

**Marin Čorluka<sup>1</sup>**  
**Goran Gabrilo<sup>2\*</sup>**  
**Mateo Blažević<sup>3</sup>**

## **DOPING FACTORS, KNOWLEDGE AND ATTITUDES AMONG BOSNIAN AND HERZEGOVINIAN FOOTBALL PLAYERS**

### **DEJAVNIKI DOPINGA, ZNANJE IN ODNOS DO DOPINGA MED NOGOMETAŠI BOSNE IN HERCEGOVINE**

#### **ABSTRACT**

Doping is a serious health hazard sport faces today. Studies dealing with doping knowledge, attitudes and behaviours (doping factors) in football are scarce. In this study, we investigated ethnicity-specific doping factors among football players from Bosnia and Herzegovina (B&H). The sample of subjects comprised three groups of football players from B&H: ethnic Croats (CRO; n = 61; 23 ± 4 years of age), Serbs (SER; n = 57; 22 ± 3 years of age), and Bosniaks (BOS; n = 63; 23 ± 4 years of age). Through an extensive anonymous self-administered questionnaire, the subjects were asked about general, educational, social and sport factors (predictors), along with doping factors (criteria). Apart from a descriptive analysis, an analysis of variance, Kruskal-Wallis test, and Spearman's correlation were used. Almost half of the Croats and Serbs do not rely on their physician's and/or coach's opinion and expertise about doping. The Bosniaks achieved the best results for doping knowledge. There are no significant ethnic differences regarding opinions on doping habits in football, the likelihood of personal doping and anti-doping penalties. Age and sport experience are significantly related to knowledge of doping and doping health hazards only for the Bosniaks. Among the Serbs, more experienced players are more prone to potential doping behaviour. Those Croats and Bosniaks who are more convinced about doping practices in their sport are more likely to use doping in the future. Approximately 20% to 30% of the subjects will engage in doping if assured that such behaviour will not bring potential negative health consequences, 3% to 12% will engage in it without regard to the health risks, although none of the subjects declared that doping in football should be allowed. Apart from educational status, the most important factor of knowledge of doping and doping health hazards is found in professional support for football. All of the discussed factors should be used to tailor a specific anti-doping programme for B&H football.

*Key words:* soccer, football, substances, differences and relationships

<sup>1</sup>University of Mostar, Faculty of Natural Sciences, Mathematics and Education, Bosnia and Herzegovina

<sup>2</sup>University of Split, Faculty of Kinesiology, Croatia

<sup>3</sup>Lucac Primary School, Split, Croatia

#### **IZVLEČEK**

V današnjem športu uporaba dopinga predstavlja resno zdravstveno tveganje. Raziskave, ki obravnavajo znanje o dopingju, odnos do dopinga in obnašanje (dejavniki dopinga) v nogometu, so zelo redke. V pričujoči raziskavi smo preučevali etnično-specifične dejavnike dopinga med nogometiški iz Bosne in Hercegovine (BiH). Vzorec anketirancev je obsegal tri skupine nogometišev iz BiH: etnični Hrvati (HRV; n = 61; starost: 23 ± 4), Srbe (SRB; n = 57; starost: 22 ± 3) in Bošnjake (BOŠ; n = 63; starost: 23 ± 4). S pomočjo obsežnega, anonimnega vprašalnika za samoizpolnjevanje so anketiranci odgovarjali na vprašanja o splošnih, izobrazbenih, družbenih in športnih dejavnikih (prediktorjih) ter dejavnikih anti-dopinga (merilih). Poleg deskriptivne analize smo opravili še analizo variance in test Kruskal-Wallis ter izračunali Spearmanov koeficient korelacije. Skoraj polovica HRV in SRB se ne zanaša na mnenje zdravnika in/ali trenerja in niti na strokovno znanje o dopingju. Najvišje rezultate pri znanju o dopingju so dosegli BOŠ. V mnenju o dopinških navadah v nogometu, verjetnosti, da posameznik uporabi doping, in o antidoping kaznih ni bilo statistično pomembnih etničnih razlik. Starost in športne izkušnje so pomembno povezane z znanjem o dopingju samo pri BOŠ. Pri SRB so bolj izkušeni igralci bolj nagnjeni k potencialnemu dopinškemu obnašanju. Tisti HRV in BOŠ, ki so bolj prepričani v dopinško prakso v svojem športu, bodo v prihodnosti verjetno uporabljali doping. Okrog 20 do 30 % anketirancev bo uporabljalo doping ob zagotovilu, da takšno ravnanje ne bo imelo morebitnih negativnih zdravstvenih posledic, 3 do 12 % bo doping uporabljalo ne glede na tveganje za zdravje, nihče pa ni izjavil, da bi moral biti doping v nogometu dovoljen. Poleg izobrazbenega statusa smo ugotovili, da je najpomembnejši dejavnik znanja o dopingju poklicna podpora v nogometu. Obravnavani izsledki bi morali biti uporabljeni pri oblikovanju anti-doping programa za nogomet v Bosni in Hercegovini.

