

SELECTED DETERMINANTS OF THE FREQUENCY OF CONSUMING PARTICULAR FOOD PRODUCT GROUPS AMONG REGIONAL-LEVEL FOOTBALL REFEREES

Maria Gacek,^{1, A, B, C, D, E} Grażyna Kosiba,^{2, A, C, D} Agnieszka Wojtowicz^{3, A, C}

¹ University of Physical Education in Kraków, Faculty of Physical Education and Sport
Department of Sports Medicine and Human Nutrition, Poland

² University of Physical Education in Kraków, Faculty of Physical Education and Sport
Department of Theory and Methodology of Physical Education, Poland

³ University of Physical Education in Kraków, Faculty of Physical Education and Sport, Department of Psychology, Poland

^A Study Design; ^B Data Collection; ^C Statistical Analysis; ^D Manuscript Preparation; ^E Funds Collection

Address for correspondence:

Maria Gacek
Zakład Medycyny Sportowej i Żywności Człowieka
Wydział Wychowania Fizycznego i Sportu
Akademia Wychowania Fizycznego
Al. Jana Pawła II 78, 31-571 Kraków, Poland
E-mail: maria.gacek@awf.krakow.pl

Abstract The aim of the study was to assess the frequency of consuming particular food groups among regional-level football referees depending on age, refereeing experience and sense of generalised self-efficacy. The study was conducted among a group of 138 male football referees from the Małopolska and Podkarpacie regions, using the authors' own questionnaire on food consumption frequency and the Generalised Self-Efficacy Scale (GSES). It was shown that along with the age of the referees, the frequency of consuming fruit ($p < 0.001$), milk and dairy products with reduced fat content ($p < 0.001$), poultry and cold-cuts ($p < 0.01$) as well as nuts ($p < 0.001$) increased, while the frequency of consuming white cereal products ($p < 0.001$) and sea fish ($p < 0.05$) decreased. Along with refereeing experience, the frequency of eating fruit ($p < 0.001$), milk and dairy products with reduced fat content ($p < 0.01$), poultry meat and cold-cuts ($p = 0.001$), nuts ($p < 0.001$) and alcoholic beverages ($p < 0.001$) increased, while the frequency of consuming white cereal products ($p < 0.001$), sea fish ($p < 0.05$) and sweet carbonated drinks ($p < 0.01$) decreased. A positive correlation was found between the intensity of generalised self-efficacy and the frequency of consuming milk and dairy products with reduced fat content ($p < 0.01$), fermented dairy products ($p < 0.01$), eggs ($p < 0.001$) and mineral water ($p < 0.001$) as well as dry red wine ($p < 0.05$), and a negative correlation was noted with the frequency of consuming pork ($p < 0.05$), fast food products ($p = 0.001$) and sweetened carbonated beverages ($p < 0.001$). In the examined group of regional-level football referees, there was a tendency towards more rational nutrition choices along with age and refereeing experience as well as a sense of self-efficacy, while the most explicit trends regarded relationships with the sense of self-efficacy.

Key words food consumption frequency, football referees, nutritional determinants, sense of generalised self-efficacy, age, refereeing experience

Introduction

Maintaining and improving health and exercise capacity is facilitated by a varied diet, with a high proportion of products having high nutritional value, such as vegetables and fruits, whole grain products, legume seeds and dairy products with reduced fat content, natural fermented dairy products, fish and nuts, with limited consumption of high energy density products, such as sweets, confectionery and fast food products. Current nutritional models, such as the Swiss nutrition pyramid for individuals undertaking increased physical activity, the Polish Pyramid of Healthy Nutrition and Physical Activity for adults, and recommendations of other scientific centres, emphasize the special importance of water and other unsweetened beverages for hydration and electrolyte management (Burke, 2008; Kreider et al., 2010; Potgieter, 2013; Thomas, Erdmann, Burke, 2016; Kerksick et al., 2017; Oliveira et al., 2017).

