Blank C[1], Leichtfried V[1], Fürhapter C[1], Müller D[2], Schobersberger W[1,3]

Doping in Sports: West-Austrian Sport Teachers' and Coaches' Knowledge, Attitude and Behavior

Doping im Sport: Wissen, Einstellungen und Verhalten West-Österreichischer Sportlehrer und Trainer

[1] Institute for Sports Medicine, Alpine Medicine & Health Tourism, UMIT, Hall, Austria
[2] National Anti-Doping Agency (NADA), Vienna, Austria
[3] Institute for Sports Medicine, Alpine Medicine & Health Tourism, TILAK, Innsbruck, Austria

SUMMARY

Coaches are seen as strong influencing factors in the regulation of athletes' behavior and attitudes, as well as being in a good position to transfer knowledge. Hence, they should be included in targeted education strategies in doping prevention. The current study aimed at evaluating the knowledge and attitudes of Western-Austrian coaches to outline possible associations between education and perceived and actual knowledge. A questionnaire divided into four main fields of interest: (a) perceived knowledge, (b) actual knowledge, (c) attitudes, and (d) coach behavior, was handed out to 135 sport teachers and coaches in Tyrol (response rate: 45.9%). Perceived knowledge was significantly lower than actual knowledge (72.2 and 87 out of 100, $p<0.001$). The score on attitudes was 86.8 (out of 100), outlining a positive anti-doping attitude. Coach behavior scored very moderately (48.7 out of 100). Coaches, confronted with the topic during primary education and subsequent training scored significantly higher in perceived knowledge compared to primary education only (77.3 vs 52.8, $p<0.05$). The goal of prevention strategies should be to increase actual knowledge by continuing training of the coaches, since only those who perceive themselves to be competent will actively address the topic and appear more trustworthy, thereby helping athletes develop and modify their own set of values.

Key Words: Doping prevention, trainer, education, network

ZUSAMMENFASSUNG

Obwohl Trainer als einflussreich in Bezug auf die Ausbildung und Regulierung von Einstellungen und Verhalten ihrer Athleten gelten und die Möglichkeit haben Wissen zu transferieren, wurde der Trainerstand in der bisherigen Doping-Präventions-Forschung eher vernachlässigt. Die vorliegende Studie setzt sich zum Ziel, sowohl den aktuellen Stand des Dopingwissens bei West-Österreichischen Trainern, als auch deren Einstellungen und Verhalten zu evaluieren. Zusätzlich soll der Einfluss von Trainerausbildung auf deren Wissen und Einstellungen untersucht werden. Ein Fragebogen, bestehend aus vier Hauptthemengebieten (Subjektives Dopingwissen, Objektives Dopingwissen, Einstellungen, Verhalten) wurde an 135 Trainer und Sportlehrer in Tirol verteilt (Rücklaufquote: 45.9%). Subjektiv eingeschätztes Dopingwissen war signifikant niedriger als das objektivierte Dopingwissen (Score Punkte: 72.2 vs. 87 von 100, $p<0.001$). Die Trainer erzielten einen Punkte Score von 86.8 (von 100) bezüglich Einstellungen. Das Trainerverhalten zeigte einen moderaten Wert (Score Punkte: 48.7 von 100). Trainer, die während Aus- und Fortbildungen kontinuierlich mit dem Thema konfrontiert wurden, hatten signifikant höhere Score Punkte in subjektiv eingeschätztem Wissen (77.3 vs 52.8, $p<0.05$). Schlussfolgernd kann gesagt werden, dass das Ziel von Präventionsmaßnahmen eine kontinuierliche Ausbildung der Trainer sein sollte, um die eigene Einschätzung des Wissens zu verbessern. Trainer, die sich selbst als kompetent empfinden werden ihr Wissen eher pro-aktiv an ihre Athleten weitergeben, erscheinen vertrauenswürdiger und können Athleten dadurch in der Bildung und Festigung ihrer eigene Wert und Einstellung unterstützen.

Schlüsselwörter: Dopingprävention, Trainer, Ausbildung, Netzwerk

INTRODUCTION

Doping, defined by the World-Anti Doping Code (WADC) (25), is an issue the competitive sports world faces since decades. It is generally accepted as being against the spirit of sport and believed to create unfair advantages. Research in doping developed from studies on detection and secondary prevention towards a broader focus including primary prevention either through education (11,19) or through identifying and modifying factors that might influence doping intentions (9,14,15,21).

