THE USE OF MEDICATION AND NUTRTIONAL SUPPLEMENTS DURING FIBA EUROLEAGUE WOMEN 2009 AND EUROCHALLENGE MEN 2009

Abstract

Introduction: Amount and type of substances that basketball players use is mainly unknown. A benefit of supplementation and medication use in sport is still controversial. Although some supplements could improve athletic performance and prescribed drugs are necessary in treatment of sports injury, inappropriate and excessive use could increase number of adverse drug events and interactions.

Objectives: The aim of the study was to examine nutritional supplements (NS) and medications use by elite basketball players during FIBA Europe competitions.

Methods: We analyzed data collected from questionnaires that doctors of participated teams fulfilled after the game. Team doctors were asked to write medications and nutritional supplements that athletes took in last three days.

Results: In-group of female athletes (n=172), among reported substances (n=357), 73.9% (264) were NS and 26.1% (93) drugs. NS took 69.2 % (119) athletes (2.2 per athlete). Medications is taken by 33.7 % (58) athletes (1.6 per athlete). Only 18.6 % (32) athletes didn't take any substance. The most commonly used NS were multivitamins, sports drinks and carbohydrates. Frequently used drugs were NSAID (33.3 % of all medications). Twenty-eight of all athletes (16.3 %) took these drugs and three of them (10.7 %) took two NSAID in the same time.

In-group of male athletes (n=190), among reported substances (n=316), 72.8 % (230) were NS and 27.2 % (86) were drugs. NS took 44.7 % (85) athletes (2.7 per athlete). Medications took 28.9 % (55) athletes (1.6 % per athlete). Only 36.3 % (69) athletes didn't take any substance. The most commonly used NS were multivitamins, energy drinks and carbohydrates. Frequently used drugs also were NSAID (44.2 % of all medications). Thirty-four of all athletes (17.9 %) took these drugs and four of them (11.8 %) took two NSAID in the same time.

Conclusion: High intake of supplementation and medications in international basketball, especially non-steroidal anti-inflammatory drugs, imposes necessity of education and control the use of those drugs. In view of the potential side effects, recommendations for supplementations and medication in sport need to be developed.

Introduction

The use of nutritional supplements and medical substances is widespread in international sport[1]. Data were obtained during Olympic Games in Sydney shows increasing trend of NS and medications use among professional athletes. If we look at sports individually, probably the best insight in substances use we can find in football [2, 3]. In FIFA project during World Cups 2002 and 2006, they observed high intake of medications especially of non-steroidal anti-inflammatory drugs [4]. Amount and type of substances that basketball players use is mainly unknown.

There are no enough randomized well-designed studies that can confirm the beneficial effects of nutritional supplements on sporting performance[5,6]. What is often forgotten that inappropriate and excessive use could increase number of adverse drug events and interactions [7, 8, 9].

Additional problem is the opposite opinions about the effects of supplements [10-21], as well as study of International Olympic Committee which revealed that up to 20% permitted supplements on the market contained doping substances that are not declared on the label [22, 23].

The aim of our study was to examine nutritional supplements and medications use by elite basketball players during FIBA competitions.

Methods

FIBA Europe and Anti-Doping Agency of Serbia conducted a survey on use medications and nutritional supplements by elite basketball players prior to and during FIBA EuroLeague Women 2009-qualifying round and EuroChallenge Men 2009-regular season. We analyzed data collected from questionnaires that doctors of participated teams fulfilled after the game in Doping Control Station. They were accompanied persons of athletes selected for doping control. Team doctors were asked to write medications and nutritional supplements that all athletes took in last three days.

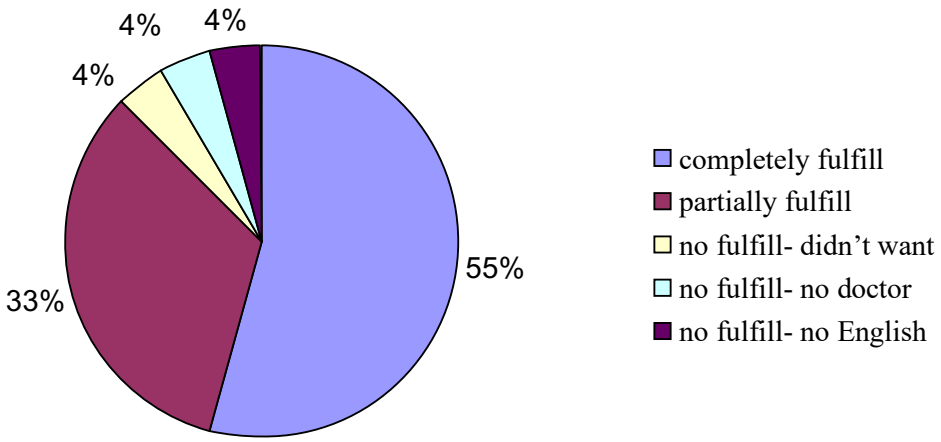
Participation in this project was voluntary and doctors signed the consent. They could choose not to answer at all of the questions on the questionnaire even after signing the consent. All data are strictly confidential.