A group with increased physical activity and specific nutritional needs are football match referees. They are important for the course of the match at every sports level (Schenck, Bizzini, Gatterer, 2018). During a match, football referees cover a distance of 5–11 km and sometimes even 9–13 km, performing efforts of an intensity similar to those playing the midfield, with high energy expenditure (Bangsbo, Mohr, Krstrup, 2006; Castagna, Abt, D'Ottavio, 2007; Mallo, Navarro, Garcia-Aranda, Gilis, Helsen, 2007; da Silva, Fernandes, Fernandes, 2008; Weston et al., 2012).

Health-related behaviours, including food choices, are determined by a wide spectrum of environmental and personality-related factors (Remick, Polivy, Pliner, 2009; Juczyński, 2012). Among the psychological features important for the development of health culture, personal resources such as self-efficacy occupy an important position. The sense of self-efficacy, derived from Bandura's theory of social learning, is the belief in having the ability to achieve intended goals, such as those related to health, which can be fostered by rational nutritional behaviours (Juczyński, 2012). In existing studies on athletes, it has been shown that eating behaviours can be related to age, professional experience and sport level (Gacek, 2018a, 2019) and the level of generalised self-efficacy (Gacek, 2015, 2019), with an indication of a tendency towards more rational behaviours among athletes with greater experience and representing higher sporting levels (Kopeć, Nowacka, Klaja, Leszczyńska, 2013; Gacek, 2018a, 2019), and those with a higher sense of self-efficacy (Gacek, 2015, 2019).

The literature on the subject contains reports on the diets of athletes training football (Ono, Kennedy, Reeves, Cronin, 2012; Frańczek, Brzozowska, Morawska, 2013; Kopeć et al., 2013; García-Rovés, García-Zapico, Patterson, Iglesias Gutiérrez, 2014; Gacek, 2018a), while there are only a few publications on the diet of football referees. Available works concern high-class Portuguese (Teixeira, Gonçalves, Meneses, Moreira, 2014) and French referees (Metz, Deleuze, Pereira, Thivel, 2015), as well as central level Polish (female) referees (Gacek, 2016a). Due to the fact that in earlier studies the relationship has been shown between age, experience, sports level, the sense of generalized self-efficacy and the nutritional behaviours of athletes professionally training team sports (Gacek, Frańczek, 2013; Kopeć et al., 2013; Gacek, 2015, 2018a), research was undertaken regarding selected conditions (including psychological) of the food choices of football referees.

The aim of the study was to analyse the frequency of consuming food product groups among a group of regional-level football referees depending on their age, experience and level of generalized sense of self-efficacy, in relation to nutritional recommendations for individuals undertaking increased physical activity.

Material and methods

The study was conducted in 2017–2019 among a group of 138 male regional-level football referees aged 20 to 50 (31.69 ± 8.89) years from the Małopolska and Podkarpackie Football Associations. A total of 97 (70.29%) had completed higher education and 41 (29.71%) had only secondary education. The highest percentage of subjects had technical education (47.04%) and those representing the field of physical education equalled 23.56%, while a smaller number included humanistic (17.64%) and economic (11.76%) education. The average refereeing experience was 8.44 ± 6.39 years, and the average number of matches refereed was 391.11 ± 335.92 .

An original questionnaire regarding the frequency of consumption of selected groups of food products was used in the research. The frequency of consuming 20 food products was assessed using a point scale, assigning a specific number to individual frequency categories: daily (6), several times a week (5), once a week (4), once a month (3), rarely (2) and never (1). The applied original nutritional assessment questionnaire was subjected to a validation procedure, which showed high repeatability of results.

To measure the sense of efficacy, the standardised Generalised Self-Efficacy Scale (GSES) by R. Schwarzer, M. Jerusalem and Z. Juczyński (Juczyński, 2012) was used. The GSES scale contains 10 statements constructed in such a way that the higher the test result (within the range of 10–40 points), the higher the sense of generalised self-efficacy. The median raw result on the GSES scale for the examined referees was 30 (M \pm SD: 30.94 ± 4.96 , Min-Max: 22–40).

Statistical analysis of the results was carried out using the PQStat ver. 1.6.6.202 statistical package. The relationship between age, experience and level of generalised efficacy, and the frequency of consuming individual product groups, was analysed by calculating Spearman monotonic correlation coefficients. The test probability of $p < 0.05$ was considered significant, while the level of $p < 0.01$ was considered highly significant.

