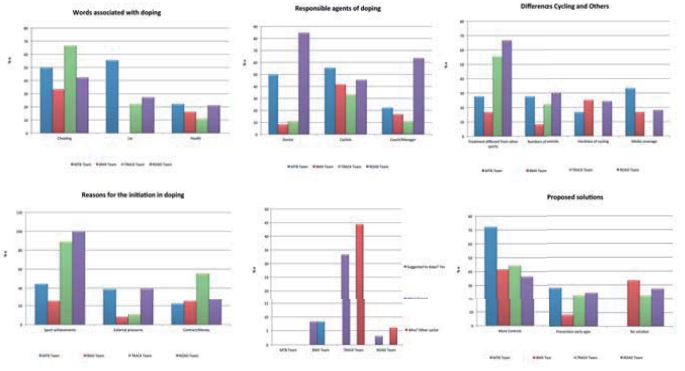
A sample of 72 Spanish national team cyclists, (19.7±4.7 years, 51 males, 21 females) was divided into four groups according to the 4 different Olympic cycling disciplines: Mountain bike -MTB- (n = 18), Bicycle Moto Cross -BMX- (n = 12), Track -TRA- (n=9) and Road -ROA-(n=33). A descriptive design was carried out using a bespoke questionnaire consisting in 7 free-response questions whose answers were analyzed and categorized.

Results

Data were expressed in terms of percentage* of participants who mentioned some (one, two or three) of the three most mentioned statements (% n), and were shown in the following order: "Total sample"; MTB, BMX, Track and Road. (see figures)

1-Words associated with doping: Cheating ("44.6"%; 50.0%, 33.3%, 66.7%, 42.4%), Lie ("28.4"%; 55.6%, 0, 22.2%, 27.3%).
2- Responsible agents of Doping: Doctor ("51.3"%; 50.0%, 8.3%, 11.1%, 84.8%), Cyclists ("48.6"%; 55.6%, 41.7%, 33.3%, 45.5%), and Coach/Manager ("40.5"%; 22.2%, 16.7%, 11.1%, 63.6%).
3- Differences Cycling vs Other sports: Different treatment ("47.3"%; 27.7%, 16.7%, 55.6%, 66.7%), Numbers of controls ("20.3"%; 27.8%, 8.3%, 22.2%, 30.3%).
4-Reasons for initiation in doping: Sport achievements ("44.6"%; 44.4%, 25.0%, 88.9%, 100%), External pressures ("28.4"%; 38.9%, 8.3%, 11.1%, 39.4%), Contract/money ("25.7"%; 22.2%, 25.0%, 55.6%, 27.3%)
5 - Have you ever been suggested to dope? "Yes" ("5/72"; 1/33, 0, 1/12, 3/9)
6 - Have you ever seen another person inciting/being incited? "Yes" ("7/72"; 2/33, 0, 1/12, 4/9).
7- Proposed solutions: the three most mentioned suggestion to eradicate doping in sport were "More controls" ("41.9"; 72.2, 41.7, 44.4, 36.3), Prevention early ages ("21.62"%; 27.8%, 8.3%, 22.2%, 24.2%), No solution ("20.3%; 0, 33.3%, 22.2%, 27.3%).

*Each participant could mention as many answers as needed, but just the most relevant are presented (the rest ranged from 1.39 to 5.56% are not considered).



Figures. Percentage of times that specific statement was mentioned (percentage of total sample of each group -% n-),

Discussion

Low percentage of cyclists saw o was suggested to dope (<10%). "Doctor" was the main responsible agent o doping only for ROA, others groups focused on "cyclists". "Sport achievement" was the main reason while "More controls" the main proposed solution. It is claimed prevention in early ages as it was suggested in previous studies [1, 2]. It would be interesting to propose similar studies in other type of sports to make comparisons.

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18th annual Congress of the EUROPEAN COLLEGE OF SPORT SCIENCE
UNIFYING SPORT SCIENCE

SITUACIÓN DEL DOPAJE EN EL FÚTBOL ESPAÑOL: ACTITUDES, CONOCIMIENTOS Y CREENCIAS.

