

NUTRITIONAL STRATEGIES OF YOUNG, PHYSICALLY ACTIVE RESIDENTS OF WROCŁAW

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Abstract Proper diet is a well-established factor influencing the effectiveness of training. To assess the knowledge of young sportspeople from Wrocław about sport nutritional strategies an online survey was distributed to Wrocław sport schools and clubs. The respondents were asked to answer questions regarding their sport activity, diet and the knowledge of nutrition strategies. The answers were then compared with the recommended strategies of International Society of Sports Nutrition (ISSN) and other research on this topic.

147 answers were analyzed. 38% of the respondents modified their diet due to training. Their most popular strategy was an additional pre-workout meal. In the group that did not modify the diet, the majority (82%) heard of some sport nutrition strategy. 52% of the respondents consumed a protein peri-workout meal. Estimated 30% consume the amount of protein recommended by ISSN.

Percentage of young sportspeople adjusting diet to training seems to be low, taking into account both established importance of such proceedings and awareness of sport nutrition strategies in this group. Interestingly, more men than women do so. Group of respondents following well-documented ISSN recommendations is comparably modest. Perhaps the topic of nutrition strategies should be given more emphasis in schools and sport associations.

Key words sports nutrition, macronutrients, performance, young athletes, diet

Introduction

According to a report prepared by the Polish Central Statistical Office, as of 2016 22% of Poles engaged in any sport activity on a regular basis, meaning at least 1–2 times weekly (GUS, Departament Badań Społecznych i Warunków Życia, 2017). The level of physical activity was significantly higher among teenagers and young adults. 40.7% of people aged 15–19 and 27.7% of 20–29 years old performed a sport activity regularly. Therefore it is likely that young people also make an important part of all Poles exercising with an aim of achieving specific progress. The progress can be understood variously, depending on the sport discipline. It can refer for example to the number of repetitions of a given exercise or the time needed to cover a distance running, swimming, or cycling.

The training itself is only one of the factors influencing sport progress. The diet accompanying trainings is of great importance too, as was proved by the results of numerous scientific studies: Grant et al. (2015); Rossi et al. (2017), Wenzel, Valliant, Chang, Bomba and Lambert (2012), Daniel, Jürgensen, Padovani, Juzwiak (2016), Kavouras et al. (2012). It was proven that the diet accompanying training can affect both the body itself, for example by accelerating muscle mass gain, and sport performance.

Since young Poles are on average more physically active than the other age groups, and nutrition in sport is of paramount significance, it is important to explore the topic of nutritional strategies of younger sportspeople.

Purpose

The aim of this article is to assess the level of awareness of young athletes from Wrocław of various nutritional strategies including those recommended by the International Society of Sports Nutrition (ISSN), to provide an insight in how sport activities affect the nutrition of young sportspeople and to draw attention of athletes to the importance of proper nutrition in achieving better results in sport.

Methods

An anonymous questionnaire, which included questions about the diets used by the respondents, was created to obtain information about the nutrition of physically active residents of Wrocław. The questionnaire was made available by e-mail to Wrocław sports schools, sports clubs and other peers who regularly practice sports. The collected data was compared to the current ISSN recommendations (Kerksick et al., 2017) and conclusions from other scientific articles on a similar subject. After analyzing the similarities and differences between the collected information and the recommendations the conclusions were drawn.

In order to emphasize the importance of diet in the context of training, the PubMed and Google Scholar databases were searched for articles on a given topic using the keywords: "Sport", "Exercise", "Nutrition", "Timing", "Macronutrients", "Performance". When selecting the articles, the dates of publication and the number of citations were taken into account. No additional filters were applied to the search. After applying the search criteria 5,800 articles were found. From among them, a few articles have been selected that best established the importance of nutrition in athletes.

Results

148 responses to the questionnaire were obtained, of which 1 was rejected due to doubts to the accuracy of the received data. The average age of the respondents was 21.27 years of age. The oldest participant was 32,

the youngest – 15 years old. The vast majority (85%) of the respondents were aged between 17 and 23 years. 56% of the respondents were women, 44% – men. The average height of the male respondent was 1.819 m, female – 1.682 m. The height range was 1.62 m – 1.94 m and 1.55 m – 1.80 m respectively. The average BMI (body mass index) of the male respondent was 22.95, female – 20.96. The highest BMI value in male participants was 31.63, whereas in female participants – 26.73. The lowest BMI values were 17.18 and 14.36 respectively.

Over 56% of the respondents have practiced sports for more than 5 years, and over 86% – for more than a year (Figure 1).

