



Original research

Attitudes, beliefs and knowledge related to doping in different categories of football players

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ABSTRACT

Objectives: The aim of this study was to study and compare attitudes, beliefs and knowledge about doping of footballers, from elite to under-18 categories.

Design: The descriptive exploratory design used an instrument combining a validated questionnaire (Performance Enhancement Attitude Scale: PEAS) with qualitative open-ended questions.

Methods: A total of 1324 Spanish football players (average age 22.56 ± 5.62 years) from 88 football teams that ranged from elite to under-18 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, $n = 48$) composed the sample.

Results: PEAS overall scores (range 17–102, with higher scores representing more permissive attitudes) was 34.02 ± 11.08 . The overall scores for all groups analysed were: FEM: 33.75 ± 14.73 ; ELI: 30.61 ± 9.91 ; PRO: 34.23 ± 11.13 ; AMA: 35.05 ± 10.35 ; and U18: 35.93 ± 11.50 . Significant differences were observed between ELI and PRO ($p < 0.001$), ELI and AMA ($p < 0.001$), and ELI and U18 ($p < 0.001$). 95% of participants did not know the meaning of WADA; 97.4% did not know the Prohibited List; 5% admitted having used banned substances and 23.7% knew dopers.

Conclusions: This study showed different an important lack of knowledge about doping and an high levels of supplement use in this sample of footballers assessed. It which clearly reinforces the idea of implementing a wide educational doping prevention programme in football environment.

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Practical implications

- The majority (97.4%) of Spanish football players did not know the World Anti-Doping Agency (WADA) Prohibited List.
- The 95% of participants did not know the meaning of WADA and the 5% of the sample admitted having used banned substances.
- The 23.7% of the Spanish Footballers knew dopers.
- Anti-doping prevention and education programs are needed in football environment.

1. Introduction

According to the World Anti-Doping Agency (WADA) Code criteria, doping definition requires considerations about enhancement

of sport performance, the potential health risk and the violation of the 'spirit of sport'.¹ In general, medical, physiological, and social science researchers have studied doping in sport in recent years.² Previous studies indicated that doping behavior and attitudes have been the strongest predictors of the intention to use banned substances.^{3,4} The vast majority of research related to doping in sport has focused on the prevalence of use, attitudes or knowledge and often used large samples composed of athletes from different sports in the same study.^{5,6} In this line, concerning recent scientific literature, studies could be found about doping in sport in general, and in specific sports such as tennis,⁷ sailing,⁸ judo,⁹ cycling¹⁰ and biathlon.¹¹

However, according to a systematic review published by Morente-Sánchez and Zabala,⁶ there are a few specific studies that assessed attitudes, beliefs and knowledge about doping of football players. A study among football players and coaches in Iran showed that these two categories have poor knowledge of doping.¹² Moreover, Giraldi et al.¹³ investigated the knowledge, attitudes and behaviors in the doping of young football players in

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Italy. The study showed that 6.5% of the males, but none of the females, considered personal use of substances to enhance sport performance. Interestingly, Waddington et al.¹⁴ carried out a study among English professional footballers. Authors focused on the use of supplements, the sources of information, the experience with and attitudes towards drug testing, the views of banned PES and recreational drugs of the football players. This research revealed specific cases of former Premier League players who admitted using substances before matches. Another research group¹⁵ investigated the use and awareness of lawful and unlawful substances by amateur footballers in Cameroon, but the results from this study should be interpreted cautiously, due to a different sociocultural context (i.e., 7% of the participants admitted using cocaine before matches and 16% did the same with alcohol drinks). Hence, unfortunately, doping in football is not a new phenomenon and, consequently, it should be studied comprehensively in order to provide efficient intervention in potentially risky groups.

Therefore, we focused on footballers into different categories and used a questionnaire containing a validated scale to assess attitudes towards doping (Performance Enhancement Attitude Scale, PEAS),² as well as specific qualitative open-ended questions to assess other aspects, such as the use of supplements, beliefs, and knowledge, to provide efficient intervention in these potentially risky groups. While the aim of this study was to discover and compare attitudes, beliefs and knowledge about doping among footballers from the elite to under-18 categories, the hypothesis was that this sample of footballers would not be tolerant to doping,¹⁶ although their beliefs and knowledge about doping would be improvable.