Autores: Jaime Morente-Sánchez, Mikel Zabala

Facultad de Ciencias del Deporte. Universidad de Granada. España

RESUMEN

Antecedentes y objetivo: No existen estudios previos sobre el fenómeno del dopaje en el fútbol español. El objetivo del presente trabajo fue conocer y comparar actitudes, creencias y conocimientos sobre dopaje en el futbol español desde élite hasta categorías sub-18 (juvenil y cadete).

Método: Un total de 1324 participantes (22.56±5.62 años), procedentes de distintas categorías: élite (1ª y 2ª; ELI; n=304), profesionales no élite (2ªB; PRO; n=308), top amateur (3ª; AMA; n=330), Elite sub18 (U18; n=334) y chicas elite (1ª; FEM; n=48), completaron un cuestionario constituido por una escala validad de evaluación de actitudes hacia el dopaje (PEAS) y preguntas específicas de carácter cualitativo.

Resultados: La puntuación en el PEAS para la muestra total fue 34.02±11.08; y para los diferentes grupos: ELI: 30.61±9.91; PRO: 34.23±11.13; AMA: 35.05±10.35; U18: 35.93±11.50; FEM: 33.75±14.73; diferencias significativas entre ELI y PRO (p=0.000), ELI y AMA (p=0.000), y entre ELI y U18 (p=0.000). El 94.5% de la muestra total no conocía el significado del acrónimo WADA mientras que el 97.4% desconocía la lista de sustancias prohibidas (autoevaluación sobre conocimiento: 3/10). El 31.7% usaba regularmente suplementos siendo este dato especialmente alto en ELI y PRO (49% y 43.6%, respectivamente). El 4.5% reconoció haber consumido sustancias prohibidas alguna vez y el 23.7% conocía a compañeros que lo hicieron. La palabra asociada a dopaje más mencionada fue "trampa" (21.1%), el agente responsable "médico" (29.60%), la razón para recurrir "rendimiento" (35.5%) y la propuesta de solución "más controles" (15.60%). El 73.5% del total de la muestra consideraba que existía un trato discriminatorio entre deportes: más perseguido "ciclismo" (44%) y menos perseguido "deportes colectivos" (27.8%).

Conclusión: Los futbolistas españoles no son tolerantes en materia de dopaje. Existe un importante desconocimiento sobre este fenómeno. Necesidad de programas de educación/prevención y dopaje en fútbol tanto en adultos como en jóvenes.

Palabras clave: dopaje, fútbol, elite, amateur, prevención.

DOPING SITUATION IN SPANISH FOOTBALL: ATTITUDES, KNOWLEDGE AND BELIEFS.

Authors: Jaime Morente-Sánchez & Mikel Zabala

Faculty of Sport Sciences, University of Granada, Spain.

Address for correspondence:

Jaime Morente Sánchez

Faculty of Sport Sciences, (University of Granada). Department of Physical Education and Sport. Carretera de Alfacar s/n (18011). Granada (Spain)

Phone: +34 651775666; Fax: +34 958244369

Mail: jaimemorente@ugr.es

ABSTRACT

Objective: There is no previous research focused on the phenomenon of doping in Spanish football. The aims of this study were to know and compare attitudes, beliefs and knowledge about doping in Spanish footballers from elite to under-eighteen categories.

Methods: A total of 1324 football (22.56±5.62 years), from the different categories: elite (1ª y 2ª; ELI; n=304), professionals non elite (2ªB; PRO; n=308), top amateur (3ª; AMA; n=330), Elite under18 (U18; n=334) y elite females (1ª; FEM; n=48). Descriptive design was carried out using a questionnaire composed of a validated scale (PEAS) and specific qualitative questions. Results: Overall mean score from PEAS (17–102) was 34.02±11.08; and for different groups: ELI: 30.61±9.91; PRO: 34.23±11.13; AMA: 35.05±10.35; U18: 35.93±11.50; FEM: 33.75±14.73; significant differences were observed between ELI and PRO (p=0.000), ELI and AMA (p=0.000), and between ELI and U18 (p=0.000). Almost all the participants (94.5%) did not know the meaning of WADA neither the 97.4% the prohibited list (knowledge self-assessment mark was 3/10). Supplements were used by 31.7% of total sample being especially high in ELI and PRO groups (49% and 43.6%, respectively). Almost five percent of participants (4.5%) recognized having used banned substances and 23.7% knew dopers. The most mentioned word associated with doping was "cheating" (21.1% of total sample), the responsible agents of doping "doctor" (29.60%), the main reason for doping "performance" (35.30%), and the major proposed solution was "more doping controls" (15.60%). Moreover, 73.5% stated that there was "a different treatment among sports", being "cycling" the most persecuted (44%) and "team sports" the less one (27.8%).