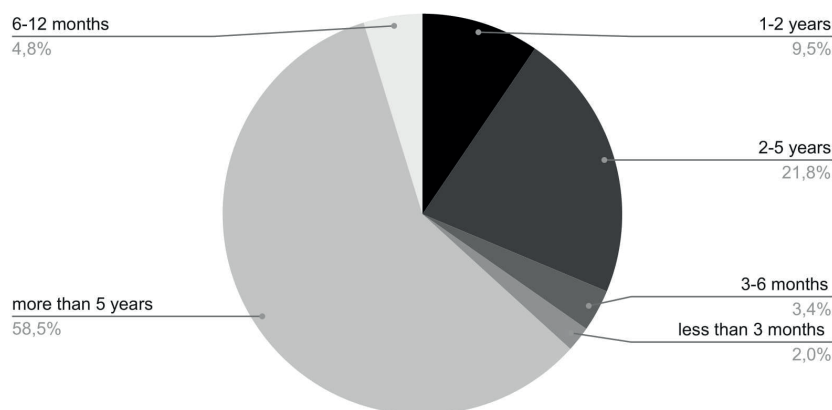


Figure 1. How long have you been practising sport?

Endurance, strength and mixed sports were represented by similarly large groups. The respondents declared the duration of the average training session ranging from <15 minutes to >90 minutes (Figure 2). Similarly differentiated responses were observed in the number of training sessions per week (mostly 2 to 5 times a week).

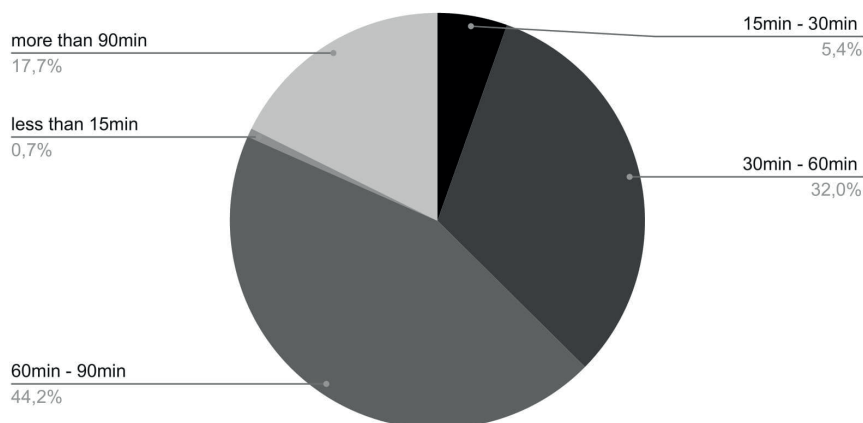


Figure 2. How long does the average training session last?

Almost 38% of people declared that they modify their diet due to training. It is worth mentioning that more than half of them were men, despite the fact that more women participated in the survey. Half of these people reported that their daily diet was modified depending on whether it is a training day. The most common diet modification on training days (81.5%) was the pre-workout meal, another strategy was to eat meals with increased protein or carbohydrate content on training days (17.5%). 48% of the additional meals consisted of: protein and carbohydrates (protein supplement with milk, lentils, chickpeas, beans, peas, broad beans); 30% – carbohydrates and sugar (sweets, fruit, corn bread, rice, flour dishes, potatoes); 22% – protein (e.g. protein supplement with water, seitan, poultry, pork) (Figure 3).