Especially for the young athlete, the educational approach seems to be of high importance, since it is assumed that a profound knowledge about doping might be one possibility to prevent athletes from developing pro-doping attitudes (1,6). Further studies found a direct association between doping attitude and doping intentions (4,23). Additionally, enhanced knowledge might prevent athletes from applying doping behavior, through the formation of correct attitudes, a concept coming from human sciences (1,6). Knowledge can only be achieved through training and a learning process and the multifaceted and complex network surrounding the athletes might influence their experiences, behaviors and knowledge (5,10,18).

Coaches, as part of this network, are significant sources of information regarding doping related issues (20). Besides, prevention pro-

accepted: May 2014
published online: October 2014
DOI: 10.5960/dzsm.2014.133
Blank C, Leichtfried V, Fürhapter C, Müller D, Schobersberger W: Doping in Sports: West-Austrian Sport Teachers' and Coaches' Knowledge, Attitude and Behavior. Dtsch Z Sportmed 2014; 65: 289-293.

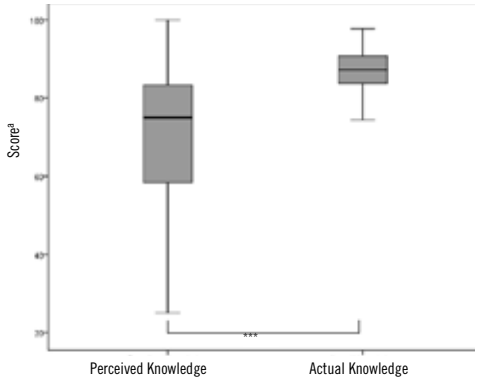

Figure 1: Difference between perceived and actual knowledge of coaches. ***p<0.001; [a]score between 0 and 100.

grams in team-sport or class rooms setting showed to be very efficient in preventing athletes from future behavior (12). To function as a role model, coaches and teachers must prove their profound knowledge and ethically correct attitudes (10), especially, when considering that coach behavior was often used by athletes to justify doping (8). The role of the coach is even defined by the WADC: "…to use their influence on athletes values and behavior to foster anti-doping attitudes" (25). A recent review on coaches' knowledge, attitudes and beliefs regarding doping found that coaches have favorable attitudes towards anti-doping and are able to inspire athletes, and foster understanding and compliance to anti-doping rules by creating a positive performance climate, but also a lack of coaches' knowledge (2). The aim of the current study was to evaluate the knowledge and attitudes of West-Austrian coaches and sport teachers regarding anti-doping and to evaluate association between education and perceived and actual knowledge. The focus was set on coaches working with young athletes (aged 14-19) because prior research indicates that athletes are especially vulnerable to doping during sporting career transitions (19).

MATERIALS AND METHODS

Study design

The current cross-sectional survey study is part of a research project that has assessed knowledge, attitudes and behavior of Tyrolean junior elite athletes (11), their parents (5) and coaches/sport teachers and was approved by the ethics committee of the Medical University of Innsbruck (AN3854, 284/4.1.). The study at hand displays the data analyses of Tyrolean coaches and sport teachers. Data were collected over a period of four months (April till June 2010) by distributing a self-reporting questionnaire to all coaches and teachers of the contacted schools and training centers. To ensure anonymity, data collection was performed with randomly encoded case report forms. Participation in the study was voluntary and all participants provided written informed consent.

Population

Tyrolean sport coaches and sport teachers were selected at three Tyrolean sport schools (one focusing on alpine sports and the other two on different team and individual sports), and two Tyrolean sport trainings centers (soccer and American football).

The chosen institutions intensively support junior sports and were the only ones in Tyrol with a designated sport branch, principally hosting most of the future Tyrolean elite athletes.