*Ključne besede:* nogomet, substance, razlike in odnosi

Corresponding author:

Goran Gabrilo

University of Split, Faculty of Kinesiology,

Tesla's street 6, Split – 21000, CROATIA

e mail: goran.gabrilo@kifst.hr

## INTRODUCTION

Doping in sports is defined as a violation of an anti-doping code and, most frequently, involves the occurrence of a prohibited substance in a specimen (e.g., urine and/or blood) taken from an athlete. In sports, doping: (1) is used as a way of improving recovery between training and/or competition sessions; (2) is used to increase one's energy levels; and/or (3) involves the use of psychostimulants (Noakes 2004; Peters Jr. et al. 2005; Thevis, Sigmund, Geyer, & Schänzer, 2010). Apart from being a serious health hazard that is undoubtedly and frequently related even to instances of sudden death in sport (Di Paolo et al. 2007, Fineschi, Baroldi, Monciotti, Reatelli, & Turillazzi, 2001), doping is considered an unethical way of improving the physical capacities of athletes and, therefore, corrupting the main essence of sports and fair play (Kayser, Mauron, & Miah, 2007; Petróczi, 2007). Studies have frequently found doping habits to be culturally-specific (Pedersen, 2010; Rodek, Sekulić, & Pašalić, 2009; Sekulić, Kostić, & Miletić, 2008), and the World Anti-Doping Agency (WADA) has recognised the importance of such an approach and directly stimulated (financed) social science investigations aimed at defining cultural, religious, regional and other specific patterns of doping behaviours among different subsamples of athletes (Backhouse, McKenna, Robinson, & Atkin, 2007, Petróczi, Mazanov, Nepusz, Backhouse, & Naughton, 2008; Sas-Nowosielski & Światkowska, 2007; Mottram, Chester, Atkinson, & Goode, 2008; Suzić Lazić, et al. 2009). The WADA's intention has been to target specific templates of doping behaviours within different subsamples so as to ensure the development of precisely tailored anti-doping intervention programmes (Backhouse, et al. 2007).

Studies have regularly interpreted substance use and misuse habits by comparing different ethnicities, including for alcohol consumption (Van Tubergen & Poortman, 2010; Weden & Zabin, 2005), cigarette smoking (Primack, Fertman, Rice, Adachi-Mejia, & Fine, 2010; Terry-McElrath, et al. 2007, Spein, Kvernmo, & Sexton, 2002), cannabis consumption (Marsiglia, Kulis, Luengo, Nieri, & Villar, 2008; Chen, & Killeya-Jones, 2006), and/or other drug use and misuse (McCabe, et al. 2007; Hjern, 2001). Generally, ethnicity and related cultural, religious and heritage factors are considered important issues in evidencing substance use and misuse and therefore judged as important factors of intervention strategies. Interestingly, there is an evident lack of studies dealing with doping substance misuse (e.g., doping habits and behaviours) in relation to ethnicity.

Bosnia and Herzegovina (B & H) is a country in South-east Europe, on the Balkan Peninsula. It is bordered by Croatia to the north, west and south, Serbia to the east, and Montenegro to the south-east. The country is home to three ethnic groups: Bosniaks, the largest population group among the three (mostly Muslims), followed by Bosnian Serbs (mostly Serbian Orthodox Christians), and Bosnian Croats (Roman Catholic Christians). Due to the political and social organisation of former Yugoslav, ethnic groups in B & H do not differ notably in their socio-economic and educational status. This is typically reflected in sports, one of the most important factors of homogenisation since the Yugoslav wars.

This investigation aimed to study ethnicity-specific doping attitudes, behaviours and knowledge among football players from B & H. We believed that the data collected and interpreted in this study would provide deeper insights into the problem and allow us to develop an efficient anti-doping strategy and interventions applicable to football and sports in general in B & H.