We analyzed females and males separately, and then we looked for some difference between sex groups. Both groups were divided according to their ages on three subgroups: younger than

21, between 22-25, and older than 26. Also, players were divided according to team position: group one (point guard, shooting guard, and small forward) and group two (power forward, center).

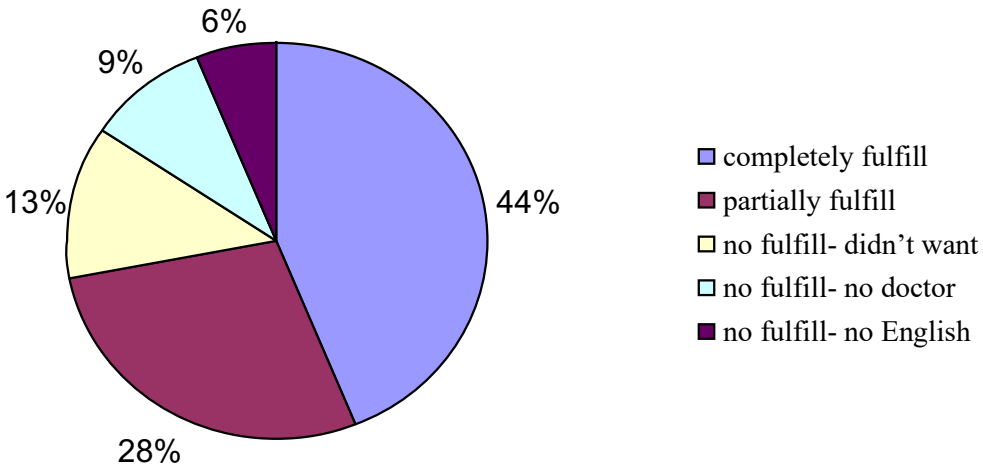
From 24 teams in female competition 12.5% (3) didn't fulfill questionnaire. One doctor didn't want to take part in the project, one didn't understand English and one team didn't have a doctor. From 21 teams that took part in project 61.9% (13) fulfill questionnaire completely and 38.1% (8) partially. Responding data are present in Figure 1.

Figure 1. Responding data in female FIBA Europe competition



In male competition, responding rate was lower. From 32 teams 28.1% (9) didn't fulfill questionnaire. Four doctors didn't want to take part in the project, two doctors didn't understand English and four teams didn't have a doctor (for one team physiotherapist fulfilled the questionnaire). From 23 teams that took part in project 60.9% (14) fulfilled questionnaire completely and 39.1% (9) partially. Responding data are present in Figure 2.

Figure 2. Responding data in male FIBA Europe competition



Classification of substances

Nutritional supplements are classified according to active substance [24]:

Vitamins: multivitamins, antioxidants, vitamin C, vitamin A, vitamin B, vitamin E.

Minerals: multiminerals, calcium, magnesium, iron, zinc, potassium.

Aminoacids: branch chained amino acids (BCAA), glutamine, other.

Protein supplements

Creatine, L- carnitine, carbohydrates, fatty acids, cartilage protectors, sports drinks, coenzyme, ginseng, other herbal supplements, mildronate and other.

Medications are classified according to active pharmaceutical ingredient as one of the following: non-steroidal anti-inflammatory drugs (NSAID), muscle relaxant, analgesics, gastrointestinal agents, cough and cold medications, anti-infective, antiallergic medications, anti-asthmatics, dermatologic, ocular preparations, corticosteroids and other.