Instrument

The questionnaire was created with closed-ended questions. Items of the questionnaire either had a nominal ("yes", "no", "do not know") response scale or a three (e.g. "very small", "small", "high", "very high") or four point (e.g. "absolutely not true", "probably not true", probably true", most likely true", "absolutely true") Likert scale. They were designed based on published questionnaires used to evaluate doping knowledge and attitudes among athletes (16,20,24) and adapted to fit for coaches. Next to collecting socio-demographic data, contact to persons within the athlete's network, information about trainer education, coach behavior and former own sports career (including temptation to dope), four categories, not labeled in the survey were built: (a) perceived knowledge about doping substances and methods, (b) actual knowledge about doping substances and methods (i.e. questions on different substances and methods prohibited and non-prohibited based on the WADA 2010 prohibited list), (c) attitudes and norms towards doping (i.e. ethical and fairness questions), and (d) coach behavior (i.e. questions regarding information and preparation behavior). Reliability analyses revealed an overall acceptable fit of the scales (Cronbachs-α between 0.66 and 0.74) except for the attitude scale with Cronbachs-α of only 0.4.

To simplify data interpretation, nominal scales of doping related questions were aggregated to create binominal data (i.e. yes/no, agree/disagree). This practice can be found in previous doping research (13,18) where reports show that anything other than a "definitely no/yes" response to future doping intentions indicates vulnerability.

To include all different items of the categories, a score was computed for each of them, with 100 achieved if all questions were answered correctly and/or ethically most favorable and/or most norm-according. A wrong and/or ethically unfavorable and/or not entirely norm-according answer reduced the score depending on the degree and the response scale. A score of 0 indicated no correct answer with respect to the knowledge questions and/or least ethically favorable and/or least norm-according answer with respect to the attitude questions. The questionnaire was pretested with a sample of 12 coaches prior to the study to exclude and/or change ambiguous questions.

Statistical Analysis

Data was analyzed using SPSS 20.0 (Statistical Package for the Social Sciences, Chicago, Illinois).

Even though some data was not normally distributed (according to the Kolmogorov-Smirnoff test) parametric methods of testing were used. This procedure was shown to be adequate when analyzing samples of more than 30 respondents (7). However, as a supplementary statistical analysis, non-parametric testing was applied as well (Mann-Whitney U test, Spearman Correlation Coefficients and Wilcoxon Test). Results did not differ between analyses; therefore, statistical significances by mistake can be excluded.

Data are shown as mean ± standard deviation (SD) and frequencies with the corresponding 95% confidence interval ($CI_{95\%}$). Unpaired t-tests were applied to analyze differences of scores with respect to binomially scaled demographic information (e.g. gender, sporting career). Paired t-tests were applied to compare actual and perceived knowledge. A univariate ANOVA was used to analyze differences of knowledge between the three education groups (primary education, secondary training, both) and to identify possible differences in knowledge, attitudes and behavior between the groups of coaches, sport teachers and both.

Pearson correlation analyses were utilized to evaluate associations between socio-demographic variables and scores of the four categories. Multiple linear regression analysis was applied to analyze

Table 1: Coach attitudes. CI95%,Yes: 95 % confidence interval of coaches answering with 'yes'

n= 55	Not important (%)	Limited importance (%)	Important (%)	Very important (%)	Mean (SD)
Fairness and Fair Play for me as a coach is …	0	0	6.5	90.3	2.9 (0.3)
Ethics in sport for me as a coach is …	0	0	17.7	79	2.8 (0.4)

	Yes (%)	No (%)	CI95%,Yes
Doping in sport is ethically and morally reprehensible	87.1	9.7	0.76;0.94
Moral concepts in sports are destroyed by doping	91.9	4.8	0.82;0.97
Doping should be refused	96.8	1.6	0.89;0.99
Doping should be generally prohibited	96.8	1.6	0.89;0.99
Doping should be generally legalized	0	100	0.84;0.98
Athletes should be punished based on a positive doping sample	93.5	3.2	0.18;0.42
Sport clubs should be punished based on a positive doping sample of their athletes	29	64.5	0.13;0.35
Sport federations should be punished based on a positive sample of their athletes	22.6	74.2	0.84;0.98
Doping Controls should be increased	93.6	6.4	0.94;1

Table 2: Coach Behavior. CI95%,Yes: 95 % confidence interval of coaches answering with 'yes'

n=52	Yes (%)	No (%)	$CI_{95\%,Yes}$
Do you discuss physical and psychological problems with your athletes?	88.7	3.2	0.78;0.95
Do you discuss about winning, loosing, competition and fear within the framework of doping with your athletes?	48.4	43.5	0.35;0.61
Do you talk about doping substances and methods with your athletes?	53.2	37.1	0.4;0.66
Is doping and doping prevention a relevant topic in your training routine?	19.4	69.4	0.1;0.31
Do you prepare your athletes for doping controls?	21	62.9	0.12;0.33
Do you encourage your athletes to take nutritional supplements?	50	21	0.37;0.63

whether norms/attitudes and doping knowledge (perceived and actual) can explain variance in coach behavior. The significance level was set at $p<0.05$.

