

## **KNOWLEDGE AND ATTITUDES OF ELITE EUROPEAN BASKETBALL PLAYERS**

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**Abstract:** According to International Olympic Committee's recommendations from the last XIII Olympic congress regarding organization of educational programmes for athletes, we conducted surveillance about knowledge and attitudes of the basketball players in 3 important topics: doping, nutrition and injuries. Since 2003 there is almost tripled number of doping controls in basketball and decreased number of doping positive cases, but basketball players are still in the group of risky sports. The aim of the surveillance was 1) to assess knowledge and attitudes about doping, nutrition and injuries 2) to establish whether there was an interest in educational programme 3) and if so, which areas should be addressed the first and what educational method is the most appropriate.

**Methods:** Randomly chosen players from every team participating in qualifying round at EuroLeague Women and EuroChallenge Man in the season 2010 were included in the surveillance. The information were provided by players (male=63, female=20, age 25.7±4.2) through questionnaire. Standard descriptive statistics (mean value, frequency distribution) were used to describe knowledge and attitudes and Chi-square test and ANOVA were used to compare targeted groups. All statistical calculations were performed using SPSS with a significance level of 0.05.

**Results:** Players showed the highest correct answers in doping (50.0%), less in nutrition (37.3%) and the worst knowledge in sports injuries (26.8%). They expressed significant differences in knowledge about changes of the List of prohibited substances and knowledge about substances for recover energy muscles ( $p=0.013$ ). Generally the athletes are the most interested in education about nutrition with mean value 3.30 (min.1, max.4) and the least interested in anti-doping rules and doping control procedure with mean value 2.87 (min.1, max.4). Education of athletes is reported as the best way of fight against doping. The significant differences exist between young and top career athletes within their concern about medicaments. Before consumption the drug middle aged players more frequently look for medical advice ( $p=0.011$ ) and they believe that is more important to be informed about it ( $p=0.043$ ).

**Conclusion:** Knowledge about doping, nutrition and injuries of European basketball players is not on proper level. They showed clear interest for educational programmes. The first efforts should be concentrated on nutrition. They found Internet as the best platform for providing additional knowledge. From another side we have found that the educational work addressed to young athletes should be more focused on anti-doping issues because of existing slight indifference for this topic and since the education of athletes is reported as the best way of fight against doping.

**Key words:** doping, nutrition, injury, knowledge, basketball

## **Introduction**

The XIII Olympic Congress, held in Copenhagen, October 2009, emphasized importance of a role model of athletes in all society. The fight against doping (with zero tolerance) and protection the physical and psychological health of all athletes were recognized as absolute priorities by entire Olympic Movement. The recommendations underline the necessity of educational programmes providing information on doping, health protection and injury prevention. Proactive information programmes should be organized through the national and international sport bodies. [1]

Although some may perceive doping in sport and sport related injuries to be unavoidable part of the game, these occur in predictable patterns and many are preventable through the implementation of targeted interventions.

According to WADA (World Anti-Doping Agency) annual statistical report of Adverse Analytical Findings in basketball since 2003 there is almost tripled number of doping controls and there is decreasing in percentage of doping positive cases in 2008 (1.56%) contrary to previous years (e.g. 1,94% doping positive findings in 2003). Despite that fact in 2008 basketball players are still in the group of Olympic sports with high percentage of doping positive findings, just behind athletes from cycling (1.89%), weightlifting (2.05%) and boxing (2.21%).

In spite recommendations of American Dietetic Association from 2000 that balanced diet with adequate calories can potentially provide the necessary nutrients and that nutritional supplement should be used only if it is deemed by nutritional expert, supplement use is widely accepted in the sporting community. [2,3] The elite national athletes reported more frequent use and larger number of supplements in comparison to university athletes. [4] In First Spanish Basketball League, 58% of basketball players use dietary supplements, and 81% use it on daily basis.[5] Across the literature, numerous motives for supplement use are represented: inadequate diet, performance enhancing effect, prevention of illness, overcoming injury, increasing energy, consumption by every top athlete, doctor's advice, coach's advice... [2, 3, 6]

The basketball is one of the most popular sports in the world, with rising number of young participants, as well as basketball injuries which are inevitable negative side effect of sports participation. [7, 8] In the last three decades much retrospective and prospective surveillance were conducted about incidence, risk factors and prevention programmes of basketball injuries. The evidence based data should be implemented for education of athletes, coaches, medical professionals in purpose to provide safer environment for basketball players.

