

# Nutritional awareness and habits of Premier league sportsmen in the Sarajevo Canton

Arzija Pašalić<sup>1\*</sup>, Fatima Jusupović<sup>1</sup>, Zarema Obradović<sup>1,2</sup>, Jasmina Mahmutović<sup>1</sup>

<sup>1</sup> Faculty of Health Studies, University of Sarajevo, Bolnička 25, 71000 Sarajevo, Bosnia and Herzegovina. <sup>2</sup> Sarajevo Canton Bureau for Public Health, Vrazova 11, 71000 Sarajevo, Bosnia and Herzegovina

## Abstract

**Introduction:** Selection of optimal nutrition for physical activity of sportsmen depends on several factors, and includes the type and duration of exercises, total energy consumption, time needed for recovery, and nutritional preferences. Proper nutrition of sportsmen relies on adequate combination and participation of all the macronutrients. The aim of this research was to analyse and determine the nutritional awareness and habits of sportsmen depending on their age and type of sports they indulge.

**Methods:** This is a cross-sectional, descriptive, and analytical study undertaken from May to July 2011 on the sample of 100 examinees/sportsmen of the Football Club "Željezničar" and Basketball Club "Bosna".

**Results:** General awareness of sportsmen on basic principles of proper nutrition is unsatisfactory. Statistical significance per type of sport and age of sportsmen is proved through representation of macronutrients in their nutrition. For 49.1% footballers and 52% sportsmen over 19 years of age the most important combination of macronutrients resembles the model of carbohydrates-proteins-fats, while 48.9% of basketballers and sportsmen under 18 prefer proteins-carbohydrates-fats. The study had shown a statistically significant difference ( $p=0.01$ ) between the footballers and basketballers with regard to the type of meal they consume before the trainings.

**Conclusion:** Insufficient knowledge on the subject reflects in bad nutritional habits, especially those related to the number and arrangement of daily meals in comparison to respective sports activities.

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## Introduction

Nutrition of sportsmen seems to get more and more attention of scientists striving to acquire even better results while preserving their health, composition of the body and mass, as well as to fulfil the energetic needs for their physical activities. Sportsmen nutrition should be focused on: satisfying the energetic needs, and providing sufficient amount of energy for work of muscles and other tissues. Importance of proper nutrition is placed right behind the talent and the exercise. Nutrition of sportsmen must be organised in a way to provide for certain types of activities, such as speed and anaerobic endurance. The energy released in chemi-

cal processes of decomposition of carbohydrates, fats, and proteins is used for work of muscles and conduction of basic processes in organism (1). The general public is suggested to consume carbohydrates in amount of 50-55% of the total number of calories (2), while the official nutritional guidelines for sportsmen unanimously recommend nutrition that is 60-70% rich in carbohydrates. However, a better way for determining actual carbohydrate needs of a sportsman has to do with recommendation that the amount of carbohydrates is proportional with the body mass, and is to be expressed in grams per kilogram of body mass (g/kg BM). Daily intake of carbohydrates for common needs varies from 5 to 7 g/kg, while the needs for increased endurance of sportsmen vary from 7 to 10 g/kg/a day. Burke and associates proved that amplified availability of carbohydrates improves the endurance during increased physical activity (3). A sportsman needs carbohydrates for they: secure energy sufficient for satisfying the majority of calo-

\* Corresponding author: Arzija Pašalić,  
Faculty of Health Studies, University of Sarajevo,  
Bolnička 25, 71000 Sarajevo, Bosnia and Herzegovina  
Tel: +38733569822;  
Fax: +38733569859;  
e-mail: arzijapasalic@gmail.com