2. Methods

The characteristics of the sample are shown in Table 1. All of the 1324 participants (average age 22.56 ± 5.62 years) in this study were licensed football players. In Spain, there are 8 men's football league categories but we only included the top four, the 1st and 2nd divisions (elite, ELI, $n=304$), 2nd division "B" (non-elite professional, PRO, $n=308$) and the 3rd division (top amateur, AMA, $n=330$). All female footballers represented the 1st division (FEM, $n=48$). The under-18 group (U18, $n=334$) included elite players from the U16 and U18 top categories who might potentially become professional, and even elite, football players in the near future. From a total of 386 teams (1st to 3rd divisions), we randomly selected 124 football clubs, of which 70 (56.45%) responded back with the questionnaires. This constitutes a representative sample at a confidence level of 95%. In addition, 15 U18 teams and 3 female teams from recruited football clubs also responded back with the questionnaires. Therefore, a total of 88 football teams from different categories participated in this study. The Ethics Committee of the University of Granada (Spain) approved the study protocol.

A descriptive exploratory design was carried out using a questionnaire composed of a validated scale to assess attitudes towards doping (PEAS)² and specific qualitative open-ended questions to find out about other aspects such as the use of supplements, beliefs and knowledge. The PEAS is a 17-question 6-point Likert-type scale with points categorized as follows: strongly disagree (1), disagree (2), slightly disagree (3), slightly agree (4), agree (5), and strongly agree (6). No neutral response is offered, and all 17 items are scored in the same direction, i.e., reverse scoring is not required. As there are 17 items, the possible 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 demonstrated good psychometric properties.^{2,17,18} It has been cross-culturally adapted and validated in Spanish.¹⁷ Cronbach's α values were calculated as a measure

of internal consistency, with a cut-off value of 0.7 to determine acceptable scale reliability.¹⁹ The Cronbach's alpha values ranged from 0.73 to 0.82 among the groups studied.

An ad-hoc qualitative open-ended questionnaire was used to assess experience, knowledge and beliefs of the participants.¹⁷ The participants were asked questions on the following topics: (1) the use of supplements and which ones are taken; (2) knowledge self-assessment: the meaning of WADA, the categories on the Prohibited List, what type of substance Clenbuterol is, and the criteria for inclusion on the Prohibited List; (3) words associated with doping; (4) reasons to start doping; (5) persons responsible for doping; (6) differences between 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 people who dope? What percentage of footballers do you think use doping? (% projected use); (8) questions about oneself: Has doping been suggested to you? Have you ever doped?; (9) hypothetical magic drug scenarios; following Bloodworth et al.,^{20,21} the athletes were presented with hypothetical situations regarding the use of a prohibited substance or a method and asked to indicate their own willingness to take the substance or use the method and also estimate the likelihood of other athletes doing the same. (10) How do you feel about your corporal image?; (11) proposed solutions.

For the purpose of this study, "doping", "drugs" or "banned substances" only included those substances that are prohibited by the WADA or other governing bodies during training and/or sport competition, and this was explained to the participants before they responded.

The data were collected during the period 2012–2013. Initially, we contacted the players by emails, introducing the study and inviting to participate. A total of 88 football teams agreed to collaborate in the study. With an average of 22 players per team, the potential total sample included 1936 participants. However, only 1324 questionnaires and respective informed consent forms were received (response rate 68.39%; mean 15.05 players per team).

Once the participants gave written informed consent, they were requested to fill in and return the anonymous questionnaires. Written informed consent was obtained from all participants. With reference to minors, the document was signed from the parents or guardians on behalf of the minors involved in the study. We recommended completing the questionnaire before a training session or while on a pre-match trip. One person in charge of each team's staff (generally the trainer) was responsible for verifying that the questionnaires were filled out individually. There was no time limit for completing it. Once interested players completed all questionnaires, they were picked up and sent back to the first author of this study in a sealed prepaid envelope. The participation was completely voluntary. To provide the participants with a sense of security and thus to obtain reliable data, the principle of anonymity was established.

The data were coded and entered into Excel spread sheets. The analyzed data were expressed as frequencies, percentages, means, and standard deviations. For the PEAS, the Kolmogorov–Smirnov test was applied to test for a Gaussian distribution of the results. Because the distribution was not normal, the nonparametric Mann–Whitney U-test with Bonferroni post-hoc correction was carried out. Spearman's correlation coefficient was also used to assess the relationships between the PEAS and other analyzed variables. Statistical analyses were performed using the IBM SPSS 20.0 software.

3. Results

The overall average score was 34.02 ± 11.08 (range: 17–102; a higher score indicates a more permissive attitude toward dop-

Table 1

Descriptive statistics and comparison 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 < 0.001 ^{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 < 0.001 ^{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 < 0.001 ^{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 < 0.001 ^{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 supra indexed numbers.