Data Analysis

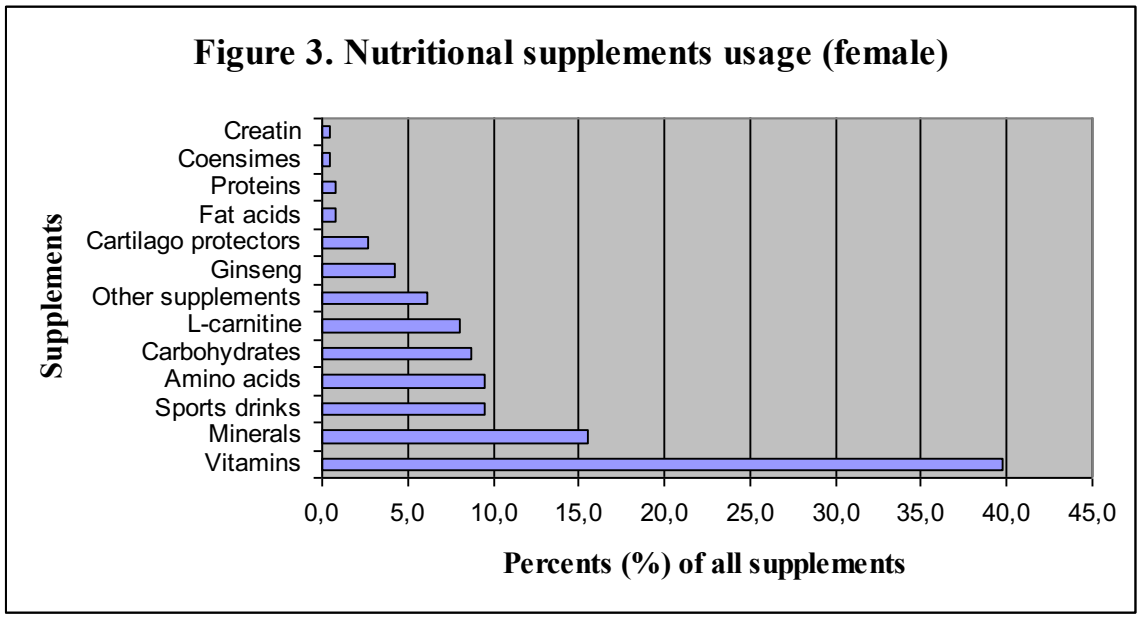
Some descriptive data were calculated as frequencies and expresses as mean values ± 1SD. Chi square test was used as a test of independence (comparing frequencies of one nominal variable for different values of a second nominal variable). For further specification of the group differences (and finding significant differences between the percentages) in NS usage Z-test for equality of two percentages from independent samples was used. To compare the means of two independent groups Student's t test was used. A 2-tailed probability value (p) less than 0.05 was considered statistically significant. Data were analyzed using SPSS for Windows 13.

Results

Demographic and position characteristics for female athletes are present in Table 1

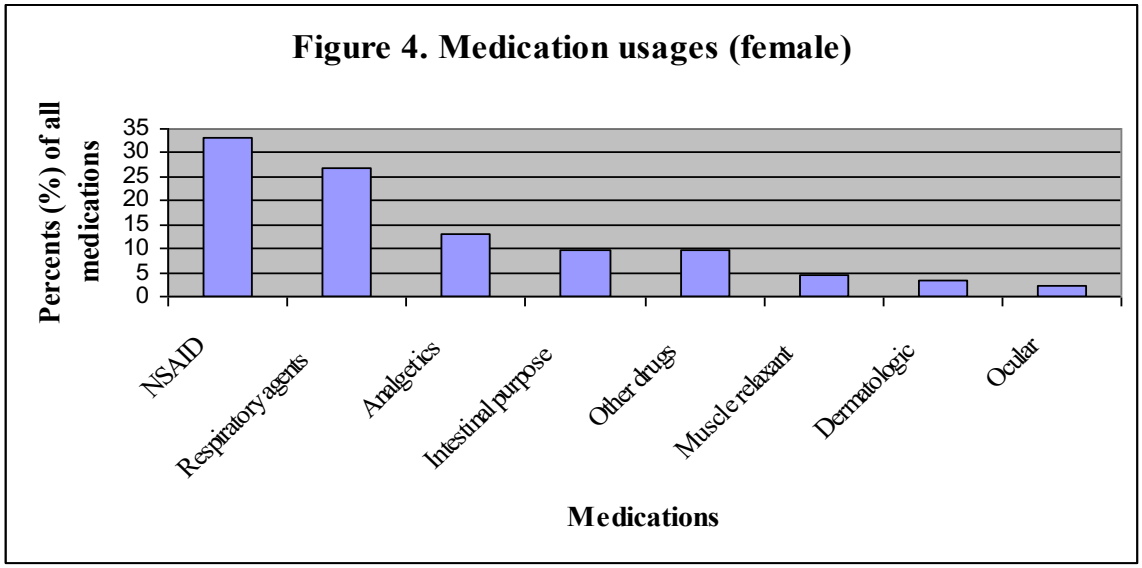
sex	mean age	≤ 21 year	22-26 years	≥26 years	position 1, 2, 3	position 4, 5
female	26.1±4.6	29	57	86	97	75