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rie needs, create optimal reserves of glycogen, provide recovery of muscles after the physical activity, and secure quick and easily accessible source of energy for maintaining the level of glucose in blood (4). Recommended level of protein intake for the general public varies from 12 -15% of total calories intake, or daily intake of 0.8 g/kg of body mass (2). There are several reasons why the sportsmen need to take more proteins than is recommended to general population: they have lesser fat free mass, they lose proteins through urine (proteinuria) where the amount of proteins excreted through urine proportionally increases with increase of intensity and length of exercise, that during the physical activities they burn small amount of proteins (approximately 5%), and they need additional amount of proteins for recovery of muscles damaged during the trainings (5). The research undertaken by Kerksick and associates showed that sportsmen indulged in intensive trainings have increasing need for proteins so their daily intake should vary from 1.4-2.0 g/kg. Sportsmen who in their nutrition use smaller amount of proteins than the indicated one, demonstrate slower recovery after trainings and are facing increasing risk of loss in body mass (6). Useful effects of omega-3 fatty acids may influence the performance of sportsmen in following manner: increase in supply of oxygen and nutrients to the muscles and other tissues, increase in aerobic metabolism, increased secretion of somatotropin (growth hormone), and reduction of muscle soreness, which can contribute to the time needed for recovery after trainings (7). The study conducted by Klein and associates proved that sportsmen that regularly indulge endurance sports for the source of energy in a moderate exercise more frequently use fatties than is the case with recreational sportsmen (8). The dynamics of intake of the energetic substances or the arrangement of meals should be harmonised with the dynamics of the expenditure of energy. The researches show that obedience to this rule helps sportsmen to maintain their fat free mass, lower the level of body fats, increase the feeling of wellbeing and improve results gained in the sports. The sports nutritionists indicate that the sportsmen generally do not drink nor eat enough (9, 10). Additionally, intake of nutrients is not adequately

arranged and affects both the body conformation and the results (11). The research conducted on national level by Bernadot and associates indicates the fact that the common pattern of sportsmen nutrition, characterised by irregular meals and intake of bountiful meals by the end of day, is not a path to good results acquired in sports, for it causes a major loss of energy (12). There are many studies on frequency of taken meals, which ascertain that more often meals lead to lessening of body fats and increasing of the body mass. Additionally, gastrointestinal tract difficulties occurring due to bountiful meals seem to lessen (13). The aim of this research was to analyse and determine level of awareness on nutritional habits of sportsmen depending on their age and type of sports they indulge.

## Methods

The study was conducted from May to July 2011 in the area of Sarajevo Canton, and covered participation of 100 sportsmen from two clubs, the Football Club "Željezničar" (43 football players) and Basketball Club "Bosna" (57 basketball players). The research involved all the senior and cadet players from the two clubs. The inclusion criteria: voluntary consent to participate in the research, and to regular exercises/trainings. The exclusion criteria: unwillingness to participate in the research, and irregular exercises/trainings. The survey was carried in a way that sportsmen were given questionnaire consisting of 50 questions to provide their written opinion. The survey covered modified questionnaire on general principles of proper nutrition (number of meals, type of groceries used, and frequency in use), and specific items on sportsmen nutrition (presence of macronutrients, type and time of meals in comparison to trainings, the supplements). The survey was aimed to provide sufficient amount of data on nutritional habits and risks related to nutrition of sportsmen. Through 18 questions was checked the knowledge of sportsmen on general principles of proper nutrition. Depending on the number of correct answers, the knowledge of sportsmen was evaluated as: unsatisfactory (0-8 correct answers), satisfactory (9-13 correct answers), and excellent (14-18 correct answers). For statistical analysis of data was used the SPSS program for Windows.

