



Understanding Legal Anti-Doping Literacy in Sport: The Roles of Coaching, Sport Context, and Regulatory Socialization

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Abstract

Adequate legal anti-doping knowledge promotes informed decision-making, reduces the risk of unintentional rule violations, and supports the integrity and fairness of sport. The aim of this study was to examine (i) whether legal anti-doping knowledge differs between athletes and coaches and (ii) whether such differences are specific to sport type by comparing participants involved in team and individual sports. The participants were 188 athletes and 35 coaches involved into team sports (112 athletes and 18 coaches) and individual-combat sports (76 athletes and 17 coaches). The variables included legal anti-doping knowledge (LADK; evaluated via previously validated questionnaire tools), age, experience in sport, sport success, and experience in anti-doping testing (as an athlete/coach). Independent *t* tests revealed better LADK in coaches than in their athletes for the total sample (*t* test = 4.57, *p* < 0.001) and in individual/combat sports (*t* test = 5.58, *p* < 0.01). Univariate logistic regression revealed that participants with higher LADK scores were more likely to belong to the coach group than to the athlete group in the total sample (OR = 1.87, 95%CI: 1.42–2.47) and in both subsamples (OR = 1.19, 95%CI: 1.01–1.40; OR = 2.31, 95%CI: 1.55–3.44 for team sports and individual/combat sports, respectively). However, when controlling for covariates (age, experience in sport, sport success, and experience in antidoping testing), significant associations were detected for the total sample (OR = 1.78; 95%CI: 1.25–2.65) and for combat/individual sports (OR = 2.11; 95%CI: 1.34–3.11). The findings suggest that legal anti-doping literacy is shaped not only by stakeholder role but also by sport-specific socialization and regulatory exposure. From a legal standpoint, these results indicate that being a coach should not automatically be regarded as evidence of adequate regulatory competence.

Keywords: doping, sports, regulations, laws, social context, influence



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Introduction

Doping remains among the most important problems in modern sports, undermining both the principles of fair play and the health of athletes (Tahiraj, Zenic, Musa, Zeljko, & Rodek, 2024). Despite decades of global fight against doping, anti-doping rule violations are still reported across different sports and competitive levels. In response to this global challenge, anti-doping efforts have been largely harmonized through the World Anti-Doping Code (WADC), which serves as the central regulatory framework governing prohibited substances, testing procedures, sanctions, and appeal mechanisms (WADA, 2026). In the past decade or two, there has been an increasing opinion that doping should not be observed solely as a medical or ethical issue but also as a matter of legal regulation and institutional governance (Marinelli et al., 2022; Mazzucco & Brehaut, 2024). As a result, anti-doping regulation is being increasingly incorporated into the legislative frameworks and statutory provisions of numerous countries worldwide (Read, Skinner, Smith, Lock, & Stanic, 2024).

Athletes, coaches, medical professionals, and sport organizations are expected to comply with clearly defined rights, responsibilities, and procedural obligations associated with WADC (Sinkovic, Pivalica, Jukic, Pehar, & Sekulic, 2026). However, the effective implementation of WADC and associated policies depends on coordinated action among anti-doping agencies, sport federations, laboratories, arbitration bodies, and national authorities. Consequently, participation in contemporary sports increasingly requires the navigation of a complex legal environment in addition to performance-related demands. Therefore, understanding the legal issues of anti-doping policy is essential for maintaining the fairness and effectiveness of global anti-doping efforts (Kačer & Kačer, 2018; Stankovic, Sinkovic, Sekulic, Jelcic, & Rodek, 2022).

Anti-doping regulations are based on specific legal principles that directly determine the rights, obligations, and responsibilities of all sport stakeholders (Star & Kelly, 2021). Specifically, one of the most important principles of WADC is “strict liability”, according to which “athletes are personally responsible for any prohibited substance found in their body regardless of intent or negligence” (WADA, 2026). Additionally, anti-doping proceedings involve different procedural safeguards (i.e., notification standards, sample analysis procedures, the right to review evidence, and the right to appeal disciplinary decisions). It is clear that insufficient understanding of these legal mechanisms may expose athletes to unintentional rule violations or negatively affect their ability to protect their procedural rights. These aspects of WADC are particularly relevant in contemporary sports, where athletes are expected to make decisions regarding the consumption of dietary supplements, the use of medications, and/or cooperation during testing procedures. The question that arises is, are the athletes and supporting personnel equipped with a sufficient level of legal knowledge (legal literacy) with regard to anti-doping policy?

