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Players' and Coaches' Attitudes and Knowledge of Prohibited Doping Substances

POZNAVANJE I STAV SPORTISTA I TRENERA O ZABRANJENIM DOPING SUPSTANCIJAMA

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Summary
Introduction. Doping is an illicit use of illegal substances or substances that the body normally contains, in order to stimulate the competitive ability of athletes, which is in collision with sports ethics as well as the physical and mental integrity of athletes. In 2006, the World Anti-Doping Agency made a list of illicit substances and prohibited their use in different sports. The aim of this research was to evaluate athletes' and coaches' knowledge and attitudes about the use of doping substances. Material and Methods. This prospective study included 199 subjects, 164 (82.4%) athletes and 35 (17.6%) coaches. The group of athletes included 88 females and 114 males, with an average age of 24.1 ± 6.4 years, being engaged in sports 9.1±4.7 years on average. The athletes were engaged in the following sports: volleyball, basketball, handball, athletics, wrestling, soccer, and swimming. The coach group included 20 males and 15 females, with an average age of 31.8 ± 8.1 years with a coaching experience of 9.3 ± 3.1 years. Results. The differences in the average scores between athletes and coaches were statistically significant (p = 0.001; p < 0.05), in favor of coaches. The average scores between male and female athletes, and between individual and team coaches showed no significant differences (p = 0.267; p = 0.349; p > 0.05). Conclusion. The knowledge on prohibited doping substances was significantly higher in coaches than in athletes, while differences related to gender and collective or individual sports were not found. Key words: Health Knowledge, Attitudes, Practice; Doping in Sports; Athletes; Mentors; Dietary Supplements; Substance Abuse Detection; Surveys and Questionnaires

Sažetak
Uvod. Doping predstavlja konzumiranje stranih supstancija ili supstancija koje organizam normalno sadrži, s ciljem da se na veštački način stimuliraju takmičarske sposobnosti sportista, što je u suprotnosti sa sportskom etikom i fizičkim i mentalnim integritetom sportista. Svetska anti doping agencija je 2006. godine napravila listu nedozvoljenih supstancija i zabranila njihovu primenu u različitim sportovima. Cilj ovog rada bio je da se utvrdi nivo znanja i stavovi sportista i trenera o zloupotrebi zabranjenih i doping supstancija. Materijal i metode. Prospektivnom studijom preseka obuhvaćeno je 164 sportista i 35 trenera, od kojih je bilo 84 (42,2%) osobe ženskog i 115 (57,8%) muškog pola, prosečne starosti 24,01 ± 6,429 godina. U studiju su bili uključeni sportisti koji su se bavili najmanje pet sati nedeljno i kondicioni treneri koji imaju bar 1 godinu radnog iskustva sa sportskim grupama. Rezultati. Razlike u prosečnim vrednostima skora dobijenog iz Upitnika između aktivnih sportista i trenera bila je statistički značajna u korist trenera (p = 0,001; p < 0,05). Prosečne vrednosti skora dobijenog iz Upitnika se nisu značajno razlikovale niti u odnosu na pol ispitanika, niti na individualni, ili tamski sport (p = 0,267; p = 0,349; p > 0,05). Zaključak. Stepni informisanost i poznavanje zabranjenih doping supstancija značajno je izraženiji kod trenera u odnosu na sportiste, dok razlika u nivou znanja o doping supstancijama nije bila značajna u odnosu na pol ispitanika i individualni, odnosno tamski sport kojim se bave.