Conclusion: The Spanish football players are not tolerant regarding doping. A worrying lack of knowledge about this phenomenon was showed highlighting that anti-doping prevention and education programs in football are needed in adults as well as in early ages.

Keywords: doping, football, elite, amateur, prevention

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THE PHENOMENON OF DOPING IN SPANISH PROFESSIONAL FOOTBALL

Authors: Morente-Sánchez, J., Garrido-Blanca, G., Zabala, M.

Faculty of Sport Sciences, University of Granada (Spain)

Introduction
Doping in Spanish professional football had never been investigated. The aim of this study was examine several issues related to doping in Spanish professional football.

Methods
The sample was comprised of 612 Spanish professional football players (24.6±5.22 years; response rate: 79.48%), from the different categories: Elite -ELI- (1st and 2nd Division; n=304) and non-elite Professional -PRO- (2nd Division B; n=308). Descriptive design was carried out using a questionnaire composed of a validated scale (Performance Enhancement Attitudes scale: PEAS[1]) to assess attitudes, and specific qualitative open-ended questions to get specific data.

Results
Overall mean score from PEAS (17–102) was 32.43±10.68 (ELI: 30.61±9.91; PRO: 34.23±11.13; p=0.000). The sample analyzed stated that 13.5% of professional footballers used banned substances (projected use): ELI, 11.61±14.15; PRO, 16.04±16.22 (p=0-000). Regarding knowledge, only 9.3% of total sample knew the meaning of WADA and a few recognized to know the prohibited list (2.7%). Nearly half of the sample (46.30%) used supplements. Almost five percent (4.5%) recognized having used banned substances and 22.3% knew dopers. The most mentioned word associated with "doping" was "cheating" (23.20%), with "responsible agents of doping" the word "doctor" (33.5%), the main reason for doping" "performance" (36.9%), the major proposed solution "more doping controls" (15%; 74.30% "no response"). Besides, 77.6% stated that regarding doping "a different treatment among sports" existed, considering cycling as the most persecuted (51.9 %) and team sport as the least one (33.7%: football: 12%).

Discussion
Spanish professional football players are not tolerant in relation to doping. However, a risky lack of knowledge about this phenomenon was showed highlighting that anti-doping prevention and education programs in football are needed.

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Keywords: doping, elite, professional, football, prevention

CURRICULUM VITAE ABREVIADO [SHORT CV]

DATOS PERSONALES [PERSONAL DATA]

Apellidos y nombre: **Morente Sánchez, Jaime**

Fecha de nacimiento **03-01-1986**

Email: **jaimemorente@ugr.es**

ACTIVIDAD ACADÉMICA [ACADEMIC ACTIVITY]

LICENCIADO EN CIENCIAS DE LA ACTIVIDAD FÍSICA Y EL DEPORTE.
Universidad de Granada, Facultad de Ciencias de la Actividad Física y el Deporte.
Agosto, 2009.

MÁSTER UNIVERSITARIO OFICIAL EN PROFESORADO DE EDUCACIÓN SECUNDARIA OBLIGATORIA, BACHILLERATO, FORMACIÓN PROFESIONAL Y ENSEÑANZA DE IDIOMAS (ESPECIALIDAD: EDUCACIÓN FÍSICA)
Universidad de Granada
Julio 2010

MASTER UNIVERSITARIO OFICIAL EN NUTRICIÓN HUMANA.
Universidad de Granada.
Enero 2011
Mención de Calidad: MDC 2006-00533

FIRST CERTIFICATE ENGLISH (FCE).
(B2: MARCO DE REFERENCIA EUROPEO).
Cambridge
Julio 2012.