Previous studies have developed and validated original instruments for assessing legal anti-doping knowledge among both athletes and athlete support personnel (Sinkovic, Pivalica, Jukic, Pehar, & Sekulic, 2026; Stankovic et al., 2022). The findings consistently indicated meaningful differences according to sex, competitive experience, and exposure to anti-doping testing procedures. Furthermore, intervention-based studies have demonstrated that targeted educational programs can significantly improve legal anti-doping knowledge among athletes

and athlete support personnel (ASP) (Sinkovic, Pivalica, Jukic, Pehar, Pivalica, et al., 2026; Sinkovic, Pivalica, Pivalica, Jukic, & Sekulic, 2025). However, although knowledge increased as a result of specifically designed education, the improvements in legal literacy were not accompanied by changes in doping-related attitudes, suggesting that legal literacy represents only one component of broader anti-doping behavior (Sinkovic, Pivalica, Jukic, Pehar, Pivalica, et al., 2026; Sinkovic et al., 2025).

ASPs (i.e., coaches, physicians, and nutritionists) occupy a particularly important position within the anti-doping system because they are often the primary source of guidance for athletes in everyday training and competition environments, with coaches being definitively the most important ones (Sankey, Wallace, & Caperchione, 2023; Shanmuganathan-Felton, Felton, & Jowett, 2022). In many cases, athletes rely on coaches when they make decisions related to supplements, medications, recovery strategies, and communication with sport authorities (Sung, Lee, & Lee, 2024). Moreover, the World Anti-Doping Code explicitly recognizes coaches as stakeholders who must be knowledgeable of and comply with applicable anti-doping rules. Therefore, insufficient legal knowledge among coaches may create risks for their own professional responsibility but also for the legal position of their athletes (Sinkovic et al., 2025).

Despite the recognized importance of doping-related knowledge, research has rarely compared athletes and coaches within the same framework; however, to the best of our knowledge, no study has examined this problem while specifically emphasizing the legal issues of anti-doping. Therefore, the aim of this study was to examine whether legal anti-doping knowledge differs between athletes and coaches and to determine whether such differences are specific to sport type by comparing participants involved in team and individual/combat sports. We hypothesized that coaches will possess greater legal literacy about anti-doping policies, regardless of the type of sport (e.g., team and individual/combat sports).

Methods

Participants

The participants in this study were 188 athletes and 35 coaches from Croatia and Bosnia and Herzegovina, of whom 112 athletes (42 females) and 18 coaches (6 females) were involved in team sports, while 76 athletes (49 females) and 17 coaches (4 females) were involved in individual/combat sports. For the purpose of the present study, only participants from sport settings in which meaningful athlete vs. coach comparisons could be established were included in the analyses. Therefore, the study sample was restricted to sports for which data were available for both athletes and coaches from the same competitive context. Specifically, team sports are known to be specific with respect to team cooperation, whereas combat sports were intentionally observed as a separate category because of their comparable competitive structure, coaching dynamics, and sport-specific anti-doping context. Other individual sports were not included in the comparative analyses because of an insufficient number of coaches and substantial heterogeneity across disciplines. By applying these selection criteria, we aimed to ensure greater ecological validity and more interpretable athlete–coach comparisons within relatively homogeneous sport environments. Consequently, all subsequent analyses were conducted separately for the total sample and separately for team sports and individual combat sports.

The study was initiated by contacts with sport federations and was approved by the Ethics Committee of the Faculty of Kinesiology, University of Zagreb.

Variables

Legal anti-doping knowledge among athletes was assessed using the previously validated Questionnaire on Legal Anti-Doping Regulations (Q-LADR). The instrument was specifically developed to evaluate athletes' understanding of key legal aspects of anti-doping policy, including rights and obligations under the World Anti-Doping Code, testing procedures, and selected procedural safeguards. The final version of the questionnaire consisted of 10 true/false items, with an additional "not sure" response option provided for each statement. Each correct answer was scored one point, resulting in a theoretical score ranging from 0 to 10, where higher values indicated greater legal anti-doping knowledge. Previous studies have confirmed the acceptable reliability and validity of the tool in samples of senior-level athletes. Details on questionnaire development and validation are available elsewhere (Stankovic et al., 2022).

For coaches, legal anti-doping knowledge was assessed using the adapted Questionnaire on Legal Anti-Doping Reg-

ulations for Athlete Support Personnel (Q-LADR-ASP). This version was developed from the original athlete-focused instrument, with modifications introduced to reflect the specific legal responsibilities and practical roles of coaches and other support staff within the anti-doping system. Like the athlete version, the final questionnaire included 10 true/false items with a "not sure" option. The items covered domains such as rights and obligations under anti-doping regulations, procedural aspects of doping control, and responsibilities of support personnel. Correct responses were scored with one point, resulting in a total score ranging from 0 to 10, with higher scores representing better legal anti-doping knowledge. Previous validation procedures have indicated the satisfactory reliability and criterion validity of the Q-LADR-ASP in samples of coaches and sport support personnel (Sinkovic, Pivalica, Jukic, Pehar, & Sekulic, 2026).