RESULTS

Demographic results

In total, 62 respondents returned the questionnaire (response rate 45.9%) with 88.7% being male. A third of the sample were coaches (n=20), 51.6% were sport teachers (n=32) and 16.1% indicated to be both, coach and sport teacher (n=10). Since no differences were found between coaches, sport teachers or both, the entire sample was called "coaches" for easier reading. Mean age was 37.9±11.7 years. Coaches worked in average for 13.3±9.5 years. Female coaches were older (48.7±6.9 vs. 37.7±11.6; p=0.004) and had longer coaching careers than male coaches (25.5±5.3 vs. 13±9.7; p=0.006). 53.2% of the coaches finished a university degree. On average, each coach trained 28 (±34) athletes, aged between 14 and 19 years. In detail, 16.1% of the coaches trained athletes from a federal state team, 22.6% trained athletes from a national team and 14.5% trained athletes that either belonged to a federal state or national team.

Contact with doping

69.4% of the coaches indicated that doping is not a relevant topic during everyday training even though 48.4% reported a high interest in the topic of performance enhancing substances (not necessarily doping agents) aside their athletes. Athletes showed most interest in creatine (45.2%), alcohol (29%), anabolic steroids (22.6%) and EPO (19.4%). Two thirds (67.7%) of the coaches were professional athletes themselves with a mean length of sporting career of 12.8±6.2 years of which 6.5% felt tempted to use prohibited substances during their active career. No significant differences with respect to socio-demographic characteristics and own former professional sporting career were found.

Knowledge about substances and methods

The perceived knowledge score showed a mean of 72.2±16.8. The actual knowledge score of 87.0±5.2 was based on actual knowledge about doping substances and methods (89±8.3) and on the actual knowledge about side effects (85.6±9.3). Actual knowledge and perceived knowledge of coaches differed ($p<0.05$) and showed a slight association ($r=0.27$, $p=0.03$) (Fig.1). No significant differences were found in knowledge between the three groups of coaches, sport teachers and both.

There was a tendency that men perceived their doping knowledge to be better than women ($p=0.055$). Age and duration of coaching career showed a significant but small, negative correlation with perceived knowledge ($r_{age}=-0.39$, $p=0.002$; $r_{coaching\ career}=-0.36$, $p=0.005$) respectively. No significant differences were found with doping knowledge and former own doping temptation.

Attitudes

Fifty-five coaches (88.7%) entered analyses regarding attitudes due to missing data. The mean score for norms and attitudes was 86.8 (±8.2). No significant associations were found with respect to norms/attitudes and the additional three category scores and/or socio-demographic data. Detailed outcomes of the attitude-related questions are shown in Table 1.

Coach behavior

Fifty-two coaches (84.9%) completed all questions. The mean coach behavior score was 48.7 (±20.8). Of 56 coaches, 50% advise athletes to take nutritional supplements. 31% state to be sure that there is a high risk of contamination of nutritional supplements, whereas 56.5% are not sure if there is a risk.

Coach behavior showed a positive association with perceived knowledge ($r=0.37$; $p=0.008$) but no significant association with the

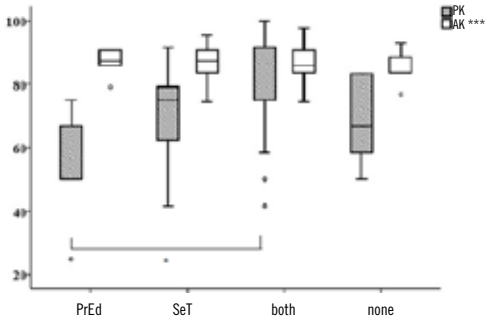

Figure 2a: Differences between educational status and perceived and actual knowledge. PK=Perceived Knowledge; PrEd=Primary education Knowledgs Score: 0-100; AK=Actual Knowledge; SeT=Secondary Training. * p<0,05; ***p<0,001.