NS: no significant difference was found.

Table 2

Percentage of correct/incorrect answers for questions (1–4) about knowledge and comparison 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)	Chi-square test	Total sample (n = 1324)
Incorrect (%)	85.40	95.70	92.90	94.20	96.40	12.453*	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)	n/a	Total sample (n = 1324)
Incorrect (%)	100	100	100	100.00	100.00		100.00
Correct (%)	0	0	0	0	0	5.637	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	5.108	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)	5.108	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).

Knowledge score (%): percentage of correct answers regarding 4 questions about knowledge.

n/a: not applicable.

* p < 0.05.

ing). The group scores were as follows: FEM: 33.75 ± 14.73; ELI: 30.61 ± 9.91; PRO: 34.23 ± 11.13; AMA: 35.05 ± 10.35; and U18: 35.93 ± 11.50. Significant differences in PEAS overall scores were observed (Table 1) between some assessed groups: ELI and PRO (p = 0.003), ELI and AMA (p = 0.003) and ELI and U18 (p = 0.003).

The obtained data were expressed as percentage of the participants adhering to a specific statement. A comparison among the different groups (total sample, ELI, PRO, AMA, U18 and FEM) was made. The summary of the results from the “yes/no” qualitative questions is shown in Supplementary material Table S1.

In the following discourse, we summarize the results for each variable analyzed:

1. Use of supplements: A total of 416 out of 1313 (31.70%) responders admitted having used supplements. For different groups, the percentages of supplement users were as follows: ELI: 49.00%, PRO: 43.60%, AMA: 24.50%, U18: 11.50%, and FEM 35.40%. The most frequently mentioned supplements were recovery substances (4.40%), amino acids (4.00%), proteins (3.60%) and vitamins (3.60%), although 68.30% of the participants gave a ‘no’ answer.
2. Knowledge: The percentages of correct and incorrect answers are shown in Table 2; though incorrect answers were given more frequently than correct ones. Based on the percentage of correct answers, a coefficient of knowledge was calculated (%). Regarding self-assessment of knowledge, there were significant differences between the groups (Table 1).

3. Words associated with doping: The three words, associated with doping, mentioned most frequently were “cheating” (21.10%), “lie” (8.50%), and “performance” (4.20%). When comparing the groups, the most repeated word was “cheating”: ELI: 25.70%, PRO: 20.80%, AMA: 22.10%, U18: 15.90% and FEM: 22.90%.
4. Reasons to start doping: The three reasons mentioned most frequently were: performance (35.30%), sport achievements (19.40%) and external pressures (4.40%). When comparing the groups, the most repeated reason was performance: ELI: 32.10%, PRO: 41.90%, AMA: 33.30%, U18: 35.70% and FEM: 25.0%.
5. Persons responsible for doping: The three persons mentioned most frequently were “doctor” (29.60%), “players” (18.60%) and “coach” (8.60%). Except for the AMA group (“players”: 22.20%), the most suggested persons responsible for doping in the other groups were 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: The majority of the footballers (73.50%) stated that there were differences, with the following positive responses by group: ELI: 77.20%, PRO: 78.00%, AMA: 77.30%, U18: 61.80% and FEM: 76.10%. The sport viewed as most persecuted was cycling (44.0%), and the ones viewed as less persecuted were football (10.40%), basketball (9.30%), and team sports (8.10%). No answer was provided in 51.50% of the cases.
7. Indirect and direct questions (point 8) are shown in Supplementary material Table S2.

Table 3
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 other 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 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.

- Hypothetical magic drug scenarios results are shown in Supplementary material Table S2 with the body image data (point 10).
- Proposed solutions: Taking into account that most of the sample replied NS/NC (75.20%), the most-mentioned suggestion on how to eradicate doping in sport was “more control” (15.60%), with the following percentages by group: ELI: 14.80%, PRO: 15.30%, AMA: 18.80%, U18: 14.40%, and FEM: 8.30%.

When we divided the total sample by sex (48 women and 1276 men), significant differences were found for variables related to others such as “Do you know doping users?” ($p = 0.043$) and “% Projected use in your sport” ($p = 0.03$) or “The number of users you think there are in your sport”.

Based on the question “Have you ever used doping substances?”, we divided the total sample into users ($n = 58$) and non-users ($n = 1253$). In this case, we found significant differences for several variables, including PEAS overall score ($p = 0.006$), “Has doping been suggested to you?” ($p < 0.001$), “Have you ever seen other people inciting others or being incited?” ($p < 0.001$), “Do you know doping users?” ($p < 0.001$), “% Projected use in your sport” ($p < 0.001$), all the scenario questions ($p < 0.05$), self-assessment of knowledge ($p = 0.026$), and “body image” ($p = 0.026$).