Despite their specificities, both questionnaires (Q-LADR and Q-LADR-ASP) contain ten items covering equivalent legal domains. Minor wording adaptations were introduced to reflect the legal role of the respondent (athlete vs. athlete support personnel) while preserving conceptual equivalence. The specifics are briefly presented in Table 1.

Table 1. Comparison of the measurement tools used for athletes (Q-LADR) and for athletes' support personnel (Q-LADR-ASP)

Domain	Q-LADR	Q-LADR-ASP
WADA Prohibited List	✓	✓
Testing frequency	✓	✓
Strict liability	✓ (athlete responsibility)	✓ (athletes' support personnel perspective)
Whereabouts obligations	✓	✓
Therapeutic Use Exemptions	✓	✓
Doping control procedures	✓	✓
Sample collection	✓	✓
B-sample rights	✓	✓
Appeals	✓	✓
Sanctions/reduction of sanction	✓	✓

Although both instruments were designed to assess comparable domains of legal anti-doping literacy, they were originally developed for different target populations and included role-specific item adaptations. Therefore, to allow a more appropriate comparison between athletes and coaches, the results of the present study were transformed into standardized z scores. This procedure enabled comparisons of relative standing in legal anti-doping knowledge across groups while reducing bias related to potential differences in questionnaire content and measurement characteristics. The z scores were used for calculations of the statistical analyses, but the results are presented here as raw scores (on a scale of 1–10) for better understanding.

Statistics

After the data were analyzed by the Kolmogorov–Smirnov test, descriptive statistics were reported as the means and standard deviations for continuous variables and as frequencies with percentages for categorical variables.

Differences between groups of interest (athletes vs. coaches, individual combat sport vs. team sports) in legal literacy were calculated by t test for independent samples. The primary analysis of the associations included calculations

of the binary logistic regression models, with the criterion variable—stakeholder status (coded as athlete = 0 and coach = 1). The main predictor was legal anti-doping knowledge, expressed as standardized z scores. In the second phase, to control for potential confounding effects, age, experience in sport, number of anti-doping tests, and highest level of competitive achievement were entered into the models as covariates. Separate binary logistic regression models were calculated for (i) the total sample, (ii) team sports and (iii) individual combat sports. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to estimate the likelihood of belonging to the coach group in relation to changes in predictor variables. The z scores were used in the calculation of the logistic regressions. Statistical significance was set at $p < 0.05$. All analyses were performed using Statistica version 13.5 (TIBCO Inc., Palo Alto, CA, USA).

Results

Table 2 presents descriptive statistics for the study variables. As is evident, a significant number of athletes and coaches achieved advanced competitive levels. With regard to doping testing, the majority of athletes had no experience with it and were never tested on the doping substances themselves.

Table 2. Descriptive statistics for the study variables (F – count, % - percentage) for combat sports (individual sports) and team sports

	Combat sports (individual sports)				Team sports			
	Athletes		Coaches		Athletes		Coaches	
	(n = 76)		(n = 17)		(n = 112)		(n = 18)	
	F	%	F	%	F	%	F	%
Experience in sport (as an athlete/coach)*								
< 5 years	9	12.0	5	29.4	17	15.2	5	27.8
6-10 years	40	53.3	3	17.6	66	58.9	3	16.7
> 10 years	27	36.0	9	52.9	29	25.9	9	50.0
Missing**	0	0.0	0	0.0	0	0.0	1	5.6
Sport success (as an athlete/coach)*								
National level competition	18	23.7	6	35.3	22	19.6	5	27.8
National level achievement (medal)	34	44.7	7	41.2	49	43.8	9	50.0
European and/or World Championship (participation and/or medal)	22	28.9	3	17.6	39	34.8	3	16.7
Olympic Games (participation and/or medal)	1	1.3	1	5.9	2	1.8	1	5.6
Missing**	1	1.3	0	0.0	0	0.0	0	0.0
Participation in anti-doping testing (as an athlete/coach)*								
Never	41	53.9	6	35.3	68	60.7	9	50.0
1-2 times	14	18.4	7	41.2	24	21.4	5	27.8
3-5 times	17	22.4	2	11.8	17	15.2	3	16.7
> 5 times	3	3.9	1	5.9	2	1.8	1	5.6
Missing**	1	1.3	1	5.9	1	0.9	0	0.0