## METHODS

The sample of subjects comprised 181 football players divided into three groups: ethnic Croats (CRO;  $n = 61$ ; mean age,  $23 \pm 4$  years of age), ethnic Serbs (SER;  $n = 57$ ;  $22 \pm 3$  years of age), and ethnic Bosniaks (BOS;  $n = 63$ ;  $23 \pm 4$  years of age), all being members of football clubs competing at the highest level in B&H (the Premier League) during the 2009–2010 competitive season. The subjects included in the study were randomly selected. In short, the authors tested the subjects at six official games played on the same day. All subjects were informed about the purpose and aim of the investigation (see the last paragraph of the Introduction) and gave their informed consent to participate. The response rate was more than 97%, meaning that only a couple of subjects did not completely answer the questionnaire and were therefore not included in the study.

With the use of an extensive anonymous self-administered questionnaire, we asked the subjects about the following: (1) general, educational, social and sport factors; (2) attitudes and behaviours regarding doping; and (3) knowledge of doping problems, including knowledge of doping testing procedures and awareness of characteristic health-threatening risks of different doping substances and habits. The first two data sets of the questionnaire are already in extensive use and reported as part of the Questionnaire of Substance Use (Sekulić, Kostić, & Miletić, 2008; Sekulić, Kostić, Rodek, Damjanović, & Ostojić, 2009; Rodek, Sekulić, & Pašalić, 2009; Čavar, Sekulić, & Čuljak, 2009; Kondrić, Sekulić, & Furjan-Mandić, 2010; Sekulić, Perić, & Rodek, 2010; Zenić, Perić, Zubčević, Ostojić, & Ostojić, 2010). The third data set was an original questionnaire that consisted of 18 issues in doping, namely: (1) whether an elevated concentration of caffeine in a urine specimen is considered as doping; (2) erythropoietin (EPO) as a doping substance used in strength-and-power sports (e.g., weightlifting); (3) if sample A test positive for doping, is an athlete entitled to ask for another sampling; (4) that WADA officials must inform the athlete a few hours before a planned doping control; (5) between two doping controls, there is a grace period of at least four weeks; (6) if the WADA official does not seem to be legitimate, the athlete is entitled to refuse the testing; (7) the use of amphetamines is related to several cases of death in cycling due to cardiovascular failure; (8) use of the human growth hormone is related to azoospermia; (9) in the case of asthma, I can use anabolic steroids; (10) a “masking agent” is a person who helps an athlete to hide their doping behaviour; (11) EPO is detected in a blood specimen; (12) a person caught with material samples of EPO can be accused of violating an anti-doping code; (13) the use of AAS in women is related to male-like body appearance changes; (14) AAS are injected intravenously; (15) the use of EPO is also known as “blood doping”; (16) synthetic testosterone increases the quantity of erythrocytes and is therefore common in endurance sports; (17) synthetic testosterone use inhibits the production of natural (endogen) testosterone; and (18) in the case of official medical treatment, an athlete is excused from doping testings. Multiple-choice answers were offered for all items (True – False – Not sure). Items answered correctly were given one point (+1), otherwise “0.” The overall results could range from 0 to 18. The authors may be contacted for further specific details and the complete questionnaire.

Descriptive statistics were calculated for all parametric variables, whereas frequencies and proportions are presented for nonparametric items. To establish differences between groups (ethnicities), an analysis of variance (parametric) and Kruskal-Wallis test (for nonparametric ordinal variables) were used. Spearman's rank order correlation was calculated to examine inter-relationships among the three data sets separately for CRO, SER and BOS.

## RESULTS

Table 1: Descriptive statistics of the studied ethnicities (CRO – Croatian; SER – Serbian; BOS – Bosniaks) and analysis of variance (ANOVA; F TEST; p – level of significance) among the groups

	CRO		SER		BOS		ANOVA	
	Mean	SD	Mean	SD	Mean	SD	F TEST	p
AGE	23.66	3.97	22.00	2.74	23.59	4.00	1.03	0.36
EXPER	12.91	3.97	11.00	4.18	13.41	3.52	1.60	0.21
DN	5.89	2.20	4.88	1.94	6.01	2.15	2.83	0.03

LEGEND: AGE – age of the subjects (in years); EXPER – football experience (in years); DN – knowledge of doping and doping health hazards