## **Objectives**

The aim of this study was to assess knowledge and attitudes about three very important topics doping, nutrition and injuries among elite basketball players.

The main purpose with the project was to gain a better insight into athletes' interest for education concerning specific sport related theme. And if the interest is recognized, to establish which areas should be addressed the first and what educational method is the most appropriate. Based on this data it would be possible to initiate purposeful educational programme build up on athletes' affinity to topics and estimation of their knowledge.

## **Methods**

During qualifying round at EuroLeague Women and EuroChallenge Men in season 2010, we investigated players from 28 teams. The teams came from 28 European cities (Samara, Krasnodar, Krasnoyarsk, Ekaterinburg (RUS), Strasbourg, Roanne, Chalon sur Soane, Villeneuve (FRA), Liege, Mons, Aalst, Antwerpen (BEL), Donetsk, Kyiv, Yuzhny (UKR), Pesaro, Schio, Taranto (ITA), Szeged, Pecs, Sopron (HUN), Amsterdam, s'Hertogenbosch (NED), Prague, Brno (CZE), Madrid, Valencia (ESP), Göttingen, Quankerbuck (GER), Nicosia, Limassol (CYP), Zagreb, Gospic (CRO), Wels (AUT), Podgorica (MNE), Ploiesti (ROM), Belgrade (SRB), Istanbul (TUR), Vilnius (LTU), Riga (LAT), Minsk (BLR), Gdynia (POL), Kosice (SVK)).

At the end of the game athletes who were randomly chosen for doping control were asked to fulfill the questionnaire. The privacy of participants was guaranteed. The limited number of 19 questions was included considering teams' tight travel itinerary often coupled with the late finishing times, tiredness of athletes and fact that their consent to the survey is voluntary. The questionnaire is consisted of general information (age, sex, playing position...) and part which estimate knowledge and attitudes regarding three areas doping, injuries and nutrition.

Attitude statements considering importance of education were measured on Likert-type scale ranging from not important (1), followed by not very important (2) and important (3), to very important (4). No neutral middle point was offered in purpose to avoid undefined athlete's attitude. A high score on this scale denotes positive or permissive attitudes to education. In order to investigate preferable doping diminution method, educational method and information on FIBA (Fédération Internationale de Basketball) web presentation, answers were related to range from 1 (the least preferable) to 5 (the most preferable).

Standard descriptive statistics (mean value, frequency distribution) were used to describe knowledge and attitudes and Chi-square test and ANOVA were used to compare targeted groups. All statistical calculations were performed using SPSS (version 12.0) with a significance level of 0.05.

## **Results**

Of the 88 distributed questionnaires five were excluded because of missing answers, resulting in 83 being available for statistical analyses.

The majority of examinees were male (n=63, 75.9%), mean age (25.7±4.2). Gender and age distribution of players are presented in Table 1.

Table 1. Players characteristics

	gender		Total
	male	female	
Young players (16-22 years)	12	6	18
Top career players (23-28 years)	35	9	44
Experienced players (29-37 years)	16	5	21
Total	63	20	83

### *Knowledge of athletes*

The basketball players demonstrated limited knowledge and understanding of topics related to health, providing the highest correct answers in doping (50.0%), less in nutrition (37.3%) and the worst knowledge in sports injuries (26.8%).

The athletes under 22 years have shown the least knowledge regarding changes of the Prohibited List. They provided 44.4% of correct answers in comparison to top career players 63.6%. The male athletes versus female athletes have shown better knowledge on Prohibited List (60.3% vs. 45.0%, p=0.228).

Although 56.6% of athletes were aware that there are regular changes on the List every year, they did not have habit to check the list of prohibited substances and methods, only 10.8% consulted this document more than once during the 2009. In the same period 54.2% did not check list at all.