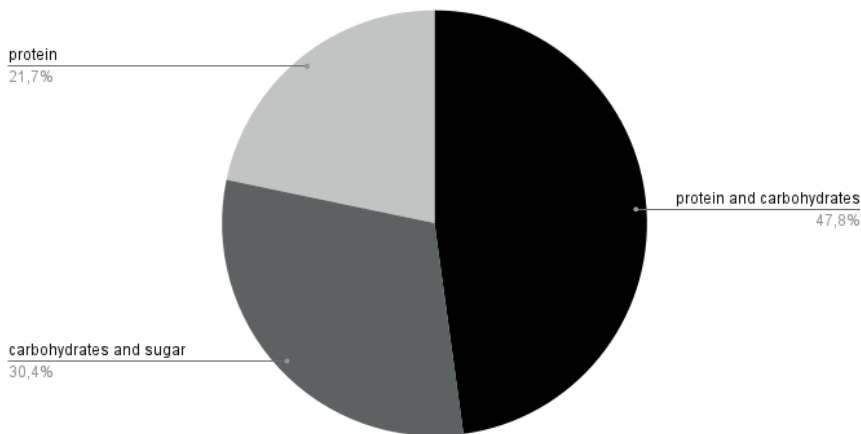


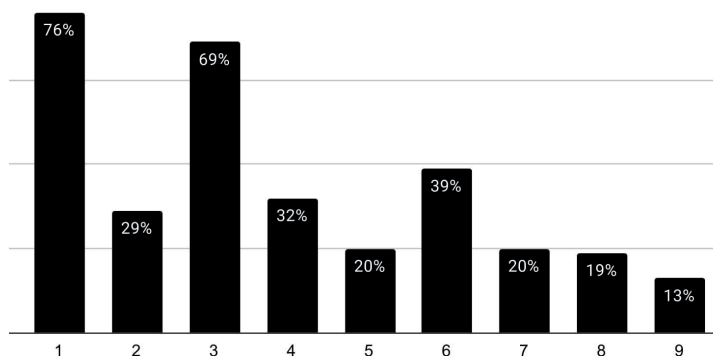
Figure 3. What does an extra meal consist of?

Most (79%) of the representatives of the second half who paid attention to the nutrition aspect of training reported that their nutritional strategy involves eating a meal in the pre-training period (I try to eat 1–2 hours before training – 39.3%/I try to eat immediately before training – 32.1%/I try to eat 1–2 hours after training – 17.9%).

Diet-modifying respondents who reported that their nutrition differed due to whether it is training day or not, were asked about the total caloric content of the meals of the day. The average energy value of meals on training days was 2,777 kcal, and on the remaining days – 2,322 kcal. Those who denied dietary diversification were asked about the caloric content and the amount of protein consumed on an average day. The average amount of protein consumed during the day was 87.5 g, which, with the average weight of the subjects being 67.5 kg, gives an average of 1.3 g of protein/kg/day. The 1.4–2.0 g/kg/day range of protein consumption proposed by the ISSN (Kerksick et al., 2017) was obtained by 32% of results, 61% was below 1.4 g/kg/day and 7% was above 2.0 g/kg/day. The average energy value of the meals was 2,400 kcal/day.

Among the respondents who do not modify their diet, the majority (59%) reported that they noticed certain trends related to nutrition in correlation with training. 72% of them related to eating a meal up to an hour before or after training.

82% of the diet non-modifiers asked if they had heard of any training-related nutritional strategies answered that they did. Their answers are presented in the graph (Figure 4).



1 – You should eat a certain amount of protein each day; 2 – You should eat a certain amount of protein on training days; 3 – You should consume a certain amount of kcal each day; 4 – You should consume a certain amount of kcal on training days; 5 – You should consume a certain amount of protein before training; 6 – You should consume a certain amount of protein after training; 7 – You should consume a certain amount of kcal before training; 8 – You should consume a certain amount of kcal after training; 9 – other.

Figure 4. What nutritional strategies have you heard about?

Discussion

The importance of diet in the context of training is very well researched and documented. For example, the scientists, who researched the influence of body composition on the risk of injury in ice hockey concluded from the obtained data that higher BMI of athletes correlates with increased risk (Grant et al., 2015).

There is no doubt that BMI depends on diet as numerous studies show. For instance, Kim et al. (2020) conducted a study that proves the impact of time-restricted diet on BMI. On the other hand, Klempel, Kroeger, Varady (2013) studied changes in body mass and composition of participants, who were receiving alternate day fasting with a high-fat or low-fat diet.

A group of scientists studying baseball players found that dietary educational intervention resulted in some changes in the diet of athletes and an improvement in their performance (Rossi et al., 2017). Similar conclusions were drawn by the researchers of volleyball players (Wenzel et al., 2012), Brazilian volleyball players (Daniel et al., 2016), and young people practicing sports (Kavouras et al., 2012).

After analyzing many nutritional strategies, it was checked to what extent the respondents adhered to the two most thoroughly studied ISSN recommendations.

1. ISSN: "The peri-workout protein intake is a pragmatic and sane strategy for athletes, especially those who engage in large volumes of exercise. Not consuming protein after training (e.g. waiting a few hours after training) has no benefit" (Kerksick et al., 2017).