Legend: * Coaches gave responses considering their coaching career only (apart from their eventual experience when being athletes); ** Missing values were not included in later calculations of logistic regressions

With respect to the total sample, the legal knowledge on doping and anti-doping regulations (legal anti-doping knowledge - LADK) was significantly greater among coaches than among athletes (6.67 ± 1.36 and 5.25 ± 1.57 for coaches and athletes, respectively; t test = 4.57; $p < 0.001$). Additionally, compared with their athletes, coaches involved in combat sports achieved better results on LADK (7.54 ± 0.81 and 5.62 ± 1.44 for coaches and athletes, respectively; t test = 5.58; $p < 0.001$). No significant difference in LADK was found between the athletes and coaches involved in team sports

(5.75 ± 1.01 and 5.00 ± 1.62 for coaches and athletes, respectively; t test = 1.87; $p > 0.05$). Athletes involved in combat sports had better knowledge of legal anti-doping issues than their peers from team sports did (5.62 ± 1.44 and 5.00 ± 1.62 for combat sports and team sports, respectively; t test = 2.68; $p < 0.01$). Additionally, a significant difference in LADK was found between coaches involved in team sports and combat sports, with better results in combat sports (7.65 ± 0.88 and 5.75 ± 1.10 for combat sports and team sports, respectively; t test = 2.68; $p < 0.01$) (Figure 1).

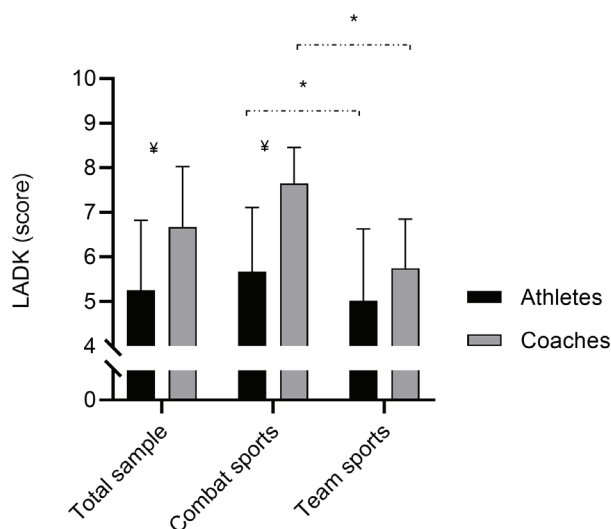


Figure 1. Descriptive statistics (means ± standard deviations) for legal anti-doping knowledge (LADK) among athletes and coaches, with t test differences between corresponding groups (* indicates t test significance of $p < 0.05$ between sports, ¥ indicates t test significance of $p < 0.05$ between athletes and coaches)

Table 3 presents the results of the binary logistic regression analyses calculated for athlete/coach status as the criterion variable. Univariate binary logistic regression revealed a significant association between LADK status as a predictor and athlete/coach status, with higher odds of being a coach among participants who achieved better LADK scores in the total sample (OR = 1.87, 95% CI: 1.42–2.47), as well as when they were stratified for team sports (OR = 1.19, 95% CI: 1.01–1.40) and combat sports (OR = 2.31, 95% CI: 1.55–3.44). In practical terms, participants with higher LADK scores were more likely to belong to the coach group than to the athlete group, with this association being notably stronger in combat sports than in team sports.

When multivariate logistic regressions were performed, adjusting for age, sport experience, sport success, and experience in anti-doping testing, the significant association between LADK and the criterion variable remained evident in the total sample (OR = 1.78, 95% CI: 1.25–2.65) and in combat sports (OR = 2.11, 95% CI: 1.34–3.11). These findings indicate that higher LADK scores independently increased the likelihood of being a coach rather than an athlete, even after controlling for relevant covariates. Moreover, the stronger association observed in combat sports suggests that LADK may be a particularly relevant distinguishing factor between coaches and athletes in this sport category.