Knowledge about sanction for anti-doping violation was poor with only 43.4 percent of athletes answering correctly. Both genders, regardless age were equally unfamiliar with anti-doping regulations.

The basketball players are significantly more informed about changes on the List of prohibited substances than about necessary substances for energy recover in muscles (p=0.013). The answers on three the most intriguing queries from questioner are shown in Table 2.

Table 2. The most intriguing answers of basketball players

		gender				age					
		male		female		athlete 16-22 years		athlete 23-28years		athlete 29-37 years	
		Count	%	Count	%	Count	%	Count	%	Count	%
List of prohibited substances is changing every two years	true	38	60.3	9	45.0	8	44.4	28	63.6	11	52.4
	false	25	39.7	11	55.0	10	55.6	16	36.4	10	47.6
For presence of any prohibited substances from the list in athlete's sample during competition, athlete will be sanctioned up to two years	true	27	42.9	9	45.0	8	44.4	19	43.2	9	42.9
	false	36	57.1	11	55.0	10	55.6	25	56.8	12	57.1
Athlete should take in the biggest amount carbohydrates during training days to recover the energy in muscles	true	24	38.1	7	35.0	6	33.3	21	47.7	4	19.0
	false	39	61.9	13	65.0	12	66.7	23	52.3	17	81.0

		gender				age					
		male		female		athlete 16-22 years		athlete 23-28years		athlete 29-37 years	
		Count	%	Count	%	Count	%	Count	%	Count	%
List of prohibited substances is changing every two years	true	38	60.3	9	45.0	8	44.4	28	63.6	11	52.4
	false	25	39.7	11	55.0	10	55.6	16	36.4	10	47.6
For presence of any prohibited substances from the list in athlete's sample during competition, athlete will be sanctioned up to two years	true	27	42.9	9	45.0	8	44.4	19	43.2	9	42.9
	false	36	57.1	11	55.0	10	55.6	25	56.8	12	57.1
What kind of food should athlete take in the biggest	true	24	38.1	7	35.0	6	33.3	21	47.7	4	19.0

amount during training days to recover the energy muscles?											
<input type="checkbox"/> Amino acids											
<input type="checkbox"/> Carbohydrates											
<input type="checkbox"/> Fatty food											
<input type="checkbox"/> Red meat											
<input type="checkbox"/> Fruits											
	false	39	61.9	13	65.0	12	66.7	23	52.3	17	81.0

Our study has shown that 72.3% of basketball players were personally responsible for their dietary regime; only 2.4% of players at the same time were supervised by medical doctor. The doctors regularly take care about nutrition of elite athletes in 16.9%, followed by nutritionist (4.8%) and physiotherapist (6.0%). It seemed that coach (1.2%) almost was not involved in consideration about food intake. Majority of top career players (79.5%) arranged meals by themselves. Few of elite European players were aware what kind of food is the most important for energy recover of muscles. Regarding this question there was no difference between male (38.1%) and female (35.0%) athletes in correct answer and contrary to expectation, significant less knowledge was shown by experienced than top career players (p=0.026).

Answers on question regarding ankle injury in basketball, revealed that players are not sufficiently informed about injury risk. Eight of the 83 athletes (9.6%) did not provide any answer and 23 (27.7%) gave partial answers. Of the athletes who gave all answers (n=52) only 27 (51.2%) were correctly assure that playing position do not have impact on ankle injury rate. Considering impact of other factors (landing, no warm up, fatigue, previous injury) on ankle injury correct responses were reported from 13.5% to 27.4%. Few basketball players (13.5%) knew that previous ankle injury is the most important risk factor for re-injury.

Nearly all participants (96.4%) considered important or very important to check the medicine before consumption in the case of illness or injury. Top carrier players in comparison to young players significantly better realized that for athlete is important to be informed about medicaments (p=0.043).