2º AVANZADO: INGLÉS (B2)
ESCUELA OFICIAL DE IDIOMAS (EOI – Granada).
Julio 2013 (Matriculado actualmente para la obtención del nivel C1)

ACADEMIC VISITOR
Faculty of Science, Engineering & Computing, Kingston University (London).
1 Junio – 31 Agosto 2013.
Supervisor: Andrea Petroczi

ACADEMIC VISITOR and TEACHER

Facultade do desporto, Universidade do Porto (Portugal).
5-9 Mayo 2014.
Supervisor: Julio Garganta

Docencia oficial en el Departamento de Educación Física y Deportiva. Universidad de Granada.

Curso académico 2012-2013. 6 créditos
Asignatura "Alto rendimiento: Fútbol"
5º curso de la Licenciatura de Ciencias del Deporte (Universidad de Granada).

Curso académico 2013-2014. 3 créditos.
Asignatura "Especialización deportiva: Fútbol"
4º curso del Grado de Ciencias de la Actividad Física y el Deporte (Universidad de Granada).

Curso académico 2013-2014. 3 créditos.
Asignatura "Especialización deportiva: Ciclismo"
4º curso del Grado de Ciencias de la Actividad Física y el Deporte. (Universidad de Granada).

Docencia en Centro autorizado de formación de técnicos deportivos IUNDENIA.
Módulo Bloque común: Entrenamiento Deportivo (fútbol, fútbol sala, esquí, montaña).
Módulo Bloque específico: Preparación física (fútbol).
Niveles: TDI, TDII y TDIII.
Cursos: 2010-2011; 2011-2012; 2012-2013; 2013-2014.

PROYECTOS DE INVESTIGACIÓN [RESEARCH PROJECTS]

"HÁBITOS DE VIDA ACTIVA EN LA POBLACIÓN GRANADINA"
Fundación Empresa Universidad de Granada
Curso 2008-2009.
Director: Javier Ocaña Wilhelmi.

"EVALUACIÓN BIOMECÁNICA DE LA LOCOMOCIÓN DE JÓVENES MEDIANTE PLATAFORMA DE PRESIONES PLANTARES"
Laboratorio ERGOLAB. FCCAFD. Universidad de Granada
Abril, Mayo, Junio 2009.
Director: Víctor Manuel Soto Hermoso

"EVALUACIÓN BIOMECÁNICA PODOLÓGICA DEL SALTO VERTICAL DE JÓVENES MEDIANTE FOTOGRAMETRÍA DE MAPAS DE PRESIONES PLANTARES"
Laboratorio ERGOLAB. FCCAFD. Universidad de Granada
Abril, Mayo, Junio 2009.
Director: Víctor Manuel Soto Hermoso

"EVALUACIÓN BIOMECÁNICA POSTURAL DE JÓVENES MEDIANTE FOTOGRAMETRÍA TRIDIMENSIONAL"
Laboratorio ERGOLAB. FCCAFD. Universidad de Granada
Abril, Mayo, Junio 2009.
Director: Víctor Manuel Soto Hermoso

"COORDINADOR GENERAL DE PROYECTOS PARA LA PREVENCIÓN DEL DOPAJE Y ESTUDIOS DE INVESTIGACIÓN EN RENDIMIENTO DEPORTIVO"
Fundación Empresa Universidad de Granada
Desde 1 Diciembre 2010 - 1 Diciembre 2012.
Director: Mikel Zabala Díaz

"ESTUDIOS DE INVESTIGACIÓN, ASESORAMIENTO Y COORDINACIÓN TÉCNICA PARA LA MEJORA DEL RENDIMIENTO DEPORTIVO DEL EQUIPO CICLISTA PROFESIONAL "MOVISTAR TEAM"
Fundación Empresa Universidad de Granada
Desde 1 Enero de 2013 - hasta actualidad.
Director: Mikel Zabala Díaz