The relationships between PEAS and other variables analyzed using Spearman's correlation coefficients are shown in Table 3.

4. Discussion

The present study suggested that, in general, the surveyed Spanish football players were not tolerant of doping. However, the AMA and U18 groups were somewhat more permissive towards the use of banned substances than the other samples analyzed, while the ELI group was the least lenient one. High levels of supplement use and very low levels of knowledge about doping were found. Moreover, the results from the open-ended qualitative questionnaire presented some interesting and specific data (e.g., self-assessment of knowledge, projected use, reasons for use or responsible persons), which need further analysis to provide more effective intervention in these potentially risky groups. These results highlight that anti-doping prevention and education programs are needed for adults as well as for early ages.

With regards to the use of supplements, we observed that almost one third of the sample used the supplements, especially in the professional categories (ELI: 49.00% and PRO: 192 43.60%) and lower in U18 (11.5%), probably because the competition was higher in the former two. In English professional football,¹⁴ 58% of 706 players reported using vitamin pills, 37% using creatine and 24% using

protein. In this study, the relative percentage of specific supplements used was lower, probably because after saying “yes, I use supplements”, 68.30% did not write the specific substance.

Due to the lack of studies focusing on football players, we have to use other types of sports for comparison. Kim et al.²² reported that 79% of male and 82% of female Korean Olympians took more than one supplement during the training period for the Beijing 2008 Summer Olympic Games. Lun et al.²³ observed that 87% of 440 Canadian athletes from 34 different sports used dietary supplementation. Kondric et al.⁷ stated that the use of supplements was widespread (80%) in female high-level tennis players ($n = 43$). In a study on high-level sailing athletes ($n = 44$), more than 77% admitted using supplements.⁸ Kim et al.⁹ observed similar prevalence in Japanese ($n = 71$) and Korean ($n = 101$) judo athletes (61% and 59%, respectively). Therefore, in comparison with other results the use of supplements in our study is not very high.

With reference to knowledge about doping, an important observation was that the vast majority of the footballers did not know the Prohibited List (97.4% of total sample) or even the meaning of WADA (94.5%), which gave them a low knowledge self-assessment mark (3.0/10). No significant differences were found among the groups regarding the knowledge, and this can be dangerous for the professional samples analyzed (ELI, PRO and FEM). Their sport careers can depend on not failing a drug test, and the lack of knowledge can imply consuming a non-permitted substance because of ignorance. This lack of knowledge about doping also exists among technical staff members of Spanish football teams,²⁴ since 57.6% of respondents did not know the meaning of WADA while 84.9% did not know the Prohibited List. Waddington et al.¹⁴ observed that 68% of 706 English professional footballers were aware of the UK sport's guidelines and the remaining 32% were not; moreover, 20% of this sample reported the use of supplements on their own, without taking advice. Following these authors, we recommend that all the stakeholders involved in Spanish professional football take steps to ensure that all players are provided with appropriate advice on the use of supplements.

The direct questions allow to get more specific information in different perspectives related to this topic, for example “words associated with doping”, “reasons for use”, or “person responsible”. In this order, it was shown that the most associated words were “cheating” (21.10%), “performance” and “doctor”, respectively. Similar results were obtained in a study carried out with the Spanish Olympic national cycling teams where a similar open-ended questionnaire was used ($n = 72$); and the words “cheating” (49%), “sport achievement” (46%), and “doctor” (53%) were most mentioned. Similarly, Striegel et al.,²⁵ while 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 another study ($n=40$), various factors were acknowledged as potential reasons for use, most notably injury recovery and the economic pressures on an elite sport.²¹ A similar study stated that for professional cyclists the main responsible persons who evoked doping were: (1) team managers, (2) doctors, and (3) cyclists, while for team managers the responsible parties were (1) the pressure of sponsors, (2) cyclists, (3) team managers, and (4) doctors.²⁶ Nieper²⁷ 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.¹⁴ stated that for English professional footballers ($n=706$) the club doctors were the least used source of advice (15%), while the main ones were the physiotherapists (28%) or the fitness trainers (21%). We suggest that it is important to raise awareness and re-educate both the professional groups (doctors and coaches), in addition to football players, because of their recognized and important influence on athletes.²⁸ Seeking a new collaborative, integrative, and positive culture in the assessment and formation of athletes based on ethics and science, is a collaborative challenge.²⁹