Ključne reči: znanje o zdravlju, stavovi, praksa; doping u sportskim disciplinama; treneri; mentori; suplementi; otkrivanje zloupotrebe supstancija; istraživanja i upitnici

Introduction
Winning is imperative in modern sports for all the participants, because nowadays sports is a lucrative job. It was not always like this and honor, prestige and personal achievements were the paramount goals. We witness that every point on the scoreboard is bringing the athlete and his team closer both to the victory and financial benefits [1]. Many experts from different fields are involved in creating a winning strategy, successful athletes and coaches, physiotherapists, nutritionists, psychologists [2–4]. While trying to achieve the maximum and win the game, some of them forget about the fair play and sports code and reach out for solutions to gain edge over the other competitors, forgetting that chemical substances and procedures could put their health at risk and even threaten their lives [5, 6]. The use of performance enhancing substances is not newly discovered and it is well known throughout the history [7]. Five thousand years ago, in ancient China ephedra was used as a stimulant, as well as dried figs, certain types of mushrooms, and strychnine in...
ancient Greece [8–10]. The World Anti-Doping Agency (WADA) defined doping as use of illegal substances (which could be normally found in the body) and methods in order to improve sports performance and they made a list of banned substances in sports [11–13]. Prevention programs are introduced in the sport clubs as efficient tool in motivating athletes to behave according to the rules to preserve their health [14].

In order to develop efficient prevention programs, we need to investigate the level of awareness and attitudes of athletes and their coaches of doping. There were many projects and massive funding to support global and national anti-doping programs, but there is still lack of valid data from the final users [15].

The authors of this article recognized the importance of education of the athletes and others directly involved in competitive sports concerning doping and potential negative impacts on their health.

Literature data provide information about daily use of dietary supplements without previous consultations with the sport nutrition experts from the field and without adequate understanding the pros and cons for the athlete [16, 17]. In his paper, Dascombe reported that among the athletes who took some supplements, most did not even know the active ingredient, the potential side effects, or the way the supplements contributed to their level of fitness. In this group, only 52.4% knew the recommended daily dose, and only 57% wanted to learn more about the supplement [18]. Education of athletes on doping is important and it could easily be done by their coaches and other sports professionals on daily basis [19, 20].

High moral and ethical standards among the athletes should be taught by their coaches, but it has to be supported by knowledge and we wanted to investigate the level of knowledge and attitudes of athletes and their coaches about doping.

**Material and Methods**

This prospective study included 199 subjects, 164 (82.4%) athletes and 35 (17.6%) coaches. The group of athletes included 88 females and 114 males, with an average age of 24.1 ± 6.4 years, being engaged in sports 9.1±4.7 years on average. The athletes were engaged in the following sports: volleyball, basketball, handball, athletics, wrestling, soccer, and swimming. The coach group included 20 males and 15 females, with an average age of 31.8 ± 8.1 years with a coaching experience of 9.3 ± 3.1 years.

All subjects filled in an anonymous questionnaire of 25 questions referring to knowledge about banned substances in sports, supplements and their attitudes to doping in sports in general. The questionnaire on doping was obligatory for every athlete involved in competition and is available on the official web site of Antidoping Agency of the Republic of Serbia (http://www.adas.org.rs/en/tue/tue-obrazac/) (Questionnaire). Data gathered in this research were computed by IBM Statistical package for social sciences (SPSS) 20.0 software using descriptive statistics (mean value, standard deviation, minimum, and maximum), student t-test and χ² test. Statistical significance was set at p < 0.05.

This research was conducted according to standards of Ethical Committee of the Faculty of Medicine in Novi Sad and all participants were introduced with the aims of the study and gave their written consent for participation.

**Results**

Our study included 67 (33.7%) volleyball players, 32 (16.1%) basketball players and track and field athletes, 19 (9.5%) handball players, 11 soccer players (5.5%), 3 (1.5%) wrestlers, 2 (1%) judokas, 2 swimmers and biathlon runners (0.5%) and 1 water polo, boxer, triathlon runner, karate player, rower, hockey player and

**questionnaire**

**UPITNIK**

| General Data/Opšti podaci |
|--------------------------|
| Gender: M F             |
| Pol Ž                     |
| Date of birth/Datum rođenja: |
| Sport/Sport:             |
| Weekly training hours: (any kind of organized and planned workout): |
| Broj sati treninga nedeljno (bilo koji vid organizovane fizičke aktivnosti) |
| Years of training/coaching |
| Koliko dugo se bavite sportom/trenerškim poslom: |

| Are you aware of the list of banned substances? | Yes No Not sure |
| Da li znate spisak zabranjenih supstancija i lekova? | Da Ne Nisam siguran |

| Have you ever taken a prohibited substance? | Yes No Not sure |
| Da li ste i kada uzeli zabranjenu supstanciju? | Da Ne Nisam siguran |

| Would you ever take a prohibited substance to achieve a sports result? | Yes No Not sure |
| Da li biste i kada uzeli doping za ostvarenje ličnih rezultata? | Da Ne Nisam siguran |
If the dietary supplement is sold at pharmacy, is it safe to use?  