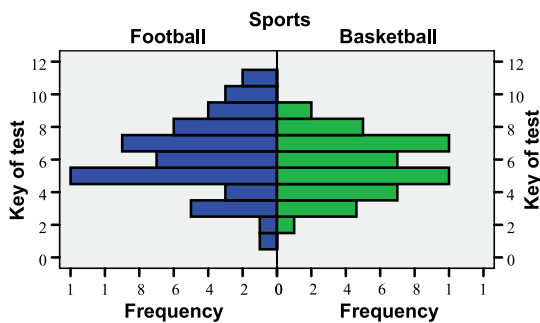


FIGURE 1. Test results on awareness of sportsmen per type of sport and age

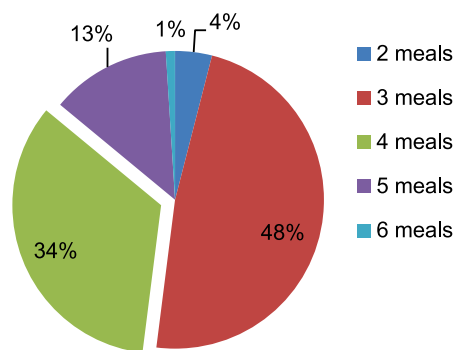


FIGURE 2. Number of daily meals

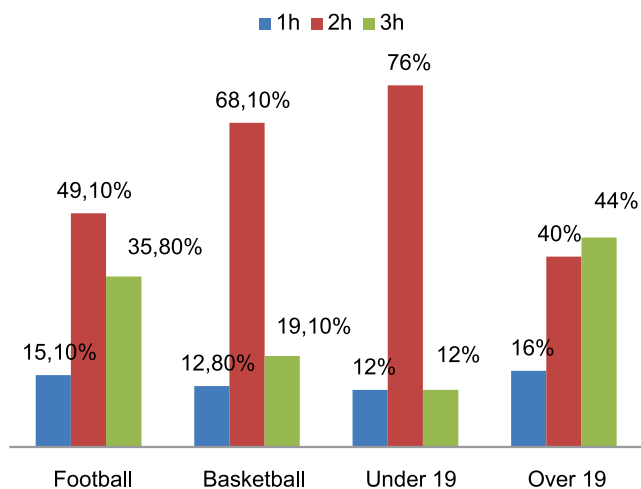


FIGURE 3. Time of consumption of the last meal prior to the training, depending on age and type of sports indulged

TABLE 1. Macronutrients per importance in nutrition depending on age and type of sports

Type of sports		Carb.hyd-Prot.-Fats	Carb.hyd.-Fats-Prot.	Prot.-Carb.hyd.-Fats	Fats-Carb.hyd.-Prot.	Total
Football	N	26	5	20	2	53
	%	49.1	9.4	37.7	3.8	100
Basketball	N	13	1	23	10	47
	%	27.7	2.1	48.9	21.3	100
Total	N	39	6	43	12	100
	%	39.0	6.0	43.0	12.0	100
Age						
Under 19	N	13	3	22	12	50
	%	26.0	6.0	44.0	24.0	100
Over 19	N	26	3	21	0	50
	%	52.0	6.0	42.0	0	100
Total	N	39	6	43	12	100
	%	39.0	6.0	43.0	12.0	100

Results

Differences in knowledge on proper nutrition between the sportsmen are insignificant, for both the football and basketball players had in average under 8 points. Sportsmen over 19 years of age had 6.28±2.27, while those under 19 had 5.64±1.80. Sportsmen usually have 3 meals a day (48%); next category has 4 meals a day (34%), five meals take 13% of sportsmen, and 2 meals a day take 4%. Footballers for the most important combination of nutrients find carbohydrates-proteins-fats (49.1%), then proteins-carbohydrates-fats (37.7%), while the least important combination for them concerns fats-carbohydrates-proteins (3.8%). For basketball players the most important combination is proteins-carbohydrates-fats (48.9%), then carbohydrates-proteins-fats (27.7%), fats-carbohydrates-proteins (21.3%), and carbohydrates-fats-proteins (2.1%). For sportsmen over 19 years of age the most important combination covers carbohydrates-proteins-fats (52%), while those under 19 think that the most important combination is that of proteins-carbohydrates-fats (44%). The examinees most frequently have their last meal 2 hours prior to the training, though those over 19 usually have their last meal 3h prior to the training (44%). Footballers most frequently have meal with carbohydrates (50.9%), while the basketballers choose proteins (48.9%).

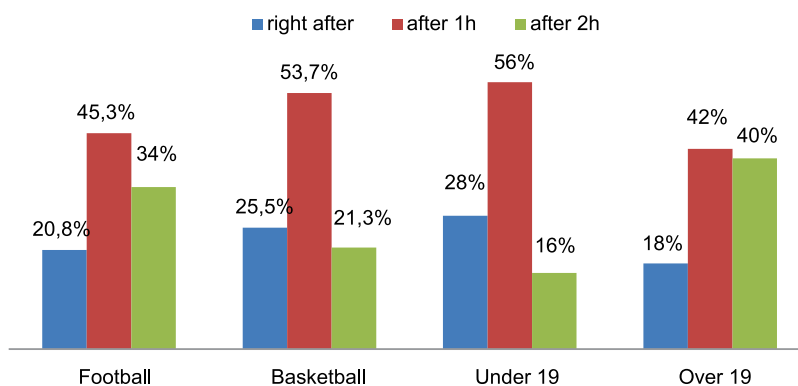


FIGURE 4. Time of consumption of meal after the training per type of sports and age