Recommendation verification:

The above recommendation is based on numerous studies on people practicing both endurance and strength sports. Ivy, Res, Sprague, Widzer (2012) conducted a study on trained cyclists which involved completing a 3-hour training session. The control group received a carbohydrate solution, and the test group received the same protein-enriched solution. The endurance turned out to be significantly increased in the study group. Saunders et al. (2004, 2007 respectively) conducted a similar study and obtained

similar results. McLellan, Pasiakos, Lieberman (2014) studied the effect of protein intake immediately after training on the results on the next day. In this study the results favored athletes taking protein in the peri-training period too. Baty et al. (2007) concluded that the athletes consuming protein in the peri-training period had significantly reduced markers of muscle damage and a better hormone balance compared to athletes consuming carbohydrates alone. Tipton et al. (2001) stated that the response of muscle protein synthesis to consumption of an essential amino acid-carbohydrate solution immediately before resistance exercise is greater than that when the solution is consumed after exercise.

There were also studies, which did not conclude that the peri-workout meal resulted in any positive effect on training, but neither did they conclude that waiting a few hours had benefits. White et al. (2008) conducted a study on twenty seven untrained men. Subjects were randomly assigned to a pre exercise (received carbohydrate/protein drink before exercise and placebo after), a post exercise (received placebo before exercise and carbohydrate/protein drink after) or a control group (received placebo before and after exercise). Subjects performed eccentric quadriceps contractions on an isokinetic dynamometer. Eccentric exercise caused significant muscle damage, loss of strength, and soreness; however timing of ingestion of carbohydrate/protein supplement had no effect.

Questionnaire:

Among the respondents who modify their diet, the dominant strategy was to eat an additional meal containing protein in the peri-workout period ($81.5 \times 70.0 = 57.0\%$). However, this group consisted of only 19% of all respondents. Among the next 19% of respondents, the recommendation is practiced by 79% of them. Some people who do not intentionally modify their diet noticed that they unknowingly follow the above recommendation, while 39% of them heard of the recommendation. Overall, 52% of respondents consume a protein-containing meal per training session. It is worth mentioning that a large part (26%) of young athletes do it unawarely and that only 39% of respondents have heard of the above recommendation.

2. ISSN: "As with carbohydrates, timing considerations for protein appear to be of lower priority than optimal amounts of daily protein (1.4–2.0 g/kg/day)" (Kerksick et al., 2017).

Recommendation verification:

Tipton et al. (2007) compared the production of muscle proteins (MPS) between groups of athletes receiving protein before and after training. Scientists found no differences in MPS between the groups. On the other hand, Andersen et al. (2005) went a step further and proved that adding protein to meals resulted in an increase in the size of muscle fibers. Hoffman et al. (2009) administered protein to athletes at different time points in regard to training and did not notice significant differences in strength or muscle gain between the study groups. Aragon, Schoenfeld (2013) and Schoenfeld, Aragon, Krieger (2013) also investigated the effects of protein timing, and their conclusions were in line with the ISSN recommendation.

Questionnaire:

Among people who do not intentionally modify their diet, the majority had heard of the following strategy: "You should eat a certain amount of protein every day" (76%). Only the group of people who stated that they modify their diet to optimize training, and at the same time do not alter their diet due to whether it is a training day, were asked directly about the amount of protein consumed during the day. In this group, the average consumption of this macronutrient was 1.3 g/kg/day. 32% of the respondents fell within the

recommended range. Others, who intentionally modified their diet, reported that their average energy value of the meals consumed was 455 kcal higher on training days. Considering that a) according to the survey, the dominant nutritional strategy in this group was to eat an additional meal containing protein, b) the most commonly known strategies were those related to the consumption of protein c) this group was the most sporty experienced group (61.5% have been practicing sports for more than 5 years), we assume that at least 80% of their representatives follow the above recommendation. In conclusion, many athletes have heard of the above recommendation, but not more than 50% of those with the greatest dietary awareness follow the above recommendation. We estimate that for all of our respondents the percentage of applicants would be around 30%.

Conclusions

1. Young men from Wrocław practicing sports choose their diet for training with more awareness in relation to young women from Wrocław (47% vs 29%).
2. Only 38% of young athletes from Wrocław pay attention to their diet. Considering how important in order to improve sports performance proper nutrition is, it was concluded that this percentage is too small.
3. 81.5% of respondents had heard of some nutritional strategies optimizing progress in training. Taking into account the number of different strategies they had heard of, it was concluded that the fact that only 38% pay attention to their diet, might be caused by too much information from too many sources. Such information overload might be difficult to verify. Improvements could be made by putting more emphasis on nutrition by coaches in clubs or physical education teachers in schools.
4. Despite the awareness of the recommendations, a relatively small group of young athletes from Wrocław follow the ISSN recommendations (52% to the first recommendation and 30% to the second recommendation).

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