Table 2: Educational and sport status of the studied ethnicities (CRO – Croats; SER – Serbs; BOS – Bosniaks; f – counts; % – proportions), and Kruskal-Wallis test significance (p – level of significance)

	CRO		SER		BOS		KW (p)
	f	%	F	%	f	%	
Education							
primary school	0	0.0	0	0.0	4	5.9	
high school	39	64.3	35	61.5	30	47.1	
student	18	30.0	22	38.5	15	23.5	
college undergraduate/graduate	3	5.7	0	0.0	15	23.5	0.6
Sport achievement <sup>ORD</sup>							
Local competition (1)	1	1.4	0	0.0	0	0.0	
Local success (2)	0	0.0	4	7.7	0	0.0	
National competition (3)	2	2.9	13	23.1	0	0.0	
National success (4)	13	21.4	26	46.2	0	0.0	
International competition (5)	15	24.3	13	23.1	48	76.5	
International success (6)	21	34.3	0	0.0	0	0.0	
National team (7)	10	15.7	0	0.0	15	23.5	0.01

LEGEND: <sup>ORD</sup> presents ordinal variables and the numbers in parentheses denote ordinal values for each answer

Table 3: Doping factors of the studied ethnicities (CRO – Croats; SER – Serbs; BOS – Bosniaks; f – counts; % – proportions), and Kruskal-Wallis test significance (p – level of significance)

	CRO		SER		BOS		KW (p)
	f	%	f	%	f	%	
Regarding doping issues I trust...							
physician	20	32.9	9	15.4	30	47.1	
no one	24	40.0	26	46.2	19	29.4	
coach	17	27.1	22	38.5	15	23.5	
I have learned about doping...							
individually	20	32.9	18	30.8	11	17.6	
through education (school)	10	15.7	9	15.4	22	17.6	
from my coach and/or physician	20	32.9	4	7.7	11	35.3	
I have no knowledge about doping	11	18.6	26	46.2	19	29.4	
Doping in football <sup>ORD</sup>							
I don't think that doping is used (1)	5	8.6	18	30.8	4	5.9	
Not sure (2)	13	21.4	13	23.1	15	23.5	
Used rarely (3)	24	38.6	18	30.8	19	29.4	
Used regularly (4)	19	31.4	9	15.4	26	41.2	0.12
Penalties in the case of doping <sup>ORD</sup>							
lifelong suspension (1)	14	22.9	9	15.4	11	17.6	
first time mild punishment, second time – lifelong (2)	24	40.0	18	30.8	22	35.3	
suspension for a couple of seasons (3)	12	18.6	22	38.5	15	23.5	
financial penalties (4)	10	17.1	9	15.4	15	23.5	
doping should be allowed (5)	0	0.0	0	0.0	0	0.0	0.54
Personal doping likelihood <sup>ORD</sup>							
Definitely no (1)	36	58.6	39	69.2	44	70.6	
Not sure (2)	16	25.7	0	0.0	7	11.8	
I would use it if it would help me without a health hazard (3)	8	12.9	13	23.1	4	5.9	
I would use it irrespective of any consequences (4)	2	2.9	4	7.7	7	11.8	0.68
The main problem of doping is...							
doping is a health hazard	40	65.7	48	84.6	33	52.9	
doping is against fair-play	21	34.3	9	15.4	30	47.1	

LEGEND: <sup>ORD</sup> presents ordinal variables and the numbers in parentheses denote ordinal values for each answer

Table 4: Correlation analysis between general, educational, sport and doping factors among the three ethnicities (CRO – Croats; SER – Serbs; BOS – Bosniaks)

		Age	Sport experience	Education	Sport achievement	Doping in football	Penalties	Doping likelihood
Sport experience	CRO	0.73*						
	SER	0.61*						
	BOS	0.66*						
Education	CRO	0.17	0.11					
	SER	0.53*	0.63*					
	BOS	0.02	0.03					
Sport achievement	CRO	0.36*	0.39*	0.07				
	SER	-0.22	-0.07	-0.38*				
	BOS	0.40*	0.51*	-0.26				
Doping in football	CRO	-0.09	-0.12	0.17	0.14			
	SER	0.42*	-0.04	-0.09	-0.42*			
	BOS	0.31*	-0.04	-0.19	-0.34*			
Penalties	CRO	-0.08	-0.07	0.00	-0.15	-0.06		
	SER	0.12	0.06	0.24	-0.18	0.07		
	BOS	-0.10	0.18	-0.13	0.12	0.30*		
Doping likelihood	CRO	0.01	0.10	-0.17	-0.02	0.30*	-0.18	
	SER	-0.02	0.48*	0.21	-0.22	-0.04	0.25	
	BOS	0.13	0.07	-0.33*	0.00	0.47*	0.34*	
Doping knowledge	CRO	0.20	0.05	0.20	0.02	-0.02	-0.20	0.11
	SER	0.08	-0.16	0.18	-0.40*	0.67*	-0.04	-0.14
	BOS	0.61*	0.56*	0.29*	0.22	-0.07	0.31*	0.11