In-group of female athletes (n=172), among reported substances (n=357), 73.9% (264) were NS and 26.1% (93) drugs. Only 18.6 % (32) athletes didn't take any substance, but 12.8% (22) athletes took five or more different products. NS has taken by 69.2 % (179) athletes (2.2 per athlete). The most commonly used NS were vitamins, minerals and sport drinks. Their usage is present in Figure 3.



Among vitamin users, 12.4 % (13) athletes took combination of multivitamins product plus one or more another multivitamins product or single vitamin in the same time. Minerals took 23.8 (41) athletes. Most frequently were used magnesium (43.9%), calcium (24.4%) and iron (14.6%). In the same percents, 9.5% (25) athletes took sports drinks and amino acids.

Medications took 33.7 % (58) athletes (1.6 per athlete). Their usage is present on Figure 4



Frequently used drugs were NSAID (33.3 % of all medications). Twenty-eight of all athletes (16.3 %) took these drugs and three of them (10.7 %) took two NSAID in the same time. Diclofenac was the most frequently reported active pharmaceutical ingredient (n=11, 35.5%), followed by Ibuprofen (n=9, 29%). Analgesics represented 12.9 % of all prescribed medicines. Substances acting primarily on respiratory tract were the second most frequently prescribed substances (n=25, 26.9%), with drugs against caught and cold being the most common of these (n=15, 60%), followed by antibiotics (n=5, 20%), antihistamines (n=4, 16%) and ß2-agonists (n=1, 4%). Inhaled corticosteroids didn't take any of athletes.

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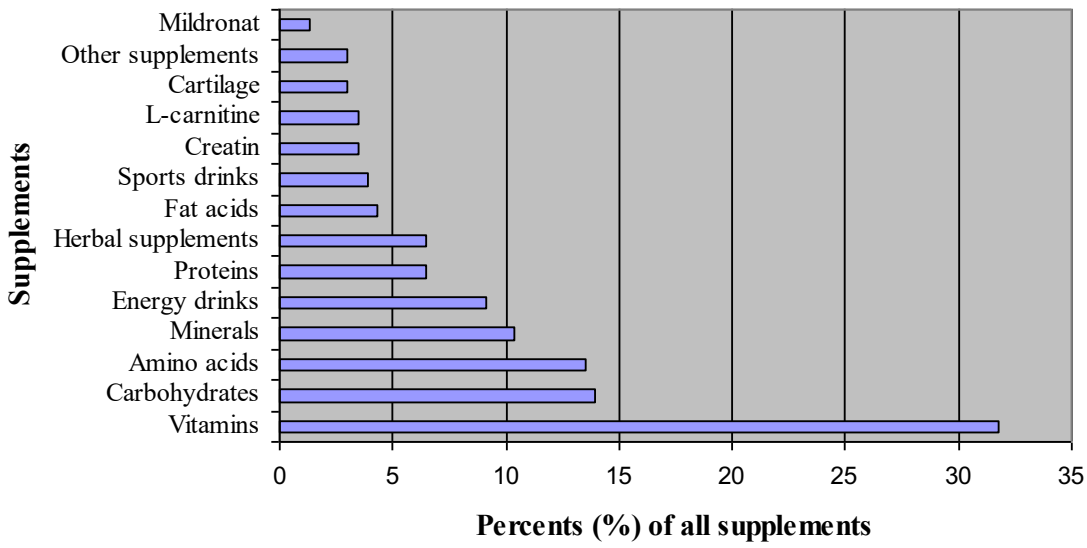
Demographic and position characteristics for male athletes are present in Table 2

sex	**mean age**	**≤ 21 year**	**22-26 years**	**≥26 years**	**position 1, 2, 3**	**position 4, 5**
male	25.9±4.5	35	70	85	99	91

In-group of male athletes (n=190), among reported substances (n=316), 72.8 % (230) were NS and 27.2 % (86) were drugs. 36.3 % (69) athletes didn't take any substance. Eleven % (21) athletes took five or more different products. NS has taken by 44.7 % (85) athletes (2.7 per athlete). The most commonly used NS were vitamins, carbohydrates and amino acids. Their usage is present in Figure 5.