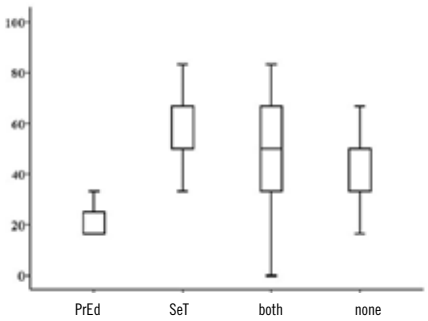

Figure 2b: Differences between educational status and coach behaviour. PrEd=Primary education; SeT=Secondary Training; Coach BEhaviour Score: 0-100.

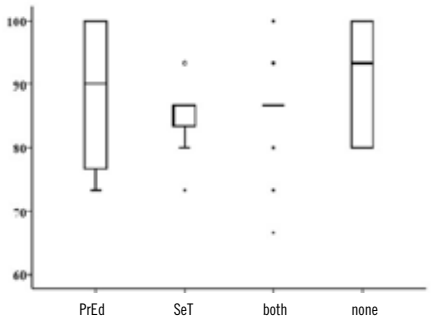

Figure 2c: Differences between educational status and attitudes. PrEd=Primary education; SeT=Secondary Training; Attitude Score: 0-100.

attitude score. Yet, there was a positive association between coach behavior and the level of agreement to ethics in sport as being important (item of the attitude score) (r=0.32; p=0.02). Detailed outcomes of the behavioral questions are shown in Table 2. No marked associations with demographic characteristics of the coaches were found. Linear regression analyses did not result in a significant model explaining variances in coach behavior.

Coach education

Even though primary education and secondary training is named most often regarding the source of information on doping (62.9%), 53.2% of the coaches wished for more education, independently of the age. Almost three in four (74.2%) requested more information from sports clubs and 71% from federations. The National Anti-Doping Agency (NADA) only comes in fourth place (32.3%) with the internet (54.8%) preceding. Of the four categories, only perceived knowledge differed between education status (p<0.05) (Fig 2a – 2c).

DISCUSSION

Western Austrian coaches generally show a good level of actual knowledge about doping substances, methods and side effects (score >85, of 100). Education impacts on this knowledge, if applied more than once, during primary education. Coaches are clearly against doping but the coach behavior scores quite low with 48.7±20.8. Norms/attitudes and knowledge do not seem to modify coach behavior within this study sample. In line with a recent review (2) the current sample was dominated by males (88.7%).

Our research has shown that doping is an issue in youth sports. Almost 50% of West-Austrian coaches state that their athletes show a high interest in the topic and approach them for information. Nonetheless, aside the coaches, doping was not seen as a relevant topic during everyday training (indicated by 69.4% of the coaches) and two third indicated not to prepare their athletes for doping controls. An explanation might be that they do not regard it to be their responsibility to prepare their students and/or athletes for doping controls. Yet, as research has shown (12), classroom settings for example, were proven to be efficient in doping prevention measures based on information. Another reason for this discrepancy might be explained by the finding that coaches, albeit having a good actual state of doping knowledge, show a perceived knowledge that is lower and shows a higher variance. It could be hypothesized that despite the sufficient knowledge, coaches, due to underestimation, might be hesitant in providing information to their athletes, in fear of providing wrong information. The moderate behavior score and the positive association that was found between coach behavior and perceived knowledge might strengthen this argument. Interestingly, actual knowledge was not associated with behavior. In line, findings of public health and health promotion research suggested that the link between actual knowledge and behavior is not as dominant as expected (22). Consequently, systematic anti-doping education could be a way to increase perceived knowledge and self-confidence about the topic resulting in improved integration in training routines to support the education of athletes. The fact that perceived knowledge was significantly better after receiving information of a combination of primary education and secondary training urges that it is not only important to inform coaches once, but to keep them updated and informed on a regular basis. Additionally, as suggested by previous research (17), coaches should not only be educated in hard facts about doping substances and methods but also in soft skills on how to forward preventive anti-doping messages to their athletes. Up to now, it is criticized that coach education in this area is still minimalistic (8).

A further interesting finding was that age and length of sporting career showed a slight negative correlation with perceived knowledge. This is in contrast to previous results of a positive association between the latter (18). An explanation could be that informational approaches in doping prevention, started in Austria only a few years ago and older coaches, obviously with longer coaching careers, might not have benefited from such education.