LEGEND: Age – subjects' age; Sport experience – experience in football; Education – education level; Sport achievement – achievement in football; Doping in football – opinion about doping habits in football; Penalties – opinion about penalties in case of an anti-doping violation; Doping likelihood – potential personal doping likelihood; Doping knowledge – knowledge of doping and doping health hazards; \* denotes a significant Spearman rank order correlation coefficient

The three studied groups do not differ in age and sport experience. However, in terms of doping knowledge, BOS achieved the best results (Table 1).

The observed groups of subjects have an equal educational status; most of the subjects have finished high school and/or are students. Interestingly, a relatively high proportion of BOS (almost 25%) have reached undergraduate and/or graduate level. Sport achievement differs among the groups. In short, BOS have the highest achievements in relative terms and one in four has competed for the national team (Table 2).

Although there are no significant differences in doping factors among the three studied ethnicities, there are some informative results (Table 3). Almost half of the CRO and SER do not rely on their physician's and/or coach's opinion and expertise about doping. Only 7.7% of SER declared that they have learned about doping from their physician and/or coach. More than half of all

subjects believe that doping occurs in football, and there is no difference among the groups. None of the subjects declared that doping should be allowed in football. Approximately 20% to 30% of the subjects would engage in doping if assured that such behaviour would not be related to potential negative health consequences, although 3% to 12% would use it without regard to the health risks.

Age is positively related to the opinion that doping is present in football for SER and BOS. Further, older BOS generally scored higher with regard to doping knowledge than their younger peers. Among SER, sport experience is related to doping likelihood. At the same time, the same predictor (sport experience) is positively correlated to knowledge about doping among BOS. In the same group, the higher the education, the lower the likelihood of doping behaviour and the greater the knowledge about doping. Sport achievement among SER and BOS is negatively correlated to the belief that doping is present in their sport. Surprisingly, the same variable (sport achievement) is negatively correlated to doping knowledge among SER. Those SER who believe that doping does exist in football have at the same time more knowledge of the problem. Penalties and doping likelihood are positively correlated among BOS, but in this case (because of the opposite metrics, see the ordinal values of the variables presented in Tables 2 and 3) this relates to the fact that those BOS athletes who are against strict penalties for doping violations are simultaneously more likely to engage in doping, and vice-versa (Table 4).

## DISCUSSION

Although the results presented above would allow a broad discussion on the problem, here we will only focus on some of the most important topics with regard to the aim and planned application of the study (see the Introduction).

### Knowledge about doping among the three ethnicities

Firstly, we note that there is insufficient knowledge about doping in B&H football. Briefly, none of the groups achieved a theoretical average result in the test (e.g., since the range is from 0 to 18, the average is 9). Of course, one could argue that the questions were perhaps too difficult, but we note that all the queries relate to general knowledge of doping and anti-doping testing, and we believe that concerning those issues the high national level of the football players should make them aware (at least) at an average level. In addition, if we accept that the results presented here may be generalised for Premier League football (the highest level), we should be particularly concerned about doping knowledge among lower competitive ranks and/or younger athletes. Therefore, irrespective of the differences among the ethnicities, a systematic anti-doping intervention programme for football in B&H is clearly needed.

Of the three studied groups, BOS evidently prevail in their knowledge of doping testing procedures, potential ergogenic effects, and doping health hazards. There are two possible causes of such results. First, it is evident that the education level of the BOS players significantly exceeds the educational status of other two ethnicities. This probably partially explains the BOS dominance in terms of doping knowledge, which can be further supported by the significant positive relationship between education level and knowledge of doping exclusively among BOS. Evidently, general education plays an important role when it comes to knowledge of doping and should be observed accordingly, as has already been suggested (Backhouse et al. 2007, Anshel, & Russel