Table 3. Results of the logistic regressions at the univariate and multivariate levels for the criterion variable - athlete/coach status (OR = odds ratio, CI – confidence interval)

	Total		Team sports		Combat sports	
	OR	95%CI	OR	95%CI	OR	95%CI
Univariate level						
Legal anti-doping knowledge	1.87	1.42-2.47	1.19	1.01-1.40	2.31	1.55-3.44
Multivariate level						
Age	1.77	1.23-2.41	1.61	1.09-2.13	1.51	0.90-2.21
Experience	1.66	1.02-2.21	1.51	0.90-1.91	1.41	0.57-2.40
Sport success	1.41	0.88-2.13	1.48	0.71-2.34	1.67	0.61-2.63
Experience in doping testing	1.47	1.11-1.76	1.37	1.05-1.72	1.59	1.05-2.14
Legal anti-doping knowledge	1.78	1.25-2.65	1.11	0.96-1.55	2.11	1.34-3.11

Discussion

There are several important findings of the study. First, legal anti-doping knowledge generally significantly predicted athlete-coach status, with coaches having higher levels of legal literacy than athletes did. However (second), these findings were consistent for individual/combat sports, irrespective of the influence of confounders (age, experience, sport success, and participation in anti-doping testing), but not for team sports. Therefore, our initial study hypothesis can be partially accepted.

Legal anti-doping knowledge differentiates coaches from athletes

At the univariate level, compared with athletes, coaches demonstrated greater LADK (legal anti-doping literacy). Such findings are generally expected, given that (i) coaches spend longer periods within organized sport systems (as athletes and later as coaches) and (ii) are more often exposed to some type of regulatory demands throughout their careers in sport (Engelberg, Moston, & Blank, 2019). Indeed, in addition to their technical and performance-related responsibilities, coaches are frequently involved in issues related to competition eligibility, supplement use, testing procedures, and communication with sport authorities (Sinkovic et al., 2025). Consequently, they are more familiar even with anti-doping rules and legal obligations than athletes are, whose primary focus is more commonly directed toward training and competitive performance. Therefore, our results support the view that coaches should be considered important reservoirs of antidoping legal knowledge within a sport society. Moreover, it must be noted that coaches often serve as the first point of consultation when athletes face decisions involving potential regulatory risk.

From the perspective of anti-doping policy, these findings

are particularly important. Specifically, regulations related to anti-doping policies are continuously evolving and are being revised (WADA, 2026). Therefore, coaches are expected to operate within the World Anti-Doping Code, updates of the prohibited list, therapeutic use exemption procedures, and national legislative amendments. Greater LADK among coaches may act as an important protective factor against doping. Coaches who are familiar with current rules are more likely to recognize regulatory risks. Such coaches are more likely to respond appropriately during testing procedures and guide athletes toward the whole anti-doping process. This is directly supportive of opinions that coaches' capacity to follow legal and procedural changes may contribute to reducing unintentional anti-doping rule violations and procedural misunderstandings (Star & Kelly, 2021). Therefore, advanced coaches' LADK may represent an efficient strategy for improving regulatory compliance across sport systems.

The present findings may be interpreted from the perspective of sociological theories explaining knowledge acquisition within professional communities. Specifically, the "communities of practice" framework proposes that professional knowledge is progressively developed through long-term participation in shared social environments and repeated practical interactions (Lave & Wenger, 1991). In sport settings, coaches are continuously exposed to anti-doping-related procedures, regulatory communication, and decision-making situations. Consequently, they develop their legal anti-doping literacy through everyday participation in sport-specific regulatory practices. Moreover, from the perspective of "role theory", coaches are expected to assume responsibilities that extend beyond technical preparation (Biddle, 1986). Such socially constructed role expectations may additionally motivate coaches to develop greater familiarity with anti-doping rules, procedures, and legal obligations.

Specificity of the team sports

When team sports were analyzed within the multivariate model (after adjustment for covariates), LADK did not differentiate coaches from athletes. This finding indicates that the higher knowledge initially observed among coaches was largely explained by age, sport experience, and competitive exposure rather than by coaching status itself. Such findings are logical, since coaches in team sports are (i) typically older and (ii) have spent more years within organized sport systems than active athletes have. Longer involvement in professional sports increases opportunities to meet certain types of anti-doping procedures, educational activities, and regulatory communication. Therefore, in team sports, higher legal anti-doping knowledge among coaches appears to reflect accumulated experience.

From a legal perspective, these findings suggest that LADK in team sports may be connected to long-term participation in sport as a system and not to the formal coaching function itself. It is logical that legal anti-doping literacy may be improved through repeated contact with officiating structures, federation procedures, disciplinary mechanisms, and, consequently, accumulated knowledge. However, the fact that the multivariate model did not reveal a significant association between LADK and coaching position has important normative implications. Specifically, it can be said that appointment to a coaching position in team sports does not automatically ensure an adequate understanding of anti-doping obligations, liability standards, or procedural safeguards. Consequently, younger and unexperienced coaches could possess a position of “theoretical authority” while lacking the level of necessary legal competence. When unaware of this lack of knowledge, young and unexperienced coaches can be at risk of inaccurate guiding regarding their athletes with regard to anti-doping. Additionally, it is not uncommon that in such situations, coaches (and athletes) seek nonformal experience-based learning (Daher, El Khoury, & Dwyer, 2021; Sekulic et al., 2016). This approach may create additional problems with regard to acquiring knowledge of LADK. Therefore, anti-doping policy in team sports should not presume regulatory competence on the basis of coaching status alone.