Do you think that product declaration of dietary supplements must match the content in the package?  

A dancer. Average competitive participation was 10.7 ± 1.1 years with 15.7 ± 8.9 hours of training weekly. Out of 199 participants in the study, 140 (70%) stated that they were familiar with the content of the list of banned substances, while 59 (30%) gave negative or indifferent replies to the question.  

**Graph 1** represents the answers to the question: “Is it possible to test positive on doping test only by using

| Question                                                                 | Yes | No  | Not sure |
|------------------------------------------------------------------------|-----|-----|----------|
| Do you think it is possible to cheat a doping test and not get caught?  | Da  | Ne  | Nisam siguran |
| The athletes can be tested only during a competition?                  | Da  | Ne  | Nisam siguran |
| Therapeutic use exemption (TUE) form is submitted during the competition? | Da  | Ne  | Nisam siguran |
| Can an athlete test positive only for using a dietetic supplement?     | Da  | Ne  | Nisam siguran |
| Do you think that product declaration of dietary supplements must match the content in the package? | Da  | Ne  | Nisam siguran |
| If the dietary supplement is sold at pharmacy, is it safe to use?      | Da  | Ne  | Nisam siguran |
| Positive doping tests result is the only reason for an athlete to be sanctioned? | Da  | Ne  | Nisam siguran |
| If the athlete takes marihuana 2 - 3 days prior to competition, is he/she going to test positive? | Da  | Ne  | Nisam siguran |
| Growth hormones are allowed to use out of the competition?             | Da  | Ne  | Nisam siguran |
| If the athlete has asthma and uses Ventolin, which contains active substance beta2agonist-salbutamol, does he/she need TUE? | Da  | Ne  | Nisam siguran |
| Athlete with cold uses ASPIRIN COMPLEX, DEFRINOL and CAFFETIN COLD.    | Da  | Ne  | Nisam siguran |
| Are intravenous infusions or injections containing more than 50 ml over a period of 6 hours allowed? | Da  | Ne  | Nisam siguran |
| Is Ethanol a banned substance in all sports?                           | Da  | Ne  | Nisam siguran |
| Is Propranolol a banned substance in archery, shooting, motor racing and snooker? | Da  | Ne  | Nisam siguran |
| Is local application of adrenaline (nasal) banned?                     | Da  | Ne  | Nisam siguran |
| Are narcotics (such as morphine, heroin) banned during competition?    | Da  | Ne  | Nisam siguran |
| Is testosterone always banned (both during competition and preparation)? | Da  | Ne  | Nisam siguran |
| Is insulin in the group of substances banned during competition?        | Da  | Ne  | Nisam siguran |
| Is caffeine banned in all sports?                                      | Da  | Ne  | Nisam siguran |
| Can an athlete test positive due to use of nasal drops?                | Da  | Ne  | Nisam siguran |
| Is autotransfusion considered doping?                                  | Da  | Ne  | Nisam siguran |
nasal drops (117 correct answers), aspirin or defrinol (81 correct answer), marihuana 2 - 3 days prior the competition (118 correct answers) and dietetic supplements (79 correct answers)".

Therapeutic Use Exemption (TUE) and knowledge on the topic is presented in Graph 2. Low level of correct answers concerning this topic indicates low level of information.