Of all athletes 74.7 % reported use of NSAID. Consumption among experienced athletes (81.0%) was higher than in the group of young athletes (61.1%). For taking medicaments the basketball players were most frequently advised by team physician (38.7%), followed by physiotherapist (33.9%) and family doctor (11.3%). None of them consulted friend or coach. The data are presented in Table 3. The female athletes significantly less asked advice from team physician than male athletes (6.25% vs. 50.5%, p=0.002), and accordingly the female athletes slightly more believed to team therapist (50.0% vs. 28.3%). The young and top carrier players showed significant differences within their concern about medicaments. Before consumption the drug top carrier players were more prone to look for medical advice from team physician (p=0.011) comparing to the young athletes who preferable took advise from physiotherapist (p=0.007).

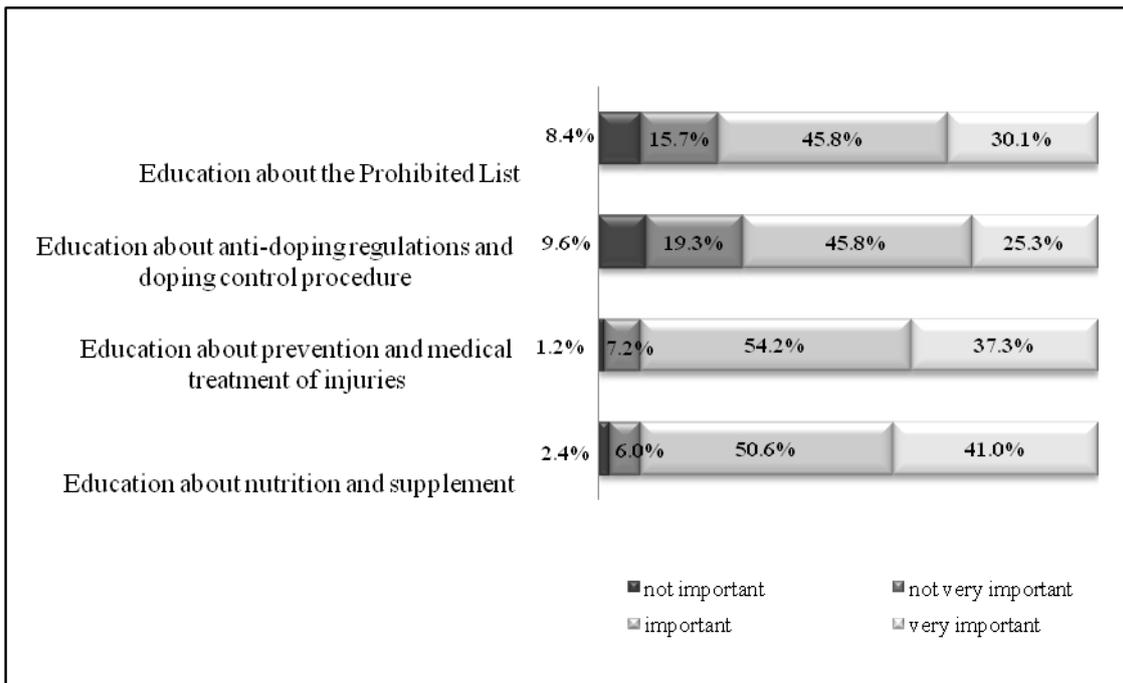
Table 3. Who did advise athletes before taking NSAID in the last six months?

	age						gender	
	athlete 16-22 years		athlete 23-28years		athlete 29-37 years		male	female
	Count	%	Count	%	Count	%	Count %	Count %
PHYSIOTHERAPIST	7	38.9	7	15.9	7	33.3	13 20.6	8 40.0
TEAM PHYSICIAN	1	5.5	17	38.6	6	28.6	23 36.5	1 5.0
DOCTOR	2	11.0	3	6.8	2	9.5	4 6.3	3 15.0
COACH	0	0	0	0	0	0	0 0	0 0
FRIEND	0	0	0	0	0	0	0 0	0 0
MYSELF	1	5.5	7	15.9	2	9.5	6 9.5	4 20.0
DID NOT TAKE	7	38.9	10	22.7	4	19.0	17 27.0	4 20.0
TOTAL	18	100.0	44	100.0	21	100.0	63 100.0	20 100.0