Specificity of combat sports

In combat sports, coaching status was positively associated with LADK even after adjustment for covariates (i.e., age, experience, and status). These results suggest that coaches in combat sports develop legal anti-doping literacy through mechanisms that are independent of simple accumulation of sport experience. Therefore, LADK in combat/individual sports may be observed as a more role-specific competence directly linked to the coaching function itself, including the practical interpretation, everyday application, and risk management of anti-doping regulations. Several plausible explanations may account for these findings.

First, it is well known that coaches in combat sports are frequently former athletes from the same sport discipline (Behr & Kuhn, 2019). As a result, many of them have already been exposed to anti-doping procedures, testing protocols, and regulatory requirements during their own competitive careers. This may be particularly relevant in combat sports, where the prevalence of doping and anti-doping surveillance have often been recognized as relatively pronounced (Damjanovic et al.,

2025). Consequently, future coaches may begin to accumulate practical legal anti-doping knowledge long before they enter the coaching profession itself. Their later coaching role may therefore build upon regulatory knowledge initially acquired as athletes, including familiarity with notification procedures, testing obligations, sanctions, and procedural rights under anti-doping rules.

The second explanation may be related to the continuity of coach–athlete relationships, which is characteristic of many combat sports. Coaches in these disciplines often accompany athletes from the earliest phases of their career. Consequently, they are repeatedly exposed to anti-doping matters arising across different phases of athlete development. This includes educational activities, testing procedures, supplement-related decisions, therapeutic issues, and, most likely, communication with regulatory bodies. Continuous involvement in such processes may allow coaches to progressively expand and refine their LADK over time. In practical terms, each anti-doping-related situation concerning the athlete may simultaneously function as a learning opportunity for the coach. This type of cumulative knowledge development is likely less common in team sports, where coaching changes are frequent and athletes are commonly supervised by multiple coaches throughout their careers (König, 2013).

Third, the strong sense of personal responsibility that often develops between coaches and athletes in combat sports may also contribute to the present findings. As stated previously, coaches in combat sports frequently guide athletes over many years, and their role naturally includes mentorship or even some kind of parental support. In such circumstances, coaches are likely to perceive the athlete’s successes and failures as their own responsibility. Consequently, any careless decision related to anti-doping procedures could compromise the relationship between the athlete and coach (in combat sports, often referred to as the “master”). This heightened sense of accountability may motivate coaches to become better informed about anti-doping rules, legal obligations, and procedural requirements. Therefore, greater LADK among combat sport coaches may partly reflect a stronger perceived duty of care toward the athletes they supervise (“The master is to be a teacher and educator”) (Cynarski, 2020).

Finally, a more controversial explanation may be related to weight-management practices that are common in many combat sports because of weight-category competition systems. In such environments, rapid body mass reduction strategies (called “weight cutting”) may include the misuse of diuretics and related substances (Barley, Chapman, & Abbiss, 2019; Crighton, Close, & Morton, 2016)(Cadwallader, De La Torre, Trieri, & Botrè, 2010). Coaches involved in combat sports are likely aware of these methods and their regulatory consequences under anti-doping rules. Consequently, some coaches may develop greater LADK precisely because they are required to navigate the boundary between common sport practices and prohibited conduct. Although this possibility should be interpreted cautiously, it may partly contribute to the higher LADK observed among coaches in combat sports.

Some elements of the present findings may additionally correspond to concepts of socialization theory (Berger & Luckmann, 1991; Coakley & Pike, 2009). As already stated, individuals involved in combat sports are often socialized into highly specific sport cultures characterized by strong interpersonal ties, long-term coach–athlete loyalty, and in-

tensive everyday interaction. Through prolonged exposure to such environments, coaches may gradually internalize not only technical and tactical norms but also regulatory practices, anti-doping procedures, and attitudes toward legal responsibility in sport. Consequently, LADK in combat sports may partly represent a product of long-term socialization within the specific cultural environment of these sports.