Results

Based on the median values, it was found that the football referees most often, i.e. daily (Me = 6 ± 0.5), included mineral water in their diets. Several times a week (Me = 5) they consumed: vegetables and fruits (5 ± 0), light and wholemeal cereal products (5 ± 0.5), eggs (5 ± 0.5), poultry and pork (5 ± 0), and dairy products with a high fat content (5 ± 0.5). Once a week (Me = 4) they consumed: oatmeal (4 ± 1), fermented dairy products (4 ± 0.5), fish (4 ± 0), nuts (4 ± 0.5), sweets (4 ± 1), sweetened carbonated drinks (4 ± 0.5) and various alcoholic beverages (4 ± 1). At a lower frequency, i.e. once a month (Me = 3), they chose: dairy products with reduced fat content (3 ± 1.5), fast food products (3 ± 0.5) and energy drinks (3 ± 1), while dry red wine was included in their diets less often (Me = 2 ± 1) (Table 1).

Table 1. Frequency of consuming groups of food products in the group of regional-level football referees (descriptive statistics)

Food products	Arithmetic mean	Median	Quartile deviation	Standard deviation	Minimum	Maximum	Lower quartile	Upper quartile
1	2	3	4	5	6	7	8	9
Vegetables	5.146	5	0	0.476	4	6	5	5
Fruit	5.138	5	0	0.569	4	6	5	5
Wholemeal cereal products	4.696	5	0.5	1.111	1	6	4	5
White cereal products	5.152	5	0.5	1.073	1	6	5	6

	1	2	3	4	5	6	7	8	9
Oatmeal cereals		3.283	4	1	1.351	1	6	2	4
Whole-fat milk and dairy products		4.362	5	0.5	1.350	2	6	4	5
Milk and dairy products with reduced fat content		3.297	3	1.5	1.421	1	5	2	5
Natural fermented dairy products		4.217	4	0.5	1.145	1	6	4	5
Eggs		4.449	5	0.5	0.872	2	6	4	5
Fish		3.761	4	0	0.689	2	5	4	4
Pork meat and cold-cuts		4.906	5	0	0.626	4	6	5	5
Poultry meat and cold-cuts		4.797	5	0	0.990	1	6	5	5
Nuts		3.710	4	0.5	1.055	2	6	3	4
Fast food		3.341	3	0.5	0.859	2	5	3	4
Sweets		4.493	4	1	1.291	1	6	4	6
Sweetened carbonated beverages		4.022	4	0.5	1.205	1	6	4	5
Energy drinks		3.022	3	1	1.304	1	5	2	4
Mineral water		5.464	6	0.5	0.983	3	6	5	6
Alcoholic beverages		3.789	4	1	1.298	1	6	3	5
Dry red wine		2.572	2	1	1.039	1	4	2	4

Statistical analysis showed significant correlations between age and frequency of consuming certain groups of food products by the football referees. With age, the incidence of fruit consumption ($p < 0.001$), as well as milk and dairy products with reduced fat content ($p < 0.001$), poultry meat and cold-cuts ($p < 0.01$) and nuts ($p < 0.001$) increased, while the frequency of consuming light cereal products ($p < 0.001$) and fish ($p < 0.05$) decreased (Table 2).

Table 2. Spearman's monotonic relationship between age and frequency of consuming food product groups in the group of regional-level football referees