Figure 5. Nutritional supplements usage (male)

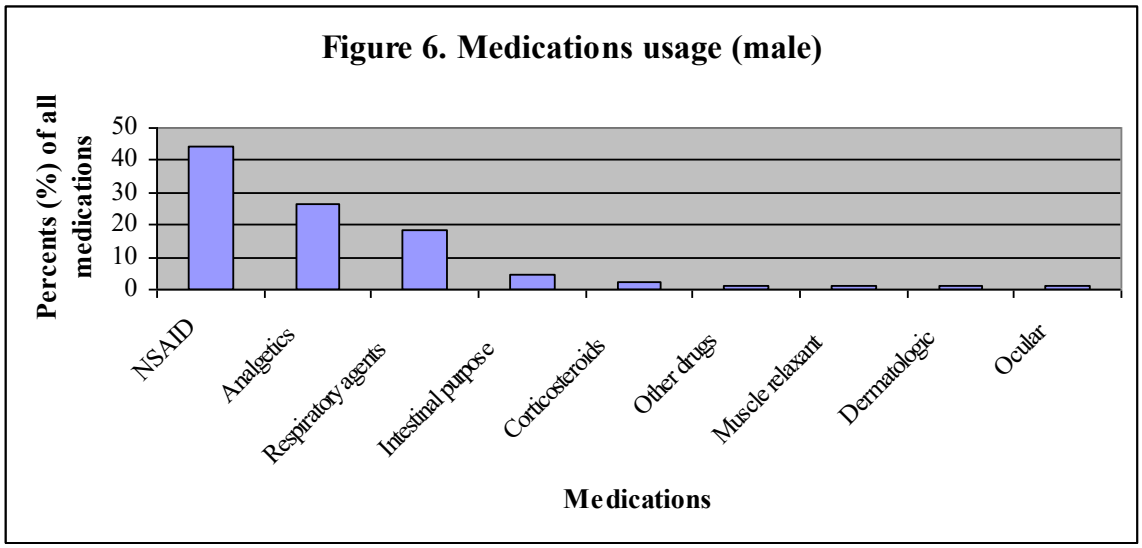


Vitamins used 37.9 % off all players (31.8% of total NS). Among vitamin users, 4.1 % (3) athletes took combination of multivitamins product plus one another multivitamins product or single vitamin in the same time.

Carbohydrates were on second place with of 10% of users (13.9% of total NS)

Amino acids were on third place with 10% of users (13.5% of total NS). One team (12 players) used two different amino acids products in the same time.

Medications took 28.9 % (55) athletes (1.6 % per athlete). Their usage is present on Figure 6.



Frequently used drugs also were NSAID (44.2 % of all medications). Thirty-four of all athletes (17.9 %) took these drugs and four of theme (11.8 %) took two NSAID in the same time. Diclofenac was the most frequently reported active pharmaceutical ingredient (n=19, 48.7%), followed by Ibuprofen (n=10, 25.6%). Two players took in the same time NSAID and ginseng supplement, and two players took in the same time NSAID and ß2-agonist. Analgesics were the second most frequently prescribed substances (n=23, 26.7%). Substances acting primarily on respiratory tract were use in next order antibiotics (n=5, 5.8 %), ß2-agonist (n=5, 5.8 %), drugs against caught and cold (n=4, 4.7 %) and inhaled corticosteroids (n=2, 2.3 %). Corticosteroids as injections were reported in 2.3% (2) players.

Gender differences

There is no statistically significant difference in ages between female and male athletes (t=-0,417 p=0,677). There is statistically significant difference of NS users between female and male athletes (χ^2 = 21.9, p<0.005). A lower percentage of NS users were observed in male athletes, but they use more NS per player. There is no significant difference between female and male athletes in medications use.

Discussion

Supplementation and medication usage is widespread among athletes. Our study showed that (n=140; 81.4%) of female and (n=121; 63.7%) of male athletes used at least one substance. Of that number in female group, 73.9% were NS and 26.1% were medications, in male group, 72.8% were NS and 27.2% were medications. Significant higher percentage of female athletes used NS, which confirmed results reported in previous studies[25, 26, 27]. Possible explanations are that females are restrictive eaters than male and they tried to compensate deficient enter food by taking NS, females being more susceptibility to advertising, more aware of nutritional needs, and having more real need for supplements compared to male athletics[28].