"ANÁLISIS Y DESARROLLO DEL TALENTO DE JÓVENES JUGADORES DE FÚTBOL PERTENECIENTES AL CENTRO DE FORMACIÓN DEL REAL BETIS BALOMPIÉ". LA VIGENCIA DE LA COLABORACIÓN"
Fundación Empresa Universidad de Granada
Desde 15 Marzo 2013 – 14 Octubre 2014.
Director: Luis Fradua Uriondo

"EXPLORING ATHLETE'S AND STUDENTS' INNER THOUGHTS ABOUT PERFORMANCE ENHANCING DRUGS: FUNCTIONAL USE OR CHEATING?"
Faculty of Science, Engineering & Computing, Kingston University
Desde 1 Junio 2013 – 31 Agosto 2013.
Director: Andrea Petroczi

BECAS DISFRUTADAS [GRANTS]

Ministerio de Educación y Ciencia (MEC).
Beca de colaboración
Curso 2008-2009
Departamento de Educación Física y Deportiva. Facultad de Ciencias de la Actividad Física y el Deporte. Universidad de Granada.

Mejores expedientes académicos
Curso 2008-2009
Departamento de Educación Física y Deportiva. Facultad de Ciencias de la Actividad Física y el Deporte. Universidad de Granada.

Universidad de Granada.
Colaboración para las Experiencias Piloto de Aplicación del Sistema de Créditos Europeos (ECTS).

Curso 2009-2010 (Octubre-Junio)
Departamento de Educación Física y Deportiva. Facultad de Ciencias de la Actividad Física y el Deporte. Universidad de Granada.

Ministerio de Educación y Ciencia (MEC).
Beca FPU (Formación Profesor Universidad) AP-2009-0529
Director: Mikel Zabala Díaz
Concedida Agosto 2010. Toma posesión 3 de Diciembre 2010 hasta 3 de Diciembre 2014.
Departamento de Educación Física y Deportiva. Facultad de Ciencias de la Actividad Física y el Deporte. Universidad de Granada

Programa de movilidad Erasmus para personal docente de la Universidad de Granada
Vicerrectorado de Relaciones Internacionales y Cooperación al Desarrollo de la Universidad de Granada.
Concedida en Diciembre 2013.Curso 2013/2014. Duración: 5-9 Mayo 2014.
Centro receptor: Facultade do desporto, Universidade do Porto (Portugal).
Supervisor: Julio Garganta

Programas de estancias breves para becarios FPU
Ministerio de Educación y Ciencia (MEC).
Estancia breve concedida a Porto (Portugal)
Concedida en Febrero 2014.Curso 2013/2014. Duración: 1 Junio-30 Agosto 2014.
Centro receptor: Facultade do desporto, Universidade do Porto (Portugal).
Supervisor: Julio Garganta

PREMIOS Y RECONOCIMIENTOS [AWARDS AND RECOGNITIONS]

RESEARCHER for WADA (World Anti-Doping Agency).
INVESTIGADOR de la AGENCIA MUNDIAL ANTIDOPAJE.
Alta: Agosto 2011 - Hasta la actualidad.

PRIMER PREMIO AL RENDIMIENTO ACADÉMICO UNIVERSITARIO (ANTIGUOS PREMIOS NACIONALES)
Otorga: Ministerio de Educación y Ciencia
Licenciatura Ciencias de la Actividad Física y el Deporte.
CURSO de finalización de Licenciatura que opta a premio: 2008-2009

PREMIO/MENCIÓN AL MEJOR EXPEDIENTE ACADÉMICO
Otorga: Universidad de Granada.
Licenciatura Ciencias de la Actividad Física y el Deporte.
Promoción 2004-2009.

PRIMER PREMIO en el VI Congreso Internacional de Fútbol Cartagena puerto de culturas. "Desde el presente hacia el futuro" con la comunicación:

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MIEMBRO comité organizador y ejecutivo VII Congreso Internacional de la Asociación española de Ciencias del Deporte. Granada 15-17 Noviembre 2012.

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importante de todo, siempre con una sonrisa en la cara “disfrutando el proceso”, quizá uno de los principios básicos que me ha transmitido mi director de Tesis. Gracias Mikel.

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