Food products	R	Error for r	-95% CI	+95% CI	t statistics for r	p value
	1	2	3	4	5	6
Vegetables	0.027	0.086	0.146	0.198	0.315	0.753
Fruit	0.326	0.081	0.163	0.472	4.024	<0.001
Wholemeal cereal products	-0.132	0.085	-0.298	0.040	-1.558	0.121
White cereal products	-0.334	0.081	-0.478	-0.172	-4.130	<0.001
Oatmeal cereals	-0.061	0.086	-0.230	0.112	-0.709	0.479
Whole-fat milk and dairy products	-0.138	0.085	-0.302	0.035	-1.621	0.107
Milk and dairy products with reduced fat content	0.301	0.082	0.136	0.449	3.685	<0.001
Natural fermented dairy products	-0.061	0.086	-0.231	0.112	-0.717	0.475
Eggs	0.068	0.086	-0.105	0.237	0.794	0.428
Fish	-0.179	0.084	-0.340	-0.007	-2.120	0.036
Pork meat and cold-cuts	-0.015	0.086	-0.186	0.158	-0.171	0.865
Poultry meat and cold-cuts	0.235	0.083	0.066	0.391	2.819	0.005
Nuts	0.447	0.077	0.298	0.575	5.826	<0.001
Fast food	0.111	0.085	-0.062	0.278	1.306	0.194
Sweets	0.129	0.085	-0.044	0.294	1.516	0.132
Sweetened carbonated beverages	-0.125	0.085	-0.291	0.048	-1.473	0.143
Energy drinks	-0.065	0.086	-0.235	0.108	-0.765	0.446

	1	2	3	4	5	6	7
Mineral water		0.070	0.085	-0.103	0.239	0.821	0.413
Alcoholic beverages		0.160	0.085	-0.011	0.324	1.902	0.059
Dry red wine		-0.097	0.085	-0.265	0.076	-1.139	0.256

There was also significant differentiation regarding the frequency of consuming certain groups of food products depending on the length of the judges' experience. Along with judging experience, there was an increase in the frequency of consuming fruit ($p < 0.001$), milk and dairy products with reduced fat content ($p < 0.01$), poultry meat and cold-cuts ($p = 0.001$), nuts ($p < 0.001$) and alcoholic beverages ($p < 0.001$), while the frequency of consuming light cereal products ($p < 0.001$), fish ($p < 0.05$) and sweetened carbonated beverages ($p < 0.01$) decreased (Table 3).

Table 3. Spearman's monotonic relationship between experience and frequency of consuming food product groups in the group of regional-level football referees

Food products	R	Error for <i>r</i>	-95% CI	+95% CI	<i>t</i> statistics for <i>r</i>	<i>p</i> value
Vegetables	0.118	0.085	0.055	0.284	1.383	0.169
Fruit	0.354	0.080	0.194	0.4956	4.413	<0.001
Wholemeal cereal products	-0.165	0.085	-0.328	0.007	-1.956	0.052
White cereal products	-0.469	0.076	-0.593	-0.323	-6.198	<0.001
Oatmeal cereals	0.014	0.086	-0.158	0.185	0.163	0.871
Whole-fat milk and dairy products	-0.094	0.085	-0.262	0.079	-1.101	0.273
Milk and dairy products with reduced fat content	0.263	0.083	0.096	0.417	3.185	0.002
Natural fermented dairy products	0.095	0.085	-0.078	0.263	1.118	0.265
Eggs	-0.032	0.086	-0.203	0.140	-0.377	0.706
Fish	-0.344	0.080	-0.487	-0.183	-4.271	<0.001
Pork meat and cold-cuts	0.002	0.086	-0.169	0.174	0.027	0.978
Poultry meat and cold-cuts	0.269	0.083	0.102	0.421	3.256	0.001
Nuts	0.332	0.081	0.169	0.476	4.098	<0.001
Fast food	-0.047	0.086	-0.217	0.126	-0.549	0.584
Sweets	-0.157	0.085	-0.320	0.015	-1.856	0.066
Sweetened carbonated beverages	-0.266	0.083	-0.419	-0.098	-3.215	0.002
Energy drinks	0.052	0.086	-0.120	0.222	0.613	0.541
Mineral water	-0.044	0.086	-0.214	0.129	-0.515	0.607
Alcoholic beverages	0.285	0.082	0.118	0.435	3.463	<0.001
Dry red wine	0.083	0.085	0.090	0.251	0.972	0.333

There was also a positive correlation between the intensity of the sense of generalised self-efficacy and the frequency of consuming milk and dairy products with reduced fat content ($p < 0.01$), fermented dairy products ($p < 0.01$), eggs ($p < 0.001$), mineral water ($p < 0.001$) and dry red wine ($p < 0.05$), while a negative correlation occurred with the frequency of consuming pork ($p < 0.05$), fast food ($p = 0.001$) and sweetened carbonated beverages ($p < 0.001$) (Table 4).