Graph 3 presents the overall knowledge amongst coaches and athletes about doping tests and sanctions for those with positive test results for using prohibited substances. To the question: "Can the athlete be tested only during competition?" 139 participants answered correctly, while to the question: "Is the positive test the only way for sanctions against the athlete?" only 90 gave correct answers. To the question about blood doping and autotransfusion, there were only 60 correct answers. To the question about the use of testosterone and growth hormone during competition and during preparations, 103 and 90 out of 199 gave correct answers, respectively.

Graph 4 presents knowledge about prohibited substances during competition where it is clear that usage of caffeine, morphine and heroin is prohibited, while the athletes and coaches know little about propranolol (in

Table 1. Differences between average questionnaire scores between coaches and athletes

| No./Br.          | Average questionnaire scores ($\bar{x}$ ± SD) | Prosečni rezultati upitnika ($\bar{x}$ ± SD) |
|------------------|---------------------------------------------|---------------------------------------------|
| Athletes/Sportisti | 164                                         | 23.65 ± 4.317                                |
| Coaches/Treneri   | 35                                          | 26.40 ± 4.754                                |
| Total/Ukupno      | 199                                         | 24.13 ± 4.508                                |

Graph 2. Knowledge about Therapeutic Use Exemption and supplements

Graph 3. Knowledge about doping tests, sanctions and banned substances

Graph 4. Knowledge about using banned substances during competition
archery, shooting and motor races) and infusions as prohibited.

The Table 1 presents the average questionnaire scores among active athletes and their coaches with a statistically significant difference between the groups (p < 0.05).

Discussion

One of the priorities of WADA is improvement of knowledge about risk factors and better understanding the side effects of doping in sports [1]. Erdman et al. included 582 athletes in their investigation and found that 76.7% (446) of subjects claim to understand anti-doping rules, 89.5% (521) truly believe in those rules, and only 63.2% (368) knows where to find valid information on the topic [21]. In the study which investigated only professional football players, 68% (460) knew about the use of prohibited substances in sports, while 32% (226) did not confirm that they had proper information about anti-doping [16]. Similar studies reported the same results which point out the fact that athletes need to be better informed about doping in sports [1]. In our study, one of the main findings is that the coaches have better knowledge about doping in sports compared to their athletes and the difference is statistically significant (p < 0.05). The good side of such results is a possible transfer of knowledge from coaches to their athletes as they are in contact with the athletes on daily basis which could be beneficial in anti-doping efforts. Nevertheless, it is up to the athlete to be diligent about anti-doping, and it is his/her obligation to clearly understand the consequences of malpractice and their professional carriers.

In our paper, we tried to answer the question if there were differences in knowledge about doping between the athletes of different gender. Molobe et al. concluded in their study that knowledge, attitude and practice concerning doping and use of prohibited substances are not good enough, whether we talk about male or female athletes, since the majority of athletes in their study (56%) thought that winning is closely related to use of prohibited substances. This study points out that use of prohibited substances is probably one of the main reasons for doping in sports in both male and female athletes [22]. The results of our investigation show that there is no difference in knowledge of male and female participants.

There were several kinds of sports included in our study and we tried to find out if the attitudes and awareness levels differed between athletes practicing individual sports compared to those in team sports. Dimeo et al. investigated the differences in attitudes towards doping in athletes in team and individual sports. Their findings suggested that in team sports there was a beneficial psychosocial factor between the athletes, since they “rely” on each other and jeopardizing the whole team is a crucial “reject” factor for using prohibited substances [23]. Our results suggest that there is no statistically significant difference in knowledge between the athletes practicing individual compared to team sports.

Conclusion

According to the gathered results, we can conclude as follows: knowledge about banned substances and doping is significantly higher in coaches than in athletes (p < 0.05) while there are no gender differences. There is no statistically significant difference in awareness level about banned substances and doping between participants involved in individual and team sports.

There is a necessity to create a continuous learning environment about banned substances and doping for all participants in sports relying on novel scientific data released by the leading authorities like the World Anti-Doping Agency. Future research should consider updating the questionnaire, in order to provide a valid tool for evaluating the efficacy of education in wider sporting community.

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