Next to the knowledge, a coach's attitude towards doping was hypothesized to impact on athletes' use of banned substances (8) but empirical data to support this statement is lacking (2). Generally, attitudes of West-Austrian coaches were against doping practices and support previous results (10,17,18,20). Fairness and ethics in sport are very important for almost all of the respondents. Most of the coaches agree on punishing athletes for doping, but less on punishing sport clubs and federations. This finding could be seen critical in view of the fact that athlete's surrounding personnel (ASP) also has certain responsibilities under the WADC (2,10,18). Coaches should be aware that bans can also hit them and other support personnel, if not complying with WADC rules and responsibilities for ASP.

Some limitations need to be taken into account when interpreting present results. The response rate with 46% might have led to a selection bias but is in line with the response rates of previous, comparable studies (2) and might reflect the general degree of interest in the

topic (7). Furthermore, doping is a sensitive topic and self-reporting methods might lead to social desirable behavior, possibly overestimating of attitude scores. Yet, in a previous study by Barkoukis, Lazuras and Tsorbatzoudis (3), effect sizes of social desirable behavior were actually rather small. Because coaches were not observed while filling in the questionnaires, they possibly looked up some answers with respect to doping knowledge. This could have impacted outcomes but on the other hand might also have led to a knowledge generation of the coaches, still mirroring their actual knowledge. Last, findings with respect to the missing associations with respect to norms and attitudes should be treated with caution since the Cronbachs-α value of the attitude scale was quite low. Yet, consulting current literature on this issue shows, that on the one hand attitudes are operationalized very heterogeneously in various studies and on the other hand its association with actual behavior can be questioned.

In conclusion, Western-Austrian coaches and sport trainers have a positive anti-doping attitude and a good level of actual knowledge even though perceived knowledge lags behind. Secondary training and continued learning seems crucial for coaches to increase perceived knowledge since only those who perceive to be competent will actively address the topic and appear more trustworthy, thereby helping athletes develop and modify their own set of values. Especially in view of the changes made to the WADC, taking the support personnel increasingly into responsibility on the one hand and the proven fact that class room settings seem to be appropriate to convey information to athletes (being students at the same time) on the other hand call for proper education of both groups – coaches and sport teachers. A sound perceived knowledge can increase the chance of proactively addressing the issue during both, training and class room sessions. Findings of this study should encourage sport clubs- and federations, as well as sport pedagogic training authorities to include educative material about anti-doping within their curriculum and support the inclusion of coaches and sport teachers.

Acknowledgements

The authors would like to thank the Austrian Federal Ministry of Sport and Defense, the Government of Tyrol (Division of Sport), as well as the NADA Austria for their financial support.