#### *Attitude of the athletes*

A high proportion of athletes (71.1% - 85.9%) in the overall sample stated that additional education is important or very important, regarding all three fields: nutrition, injuries and doping (Figure 1.). Using Likert-type scale we showed that athletes were the most interested in education about nutrition with mean value 3.30 ( $\pm 0.69$ ), followed by education about medical treatment of injuries 3.28 ( $\pm 0.65$ ). Generally, athletes showed less interest in education about Prohibited List (2.96 $\pm 0.90$ ) and anti-doping regulation with doping control procedure (2.87 $\pm 0.91$ ). Nevertheless, among proposed suggestions athletes chose as preferable doping prevention method their education with mean value 2.54, followed by education of coaches/doctors/physiotherapist (2.49), more frequent doping controls (2.05), more anti-doping campaigns (1.77) and the least preferable method was more involvement of police/authorities (1.26). There was no any different between genders, playing position or age group.

Figure 1. Frequency distribution for attitude toward education



Elite basketball players as the most preferable method of education would use Internet (value 4.02-4.25), and as least preferable method books (value 2.45-2.49). They would rather choose seminar - more lectures during one day (value 2.63-3.07) than course - more lectures in few days (value 2.52-2.63).

In practice most of players visited FIBA internet addresses (83.1%). Predominantly, 55% of them used FIBA site at least once per week. Examinees showed the highest interest in schedule of competition, standings and results (value 4.11) and very low level of interests to basketball history, rules and regulations (value 1.74) and medical information (value 1.85).

## Discussion

The elite European basketball players demonstrated limited knowledge and understanding of topics related to health, providing the highest correct answers in doping (50.0%), less in nutrition (37.3%) and the worst knowledge in sports injuries (26.8%). Up to our data there is no surveillance which considers knowledge of these three topics at the same time.

Although they have shown highest knowledge in doping field, it is far from satisfactory. The athletes provided more correct answers regarding question on List of prohibited substances (57.8%) than on sanctions for anti-doping violation (43.4%). Similar findings are observed in the group of Polish athletes (n=830) who have shown confidence in their knowledge about doping substances and methods (45.09%) and about general principles and procedure, including rule violation (41.77%). [9] To the contrary elite athletes from Australia, Canada,

UK and USA (n=557) presented more confidence in knowledge about sanction than banned substances (50.5% vs. 35.1%). [10]

Data in the literature have shown that older athletes are better informed about doping than younger one. [10, 11] Inverse finding has been reported among Polish athletes. [9] The young FIBA basketball players were less informed about update on the List of prohibited substance than their older colleagues. Svedsater et al. have found that gender has no significance on statements about doping. [11] Sas-Nowosielski reported that female athletes declare more favourable attitudes toward doping-free sport and anti-doping policy than males, even though male athletes provide higher knowledge in doping. [9] Our research did not reveal any differences on knowledge in relation to gender.

Among athletes and coaches, it was many times established misinformation about safety and effectiveness of dietary regime and supplements. [2, 4, 6, 12] Our study has revealed a poor knowledge of elite European basketball players regarding basic nutritional need for athletes' recover. The heavy training and competition schedule of elite basketball players demands fast and effective recovery. One of the primary goals of recovery is to re-fuel carbohydrate (glycogen) stores in liver and skeletal muscle. It is well known that availability of carbohydrate plays a key role during moderate and high intensity exercise and failure to achieve an adequate carbohydrate intake each day will have a negative impact on performance and increase susceptibility to illness. Maughan shows that an inadequate intake of dietary carbohydrate in the days before a match will impair running performance. [13]

Ankle injuries are the most common injuries in basketball. [14, 15, 16] In the literature, the most responsible factors for ankle injuries is the history of previous ankle injury, followed by no proper warm up and increased training load. The most common mechanism of ankle injuries is landing. [14,16, 17, 18, 19] Many authors confirm that playing position do not have any impact. [16, 17]

Although, it was no realistic to expect high level of athletes' knowledge on ankle injuries, observed result should be consider cautiously (26.8% correct answers). We presumed that athlete's knowing on the issue could be mainly based on their own or team-mates experience in injury.