Regarding doping tolerance among sports, in general, football players strongly highlighted (73.5%) an existence of different levels of tolerance. It was interesting to observe that they considered cycling as the most persecuted sport and themselves as least persecuted. There are several studies reporting different levels of doping tolerance among the different types of sports. In addition, 87.2% of the technical staff members of Spanish football assessed also recognized differential treatments of doping among sports, with cycling being considered most affected (62.6%) and team sports as least affected (27.2%) including football (15%). The opinions of our sample are in accordance with other studies that also pointed out different levels of tolerance toward the quantity and quality of doping among sports.³⁰ In fact, English professional footballers were tested for drugs less often than many other elite athletes, i.e., only about 33% per year; and 60% felt that they were unlikely to be tested in the next year.¹⁴ We suggest that eradicating such differences is a necessary starting point to achieve equity and justice among sports in 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 the footballers admitted having used doping substances, while for 6.5% doping was even suggested. Moreover, the results from both questions showed a positive and significant correlation with PEAS ($p<0.001$). Lazarus et al.³¹ analyzed a sample of 750 Greek elite athletes and 4.3% admitted that they used doping substances. On the other hand, Pitsch et al.³², who used another assessment instrument, an interview, reported a higher prevalence for current use of doping practices, with 25.8% of German top athletes ($n=448$) having admitted taking banned substances.

In this study, we posed risky questions about one's own doping behavior. Therefore, it is not surprising that when question were asked about others, the prevalence was quite higher. In professional English football, 34% of the 706 players assessed stated that banned PES were used by some players, and 6% also indicated that they personally knew doping users.¹⁴ Similarly, when the football players were asked about other people's doping behavior, the frequencies were higher (23.7% of the total sample personally knew doping users); and a positive and significant correlation with attitudes towards doping was seen ($p<0.001$). In this study, the mean percentage of projected use was 16.7%, with the highest value found in the AMA group (21%) and the lowest one in the ELI group (11%), which means that 1 in 5 elite amateur male footballers is under suspicion, while the elite players trust their sport mates. On the basis of data analysis, we would like to draw more attention to female elite footballers because the percentage of the women who knew dopers and the projected use in their sport were higher ($p<0.05$)

in comparison to the male footballers. On the contrary, Alaranta et al.³⁰ reported that men knew doping users significantly more often than women (35.2% vs. 22.7%; $p=0.0044$).

After dividing the total sample into users ($n=58$) and non-users ($n=1253$), we found significant differences for certain variables. It drew our attention that the participants who admitted having used doping also knew more users of banned substances ($p<0.001$) and reported a higher projected use ($p<0.001$), in addition to showing more permissive attitudes towards doping ($p=0.006$). Regarding this phenomenon, it is interesting to observe, by reviewing the latest scientific literature on attitudes towards doping in sport, the emergence of the so-called "false consensus effect" (FCE) concept,^{18,33} which suggests that the athletes who have a history of PED use overestimate the prevalence of drug use among other athletes.

This study is not free of limitations since work based on questionnaires covering a banned practice has its limits. Firstly, according a recent study,³⁴ the 17-item PEAS provided a poor model fit compared to other models (for instance, 11-item, 8-item, and 6-item versions). Secondly, literature demonstrated that there are not PEAS models with acceptable fit for adolescent athletes, therefore, our data on adolescent sample should be taken with caution. Moreover, answers may be deliberately false as the participants questioned may not wish to reveal that they or their teammates use banned substances, even if the researchers guarantee anonymity and confidentiality. With reference to this point, due to the division into two unequal groups regarding the number of subjects, we suggest caution when interpreting our findings. In addition, one of the limitations is given by the lack of female players' sample whom represent the category, therefore, further research should consider to investigate this sample of footballers.

5. Conclusion

The present study suggests that the Spanish football players are not permissive and less tolerant, but their beliefs and specially their specific knowledge about the matter need to be improved. The existence of an important lack of knowledge about doping has been demonstrated, as well this study showed for football players, which clearly reinforces the idea of implementing a wide educational doping prevention programme. Controls are obviously needed, but so are the more effective educational programs that do not require large investments. Moreover, anti-doping research in football context needs a new experimental approach for the assessment of the effects of substances (banned and no banned) as shown previously.³⁵ Doping is a complex phenomenon that involves medical, pharmacological, educational aspects and it raises many ethical issues. If stakeholders unite in their efforts with a multidisciplinary strategy, involving these aspects, we could clearly progress in the battle against doping.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.jsams.2019.05.010>.

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