Limitations

This study is not without limitations. First, we must acknowledge that although both questionnaires used (Q-LADR and Q-LADR-ASP) were developed within the same conceptual framework and assess equivalent legal domains, they are not identical instruments. Consequently, despite score standardization, some influence of role-specific item wording on between-group comparisons cannot be completely excluded. Furthermore, the study was conducted in Croatia and Bosnia and Herzegovina, and the findings should therefore be interpreted within this specific regional context. In addition, only Olympic sports were included in the present investigation. As these sports operate under well-established World Anti-Doping Code implementation and are generally characterized by structured anti-doping education and regulatory oversight, the findings may not be directly applicable to non-Olympic sports or sporting environments with less developed anti-doping governance. Finally, the relatively small number of coaches included in the study may have reduced the statistical power of between-group comparisons, particularly in the sport-specific subgroup analyses. Therefore, these findings should be interpreted with appropriate caution and confirmed in larger coach samples.

Conclusion

The results suggest that legal anti-doping literacy is dependent on the specific characteristics of the sport environment, with evident differences between team sports and individual/combat sports. Therefore, coaching status itself should not be automatically equated with sufficient regulatory competence in regard to doping and doping regulations, which is particularly evident in team sports. Therefore, anti-doping governance frameworks should include structured and continuous legal education for coaches in team sports, with particular emphasis on younger and less experienced professionals.

The findings support the view that legal anti-doping literacy should be observed as a systemic rather than exclusively individual characteristic. In sport settings where coaches function as long-term and primary support figures, such as in individual combat sports, their regulatory competence may directly influence athlete protection, procedural fairness, and prevention of unintentional anti-doping rule violations. Consequently, future anti-doping policies should adopt sport-specific educational strategies that recognize differences in the distribution of legal responsibility across sporting contexts. In doing so, anti-doping systems may become both more effective and more equitable.

Future research should examine legal anti-doping literacy in larger and more diverse samples of coaches and athletes across different countries and sporting contexts to determine whether the present sport-specific patterns are generalizable across anti-doping systems.

References

- Barley, O. R., Chapman, D. W., & Abbiss, C. R. (2019). The current state of weight-cutting in combat sports. *Sports*, 7(5), 123. <https://doi.org/10.3390/sports7050123>
- Behr, K., & Kuhn, P. (2019). Key factors in career development and transitions in German elite combat sport athletes. *Martial Arts Studies*, 7, 19-35. <https://doi.org/10.18573/mas.73>
- Berger, P. L., & Luckmann, T. (1991). *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*: Penguin Adult.
- Biddle, B. J. (1986). Recent developments in role theory. *Annual review of sociology*, 12(1), 67-92.
- Cadwallader, A. B., De La Torre, X., Tieri, A., & Botrè, F. (2010). The abuse of diuretics as performance-enhancing drugs and masking agents in sport doping: pharmacology, toxicology and analysis. *British journal of pharmacology*, 161(1), 1-16. <https://doi.org/10.1111/j.1476-5381.2010.00789.x>
- Coakley, J. J., & Pike, E. (2009). *Sports in Society: Issues and Controversies*: McGraw-Hill Education.
- Crighton, B., Close, G. L., & Morton, J. P. (2016). Alarming weight cutting behaviors in mixed martial arts: a cause for concern and a call for action. In (Vol. 50, pp. 446-447): BMJ Publishing Group Ltd. and British Association of Sport and Exercise Medicine.
- Cynarski, W. J. (2020). Coach or sensei? His group relations in the context of tradition. *Physical Culture and Sport. Studies and Research*, 88(1), 41-48. <https://doi.org/10.2478/pccsr-2020-0024>
- Daher, J., El Khoury, D., & Dwyer, J. J. (2021). Education interventions to improve knowledge, beliefs, intentions and practices with respect to dietary supplements and doping substances: A narrative review. *Nutrients*, 13(11), 3935. <https://doi.org/10.3390/nu13113935>
- Damjanovic, S., Rossi, C., Manolopoulos, N., Matijevic, T., Korpak, D., Kurtanovic, A., ... Roklicer, R. (2025). Doping in combat sports: a systematic review. *The Physician and sportsmedicine*, 53(2), 103-111. <https://doi.org/10.1080/00913847.2025.2449812>
- Engelberg, T., Moston, S., & Blank, C. (2019). Coaches' awareness of doping practices and knowledge about anti-doping control systems in elite sport. *Drugs: Education, Prevention and Policy*, 26(1), 97-103. <https://doi.org/10.1080/09687637.2017.1337724>
- Kačer, H., & Kačer, B. (2018). (Neke) pravne dvojbe u svezi s dopingom (in Croatian). *Collected Papers of the Faculty of Law in Split/Zbornik Radova Pravnog Fakulteta u Splitu*, 55(2).
- König, S. (2013). Coaching performance and leadership behaviors in team sports. *Sportwissenschaft*, 43(4), 253-263. <https://doi.org/10.1007/s12662-013-0309-5>
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*: Cambridge university press.
- Marinelli, S., Basile, G., Vari, M., Napoletano, G., Negro, F., & Tini, A. (2022). The evolution of European legislation on doping: new challenges in the age of NPS. *European review for medical and pharmacological sciences*, 26(18), 6405-6417. DOI: 10.26355/eurrev_202209_29740
- Mazzucco, M., & Brehaut, J. (2024). The use of doping control data to administer sex-based eligibility regulations: an analysis of how the World Anti-Doping Agency and international sport federations violate data protection