1997). However, from our point of view, these findings do not help us much because we are unable to accentuate general education among B&H football players. Therefore, if we intend to increase knowledge about doping hazards in B&H football, we must identify some factors on which we can have an impact. Possibly, such factors are coaches and medical staff, and their education. In brief, it seems (although not compared statistically) that BOS rely on their coaches' and/or physicians' opinions on doping problems more than the other two ethnicities. More precisely, more than two-thirds of BOS athletes, compared to less than one-third of CRO and SER athletes, trust their coaches and/or physicians about doping issues. In addition, 35% of BOS declared they have learned about doping directly from their coach and/or physicians (again noting that BOS achieved the best results for doping knowledge). Although we could not find any study that explored the problem specifically as we have, there are some results on the doping problem in our region which allow a comparison. Briefly, in studies where the sample consisted of Croatian and Serbian athletes authors have found clear mistrust in coaches' and physicians' knowledge of doping and doping-related problems. More precisely, Sekulić, Kostić and Miletić (2008) found that only 20% of Serbian dancers relied on their coaches' and/or physicians' expertise about doping issues, very similarly to the data presented in studies where authors investigated Croatian ballet (Sekulić, Perić, & Rodek, 2010) and sport dancers (Zenić, Perić, Zubčević, Ostojić, & Ostojić, 2010). The authors of the present study share the opinion that there is a certain possibility that even sport achievement should be considered a factor of influence on everything discussed so far (doping knowledge and trust). It is evident that none of the SER athletes have achieved international sport success or been included in the national team of B&H. This may have led not only to the relative absence of information about the doping problem but also to the unavailability of high-level medical and/or professional support as is regularly offered in high-level competitions (e.g., international club and/or national team competitions and games).

### **Doping in football and potential doping behaviours of the studied athletes**

Two-thirds of the BOS and CRO players we sampled believe that doping occurs in football, of whom almost half believe doping behaviours regularly occur among football players. Therefore, the significant positive correlation between potential doping habits and the opinion that doping is present in this sport among those two ethnicities exclusively is highly alarming. Additionally and logically, the correlation analysis between doping likelihood and the opinion about penalties for anti-doping violations reveals the tendency that those BOS players who are more prone to potential doping behaviour at the same time do not support strict penalties against those who engage in doping. Because previous studies showed similar relationships (see the following text) we believe that it should be considered as a regular pattern. Briefly, although the authors did not specifically calculate the relationship between doping likelihood and doping behaviours as we did, some similar tendencies must be recognised. Zenić, et al. (2010) found that those athletes who are more convinced about doping habits within their sport are more prone to potential doping behaviour. Very similar conclusions were made by Kondrič, Sekulić and Furjan-Mandić (2010) and Kondrič, Sekulić, Petróczi, Ostojić, Rodek and Ostojić (2011) when they studied substance use and misuse within racket sports in Slovenia. Again, we must note that in both of the mentioned investigations the authors did not present a specific correlation between these two doping factors (doping likelihood and opinions about the incidence of doping in their sport), but in light of the previously discussed results of our correlation analysis the results of our respected colleagues are highly indicative.



It is encouraging that none of the studied subjects believes that doping should be allowed and not penalised in football. Most probably because of recently reported sudden death cases in football (Özdemir, Saka, Asil, Üzün, & Öner, 2008; Belli & Vanacore, 2005), which are almost certainly connected to doping behaviours and overtraining syndrome, B&H football players have become aware of the health hazards posed by doping.

## CONCLUSION

We found evident dissimilarities in doping knowledge and doping opinions among the three studied football player ethnicities in B&H. This mostly relates to the following facts. First, BOS achieved the best results for the doping knowledge tests, which probably mostly reflects their superior general educational status compared to the CRO and SER athletes. The SER and CRO are evidently mostly concerned about possible negative health consequences of engaging in doping, with the BOS athletes considering doping mostly as a problem of “fair play.” This must be emphasised in all future anti-doping efforts in B&H football. Apart from educational status, the most important factor concerning doping knowledge was found in professional support for football since we found some evidence that the athletes’ trust in their coaches’ and physicians’ knowledge is one of the key factors of a successful anti-doping intervention programme. The “popularity” of doping problems probably leads to greater awareness about doping health hazards, but at the same time we found no evidence that it should be considered as a buffering factor of the likelihood of doping.

All of the above together with the apparent low level of doping knowledge should be emphasised when tailoring a specific anti-doping educational programme for B&H football.

Due to the evident need to further explore doping-related problems in B&H, future studies should focus on other sports.

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