In the highest percent basketball players were correctly assure that playing position do not have influence on injury rate. It is surprising how little athletes knew that previous ankle injury is the strongest predictor of ankle injuries. Injuries in young elite athletes may negatively affect their sport performance at the senior elite level. [19] Educational programme should be initiate in the early age referring the benefits of medical treatment and necessity of preventive measures on large basketball population.

One of the purposes of the study was to investigate actual practice of players and whom they believe the most, regarding usage of medicaments. Basketball players most frequently were advised by team physician, followed by physiotherapist, themselves and family doctor. From another side Australian athletes report that they have confidence in their coaches (21%) and team-mates (21%) regarding taking medicaments. [10] Unfortunately this attitude is not the

same regarding banned performance enhancing substances. According to literature it seems that athletes are getting the most of information from team-mates and less from coaches, team managers, doctors and physiotherapists. [20, 21] No doubt, positive attitude to doping is coming from coaches and managers through constant pressure for win and good results. [21]

This study helped us to reveal vulnerable group prone to use medicaments. Consumption of drug appeared to be the smallest in the group of young athletes, who preferably took advice from physiotherapist (63.6%). The female athletes showed significantly less confidence in the team doctor than male athletes and female athletes are more frequently advised by physiotherapist.

Elite European basketball players have generally positive attitude towards additional education. Attitudes of athletes were in correlation to widely recognized idea that education occupies a central role in effort to prevent undesirable events. The basketball players comprehended, as almost equally important for fight against doping, education of athletes and education of doctors, physiotherapist and coaches, giving a small advantage to own education. More doping controls, as method of secondary prevention, took third place. The least preferable method was recognized more involving the police/authorities.

In literature is proposed that attitude and doping behaviour are to change in accordance with new experience and information. [22] The best time to prevent undesirable behaviour, when athletes develop attitudes, values and beliefs toward doping is in their midteens (15-19 years) or younger (11-14 years), through organization of anti-doping programmes at schools and sport clubs. [9, 10, 23] It is also the case that juniors have less restrictive attitude to using doping as a quick way to becoming well-known top athletes and that young basketball players showed slight indifference toward doping related topics. [22]

Athletes may be lacking the information necessary to ensure safe and effective use of dietary supplements. This information is important for coaches, physicians, nutritionist and physiologists in terms of monitoring and advising athletes to maintain health and to enhance performance. [4] Education should provide safe and effective procedure of dietary supplement use and effective prevention programme to decrease injury rate.

Across the literature we find the best way of educational programme is based on booster sessions. It is unclear whether an intense programme should comprise from more sessions or more content with fewer sessions.[2] The elite basketball players would rather choose for source of knowledge Internet and leaflets than oral presentation (seminar and courses). In case of oral presentation they prefer more lectures during one day than prolonged course in few days. The books were identified as the least preferable educational method.

The study showed that at least once a month 71.1% elite European basketball players used [www.fiba.com](http://www.fiba.com) or [www.fibaeurope.com](http://www.fibaeurope.com). In accordance with these findings further strategies to improve athletes' knowledge should consider implementation of interactive educational programmes on websites. WADA and UEFA (Union of European Football Associations) already have good practice in the area of interactive anti-doping programmes. These organizations communicate and educate athletes through quiz, short videos, clear and

practical written material. Regarding these and IOCs' recommendation, FIBA Europe should apply the same approach.

## **Conclusion**

This study provided a brief screening for knowledge and attitudes of elite European basketball players and ideas for further investigation and preventive actions. It revealed players' limited knowledge about doping, nutrition and injuries highlighting clear interest for educational programmes.

Athletes' strong desire to learn more about nutrition than doping showed their will to find acceptable means of performance enhancement. Slight underestimation of anti-doping issues by young athletes indicates that future educational programme should not skip anti-doping themes.

European basketball players recognized Internet and short seminars with many lectures during one day as the most desirable educational method. Prevention programme should be organized predominantly for young athletes, preferable midteens and adolescents as in this age athletes mainly form attitudes and values.

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