An adequate nutritional intake is a critical determinant of athletic performance. A nutritionally diet based on natural food can cover all of athletes need [29, 30]. Similar is the statement of American College of Sports medicine, American Dietetic Association and Dietitians of Canada that vitamin and mineral supplements are not necessary if an athlete consuming adequate energy from a variety of foods to maintain body weight[31]. The question is it possible in modern sport with all demands not to use NS? The answer is very hard to find because there is a lot of opposite opinions about efficacy of NS[5, 6, 10-21]. In order to help athletes, coaches and doctors, expert panel of the Australian institute of Sport categorize nutritional supplements in four groups: group A-approved, group B-NS under consideration, group C-no clear proof of beneficial effects, and group D-banned NS[32]. Additional problem is presence of contaminated NS on the market[22,23,33]. Therefore, there is an obvious risk for unintentional doping among NS users.

We noticed in female group there is statistically significant difference in percents of drugs users between the youngest and the oldest group of players ($Z=2.693$, $p<0.01$). The oldest group had higher percents of drug users than youngest players did. In addition, players of the teams which lost the game used more often substances at all ($\chi^2=11.223$, $p<0.01$).

In male group there is significant difference between percent of users between players that won the game than players that lost the game did ($\chi^2 = 6.327$, $p<0.05$). In addition, winners took greater number of supplements. In comparison of age groups, the oldest group use significantly higher number of supplements than middle age group ($t=-3.394$, $p<0.01$).

In our study, we had athletes that took two same supplements in different products in the same time (vitamins, amino acids). If we said that NS could have some beneficial effects is that mean we can use it in unlimited amounts without consequences? A combination of NS and diet might lead to micronutrient levels exceeding the safe upper limits[34]. Some NS can also be potentially harmful and even decrease performance[10,35,36,37,38]. Because of all these possible side effects, very important question recommend to athletes the use of nutritional supplements. In football, coaches have been found to have a greater influence than doctors and sports dieticians[2]. Same results got authors who conducted the study among Norwegian elite athletes. Non-medical members of the support team had advised the major part of Norwegian elite athletes using NS. That surprised authors, taking in consideration that few of these coaches lack knowledge of nutrition and below 50% of those coaching Norwegian elite female athletes have any type of education in sports, physiology or nutrition[39,40].

The present results show a very common use of NSAID (16.3% of female and 17.9% of male athletes) for almost any painful condition. The NSAID guidelines from the National Health Service recommend: Lowest possible dose and for shortest possible period; one preparation at a time (in our study 10.7% female, and 11.7% male users took two NSAID in the same time); prudent application in asthmatic patients; avoid long-term use; lowering gastrointestinal adverse effects by paracetamol with or without codeine; use gastro protective agents and/or COX-2 inhibitors in patients with high risk gastrointestinal bleeding for whom NSAID therapy is necessary. Beside to well- known possible adverse effects of NSAID use, additional problems could be potentially deleterious effects on the healing process[41] and combination with ginseng. Paolini Orchard discusses the issue of soft-tissue injuries and concluded that paracetamol had similar efficacy to NSAID in soft-tissue injury but had a lower side-effect profile[42]. Combination of NSAID and ginseng could potentially lead to bleeding events (in our study two male athletes used this combination). Three male athletes (1.6%) used Mildronat-inhibitor of biosynthesis of L-carnitine, commonly used in treatment of patient with coronary artery disease and chronic heart failure because of its cardio protective effect. There is no reliable study that investigated possible effects of this substance on performance of athletes.

Conclusion

Supplementation practice is widespread among athletes. In addition, it is evident that type of supplements, combinations with some medications and usage of same supplements in two different products, shows lack of adequate knowledge of their efficacy and possible side effects. An discussion of the limitations of most supplements, and acknowledgement that some supplements may work in certain athletes, may lead the sport physician and dietician to be more credible and useful to the athlete in providing medical care and guidance that support the desire to improve performance.

The high intake of non-steroidal anti-inflammatory drugs during these FIBA competitions is difficult to explain, due to overlapping of factors such as indications, the abuse and placebo effect. It looks like that the indication for NSAIDs have been broadened to almost any painful condition, without much guidance about possible side effects. The team physician and/or physiotherapists must be aware that good practice implies knowledge about medications, indications and side effects, as well as education of coaches and athletes. It is necessary to provide more studies about analgesic effects of different type of medications in order to develop recommendations for the treatment of sports injuries.

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