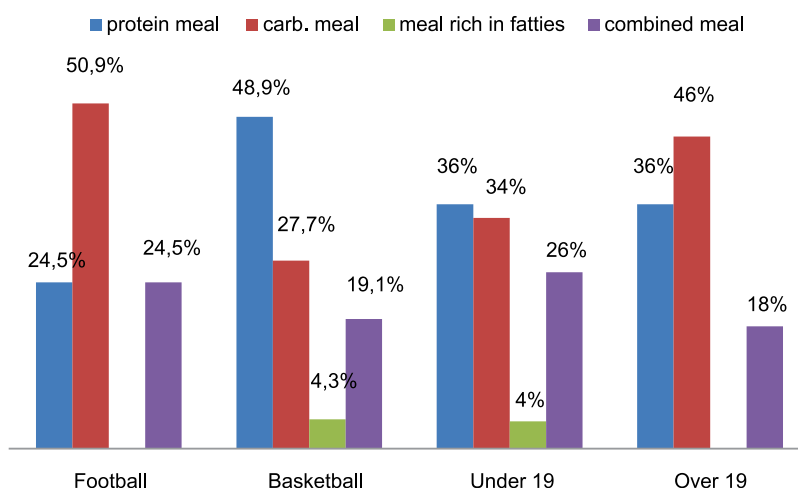


FIGURE 5. Type of meal most frequently used after the training per type of sports and age

TABLE 2. Type of meal most frequently used after the training per type of sports and age

Type of sports	Meal rich in proteins	Meal rich in carbohydrates	Meal rich in fatties	Combined meal	Total
Football	N 25	13	0	15	53
	% 47.2	24.5	0	28.3	100
Basketball	N 25	10	1	11	47
	% 53.2	21.3	2.1	23.4	100
Total	N 50	23	1	26	100
	% 50.0	23.0	1.0	26.0	100
Age					
Under 19	N 29	9	1	11	50
	% 58.0	18.0	2.0	22.0	100
Over 19	N 21	14	0	15	50
	% 42.0	28.0	0	30.0	100
Total	N 50	23	1	26	100
	% 50.0	23.0	1.0	26.0	100

With regard to the age, the sportsmen over 19 most frequently take carbohydrate meal, 46%, where sportsmen under 19 take the one with proteins, 36%. After the training, the examined sportsmen usually consume food rich in proteins, which is the case for 47.2% footballers, 53.2% basketballers, 58% sports men under 19 and 42% sports men over 19. The food rich in fats is the least consummated food.

## Discussion

The researches made up to now show that the sportsmen possess minimum knowledge on nutrition. Sportsmen who educate themselves on nutrition

demonstrate considerably higher level of awareness, which results in more adequate nutrition and in avoiding groceries that can harm them (14). Education on nutrition is very important for sportsmen, because the proper nutrition is, along with talent and training, the key to success and preservation of health of each sportsman. When it comes to nutrition, their main field of interest should concern the adequate proportion of macronutrients. Proper representation of macronutrients important for good health and performance in sports provided the footballers (49.1%) unlike 48.9% of basketballers, who had proteins on the first place. Such view of basketballers can be explained by the fact that they were younger than the footballers who wanted to increase their muscle mass through intake of proteins. This was additionally supported by results per age, because the elder sportsmen preferred carbohydrates (52%), while 44% of those under 19 were for proteins. Researches on intake of nutrients of footballers showed that their nutrition is similar to that of general population. It should be highlighted that the research undertaken by Kirkendal showed that sportsmen consume considerably lesser amount of carbohydrates, and high percentage of fats (15). Similar results were gained in Croatia, where the greatest discrepancies in daily intakes were determined for carbohydrates and fats. Daily intake of carbohydrates was lesser, while the intake of fats exceeded the recommended values (16). High percentage of sportsmen from our research even believes that the food rich in fats should come first. Such attitude is not good, for high percentage of fats in nutrition can have negative consequences on both the health and the sports performance. It is the fact that burned fats release the biggest amount of energy, but the sportsmen should keep in mind that this process requires expenditure of more oxygen. Thus, with 1 litre of oxygen used for burning carbohydrates one gets 5kcal of energy, unlike 4.7 kcal got through burning the fats (4). Fats are important for nutrition of sportsmen, especially for those indulging the endurance sports, because they represent reserve source of energy. However, one should pay attention to the type of fats included in nutrition. The nutrition should include mostly unsaturated fatty acids. This is the rule that applies for both the sportsmen and general population.