REFERENCES

1. **Auersperger I, Topic MD, Maver P, Pusnik VK, Osredkar J, Lainscak M.** Doping awareness, views, and experience: a comparison between general practitioners and pharmacists. Wien Klin Wochenschr. 2012;124:32-38. doi:10.1007/s00508-011-0077-x
2. **Backhouse S, McKenna J.** Reviewing Coaches' Knowledge, Attitudes and Beliefs Regarding Doping in Sport. Int J Sports Sci Coaching. 2012;7:167-175. doi:10.1260/1747-9541.7.1.167
3. **Barkoukis V, Lazuras L, Tsorbatzoudis H.** Beliefs about the causes of success in sports and susceptibility for doping use in adolescent athletes. J Sports Sci. 2013. Epub ahead of print.
4. **Barkoukis V, Lazuras L, Tsorbatzoudis H, Rodafinos A.** Motivational and social cognitive predictors of doping intentions in elite sports: An integrated approach. Scand J Med Sci Sports. 2013;23:330-340.
5. **Blank C, Leichtfried V, Schaiter R, Furhapter C, Muller D, Schobersberger W.** Doping in sports: Knowledge and attitudes among parents of Austrian junior athletes. Scand J Med Sci Sports. 2013. Epub ahead of print.
6. **Bloodworth AJ, Petroczi A, Bailey R, Pearce G, McNamee MJ.** Doping and supplementation: the attitudes of talented young athletes. Scand J Med Sci Sports. 2012;22:293-301. doi:10.1111/j.1600-0838.2010.01239.x
7. **Bortz J, Döhring N.** Forschungsmethoden und Evaluation. 4 ed. Springer Medizin Verlag, Heidelberg, 2006
8. **Dodge A, Robertson B.** Justifications for Unethical Behavior in Sport: The Role of the Coach. Canadian Journal for Women in Coaching. 2004;4:1-17.
9. **Donovan RJ, Egger G, Kapernick V, Mendoza J.** A conceptual framework for achieving performance enhancing drug compliance in sport. Sports Med. 2002;32:269-284. doi:10.2165/00007256-200232040-00005
10. **Fung L, Yuang Y.** Performance Enhancement Drugs: Knowledge, Attitude and Intended Behavior Among Community Coaches in Hong Kong. The Sport Journal 9 (2006)
11. **Furhapter C, Blank C, Leichtfried V, Mair-Raggautz M, Muller D, Schobersberger W.** Evaluation of West-Austrian junior athletes' knowledge regarding doping in sports. Wien Klin Wochenschr. 2013;125:41-49. doi:10.1007/s00508-012-0318-7
12. **Goldberg L, MacKinnon DP, Elliot D, Moe E, Clarke GN, Cheong JW.** The Adolescent Training and Learning to Avoid Steroid Program - Preventing Drug Use and Promoting Health Behaviors. Arch Pediatr Adolesc Med. 2000;154:332-338. doi:10.1001/archpedi.154.4.332
13. **Gucciardi DF, Jalleh G, Donovan RJ.** Does social desirability influence the relationship between doping attitudes and doping susceptibility in athletes? Psychol Sport Exerc. 2010;11:479-486. doi:10.1016/j.psychsport.2010.06.002
14. **Gucciardi DF, Jalleh G, Donovan RJ.** An examination of the Sport Drug Control Model with elite Australian athletes. J Sci Med Sport. 2011;14:469-476. doi:10.1016/j.jsams.2011.03.009
15. **Kindlundh AMS, Isacson DGL, Berglund L, Nyberg F.** Factors associated with adolescent use of doping agents: anabolic- androgenic steroids. Addiction. 1999;94:543-553. doi:10.1046/j.1360-0443.1999.9445439.x
16. **Laure P, Lecerf T, Friser A, Binsinger C.** Drugs, Recreational Drug Use and Attitudes Towards Doping of High School Athletes. Int J Sports Med. 2004;25:133-138. doi:10.1055/s-2004-819946
17. **Laure P, Thouvenin F, Lecerf T.** Attitudes of coaches towards doping. J Sports Med Phys Fitness. 2001;41:132-136.
18. **Mazanov J, Backhouse S, Connor J, Hemphill D, Quirk F.** Athlete support personnel and anti-doping: Knowledge, attitudes, and ethical stance. Scand J Med Sci Sports. 2013. Epub ahead of print. doi:10.1111/sms.12084
19. **Mazanov J, Huybers T, Connor J.** Qualitative evidence of a primary intervention point for elite athlete doping. J Sci Med Sport. 2010;14:106-110. doi:10.1016/j.jsams.2010.06.003
20. **Peters C, Schulz T, Oberhoffer R, Michna H.** Doping und Dopingprävention: Kenntnisse, Einstellungen und Erwartungen von Athleten und Trainern. Dtsch Z Sportmed. 2009;60:73-78.
21. **Petroczi A.** Attitudes and doping: a structural equation analysis of the relationship between athletes' attitudes, sport orientation and doping behaviour. Subst Abuse Treat Prev Policy. 2007;2:34. doi:10.1186/1747-597X-2-34
22. **Rimal RN.** Closing the Knowledge-Behavior Gap in Health Promotion: The Mediating Role of Self-Efficacy. Health Commun. 2000;12:219-237. doi:10.1207/S15327027HC1203_01
23. **Sas-Nowosielski K, Swiatkowska L.** Goal orientations and attitudes toward doping. Int J Sports Med. 2008;29:607-612. doi:10.1055/s-2007-965817
24. **Wanjek B, Rosendahl J, Strauss B, Gabriel HH.** Doping, drugs and drug abuse among adolescents in the State of Thuringia (Germany): prevalence, knowledge and attitudes. Int J Sports Med. 2007;28:346-353. doi:10.1055/s-2006-924353
25. **World-Anti-Doping-Agency.** World Anti-Doping Code, Montreal, 2009

Korrespondenzadresse
Cornelia Blank
Institute for Sports Medicine
Alpine Medicine & Health Tourism
UMIT
Eduard-Wallnöfer-Zentrum 1
6060 Hall in Tirol
Austria
E-Mail: cornelia.blank@umit.at