- laws. *The International Sports Law Journal*, 24(2), 97-123.
- Read, D., Skinner, J., Smith, A. C., Lock, D., & Stanic, M. (2024). The challenges of harmonizing anti-doping policy implementation. *Sport Management Review*, 27(3), 365-386. <https://doi.org/10.1007/s40318-024-00276-7>
- Sankey, C., Wallace, L., & Caperchione, C. M. (2023). Understanding the role of coaches in supporting the mental health of elite athletes. *Journal of science and medicine in sport*, 26(8), 399-404. <https://doi.org/10.1016/j.jsams.2023.06.012>
- Sekulic, D., Tahiraj, E., Zvan, M., Zenic, N., Uljevic, O., & Lesnik, B. (2016). Doping attitudes and covariates of potential doping behavior in high-level team-sport athletes; Gender specific analysis. *Journal of sports science & medicine*, 15(4), 606.
- Shanmuganathan-Felton, V., Felton, L., & Jowett, S. (2022). It takes two: The importance of the coach-athlete relationship. *Frontiers for Young Minds*, 10(676115), 167-202. <https://doi.org/10.3389/frym.2022.676115>
- Sinkovic, A., Pivalica, D., Jukic, I., Pehar, M., Pivalica, B., Cerkez Zovko, I., & Sekulic, D. (2026). The Effect of Educational Intervention on Legal Anti-Doping Knowledge and Doping Tendency in Elite Athletes. *Sports*, 14(1), 35. <https://doi.org/10.3390/sports14010035>
- Sinkovic, A., Pivalica, D., Jukic, I., Pehar, M., & Sekulic, D. (2026). Measuring Legal Competence in Anti-Doping: Reliability and Validity of the Novel Measurement Tool Among Sport Officials. *Kinesiologia Slovenica: scientific journal on sport*, 32(1). <https://doi.org/10.52165/kinsi.32.1.87-106>
- Sinkovic, A., Pivalica, D., Pivalica, B., Jukic, I., & Sekulic, D. (2025). Evaluating an Anti-Doping Education Program for Athlete Support Personnel: Knowledge Gains Without Behavioral Shift. *Sport Mont*, 23(3), 127-133. <https://doi.org/10.26773/smj.251018>
- Stankovic, D. V., Sinkovic, A., Sekulic, D., Jelacic, M., & Rodek, J. (2022). Knowledge of the Legal Issues of Anti-Doping Regulations: Examining the Gender-Specific Validity of the Novel Measurement Tool Used for Professional Athletes. *Sustainability*, 14(19), 12883. <https://doi.org/10.3390/su141912883>
- Star, S., & Kelly, S. (2021). A level playing field in anti-doping disputes? The need to scrutinize procedural fairness at first instance hearings. *The International Sports Law Journal*, 21(1), 94-117. <https://doi.org/10.1007/s40318-020-00176-6>
- Sung, J.-Y., Lee, J.-H., & Lee, K.-L. (2024). Analysis of the diet, weight-loss behavior, and nutritional knowledge of athletes and coaches in weightclass sports: influence of a coach's nutritional knowledge on athletes. *Journal of the International Society of Sports Nutrition*, 21(1), 2405159. <https://doi.org/10.1080/15502783.2024.2405159>
- Tahiraj, E., Zenic, N., Musa, M., Zeljko, I., & Rodek, J. (2024). Beyond Winning: Examining Sociodemographic and Sport Factors Associated with Doping Attitudes in High-Performance Sport Coaches Involved in Olympic Team Sports. *Montenegrin Journal of Sports Science & Medicine*, 13(2). <https://doi.org/10.26773/mjssm.240904>
- WADA. (2026). <https://www.wada-ama.org/en/resources/world-anti-doping-code-and-international-standards/world-anti-doping-code>. accessed 01 June 2026