The researches on influence of omega 3-fatty acids on sports performance did not prove any advancement in strength and endurance, nor in relieving sore muscles (7, 17). Our study shows that even 46% of sportsmen consider proteins for the most important nutrients. Sportsmen need to know that the main role of proteins is of constitutive character, so they are not good source of energy because their combustion results in lot of metabolic waste. Aside to number of daily meals, it is also very important to keep in mind the time before and after trainings when the food was taken, as well as the type of groceries consummated. Footballers most frequently consume their last meal 2 hours before prior to training (49.1%), which also applies for basketballers (68.1%). When the age is considered, the majority of sportsmen under 19 consume their last meal 2 hours prior to training (76%), unlike those over 19 who take their last meal 3 hours before the training. The meal taken before the training should prepare them for the fore coming physical activity. One should be careful of the timing of food consummation because indulging in training with food still present in stomach can cause nausea and vomiting. At the same time, one should also keep in mind the type of groceries used, because on them depends the speed of gastric emptying (18). The researches had shown that the abundance of meal taken before the training and timing of its consumption are interlinked. Since the majority of sportsmen do not like to train with full stomachs, they should have smaller meals rich in carbohydrates that are consummated 2-3 hours before the training. In case the meal consists of proteins and fats, the consumption time extends to 4 hours before the training (19-22). The meal to be consumed after the training should refill the spent reserves of glycogen in shortest time possible, and that is why its consumption should be initiated right after the training. Researches of Bloom and associates showed that the fastest refilling the glycogen depots occurs with highest rate of enzyme of glycogen-synthesis, which is just after the training. Each delay in meal for one hour or more is slowing the regeneration of glycogen reserves and extends the recovery time (23). There is about the same number of footballers and basketballers who eat their meal one hour after the training. Sportsmen under 19 have better habits than

the elder ones, because 84% of them do eat after the training, unlike the elder sportsmen who in 40% of cases eat after two hours after the training. The researchers showed that the consumption of carbohydrates right after the training results in higher level of glycogen after 6 hours, than is the case if the meal is taken 2 hours after the training (24, 25). Time of pre-training meal consumption is tightly connected to the type of meal consummated. Footballers most frequently consume food rich in carbohydrates (50.9%), and the same percentage of them also take both protein and combined meals. Before the training, basketballers most frequently consume food rich in proteins (48.9%), and 4.3% consume food rich in fatties. When considered their age, we can say that sportsmen over 19 have better habits, because 46% of them before the training take meal rich in carbohydrates, while sportsmen under 19 have almost the same intake of proteins (36%) and of carbohydrates (34%). According to recommendations of the American Institute for Sports Medicine, as well as both American and Canadian Dietitian Association, sportsmen should have pre-training intake of a meal rich in carbohydrates to maintain the level of glucose in blood, moderate amount of proteins and relatively small amount of fatties and fibres to ease the stomach discharging and evade gastrointestinal difficulties (26). Post-exercise meals of sportsmen are of great importance, too, influencing the recovery of used reserves of glycogen and the speed of the process. Lesser number of sportsmen involved in this research have a good habit of post-exercise consumption of food rich in carbohydrates (24.5% of footballers, 21.3% basketballers, 18% of sportsmen

under 19, and 19. 28% sportsmen over 19). Such routine will not help sportsmen to refill empty depots of glycogen, to recover and adequately prepare for the following training. American Institute for Sports Medicine, as well as the American and Canadian Dietitian Association recommend consumption of carbohydrates within 30 minutes after the training (27). Researches showed that consumption of smaller amount of proteins will not affect refill of glycogen in muscles and liver (28), but will contribute to quicker recovery of muscles (29).

## Conclusions

Sportsmen showed insufficient level of awareness in field of general principles of proper nutrition and of specific nutrition needed for sportsmen. Footballers and basketballers have the same level of knowledge on the subject, where slightly better knowledge was evidenced with sportsmen above 19 years of age over those under 19. The sportsmen do not have knowledge on daily needs for macronutrients, role of macronutrients in nutrition, nor on the basic principles that are specific and important for nutrition of sportsmen. Insufficient knowledge is reflected in bad nutritional habits evidenced in the number /organisation of daily meals and the sporting activity they indulge. When considered the type of meal and the sporting activity, the footballers seem to have better habits than the basketballers, and in respect of their age, sportsmen over 19 win over those under 19.

## Conflict of interest

Authors declare that there are no conflicts of interest associated with this study.

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