Table 4. Spearman's monotonic relationship between generalised self-efficacy and frequency of consuming food product groups in the group of regional-level football referees

Food products	R	Error for <i>r</i>	−95% CI	+95% CI	statistics for <i>r</i>	<i>p</i> value
Vegetables	−0.009	0.086	−0.181	0.163	−0.105	0.916
Fruit	0.052	0.086	−0.121	0.222	0.612	0.542
Wholemeal cereal products	−0.034	0.086	−0.205	0.139	−0.395	0.694
White cereal products	−0.081	0.085	−0.249	0.092	−0.945	0.346
Oatmeal cereals	0.134	0.085	−0.038	0.299	1.583	0.116
Whole-fat milk and dairy products	0.131	0.085	−0.042	0.296	1.538	0.126
Milk and dairy products with reduced fat content	0.219	0.084	0.049	0.377	2.617	0.009
Natural fermented dairy products	0.265	0.083	−0.418	−0.098	−3.211	0.002
Eggs	0.349	0.080	0.188	0.491	4.338	<0.001
Fish	0.043	0.086	−0.129	0.214	0.506	0.614
Pork meat and cold-cuts	−0.183	0.084	−0.344	−0.012	−2.174	0.031
Poultry meat and cold-cuts	0.057	0.086	−0.116	0.226	0.663	0.508
Nuts	0.052	0.086	−0.121	0.222	0.606	0.546
Fast food	0.276	0.082	0.109	0.428	3.349	0.001
Sweets	−0.109	0.085	−0.276	0.064	−1.282	0.202
Sweetened carbonated drinks	−0.279	0.082	−0.430	−0.112	−3.387	<0.001
Energy drinks	−0.053	0.086	−0.223	0.119	−0.622	0.535
Mineral water	0.341	0.081	0.179	0.485	4.230	<0.001
Alcoholic beverages	0.060	0.086	0.113	0.229	0.704	0.483
Dry red wine	0.210	0.084	0.039	0.368	2.508	0.013

Discussion

The discussed research showed qualitative nutritional errors and correlations between the frequency of consuming certain food groups with age, experience and sense of generalised self-efficacy among the regional level football referees.

The found erroneous behaviours particularly concerned the low frequency of consuming recommended foods with a high nutritional density, such as vegetables and fruits, whole grain cereals, dairy products with reduced fat content, natural fermented dairy products as well as fish and nuts. A negative tendency should also be pointed out regarding the comparable frequency of consuming contraindicated drinks (alcoholic and sweetened carbonated beverages) with the recommended fermented dairy products. On the other hand, the daily consumption of mineral water can be assessed positively within the context of the increased physical effort performed by the referees and the legitimacy of their using the same hydration strategies as those implemented by athletes (Schenk et al., 2018). The negative effects of alcohol (relatively often considered by football referees) on restoring post-workout homeostasis, such as water-electrolyte balance in physically active people (Vella, Cameron-Smith, 2010), should also be highlighted.

The diagnosed nutritional irregularities, including low consumption of fruit and vegetables and whole grain cereal products, may limit the supply of antioxidant vitamins (C and carotenoids) and polyphenols, group B vitamins, magnesium and potassium and fibre. This is unfavourable within the context of oxidative stress increasing the

demand for antioxidants (Yavari, Javadi, Mirmiran, Bahadoran, 2015), as well as increased demand for vitamins regulating metabolic intensities (group B) and minerals important in muscle contraction processes (Volpe, 2007). Low consumption of dairy products increases the risk of calcium deficiency, which is involved in the regulation of neuromuscular excitability and acid-base balance (Volpe, 2007), while low consumption of fermented dairy products reduces the consumption of probiotics that affect the maintenance of diverse and rich intestinal microflora, with numerous health-promoting properties (Cronin et al., 2017). Low consumption of fish and nuts may reduce the supply of omega-3 polyunsaturated fatty acids (PUFA) optimising blood lipid profile (Gillingham, Harris-Janz, Jones, 2011).

Nutritional errors found in the examined group of regional level football referees correspond to the trends described in other groups of football referees. In research among an elite group of Portuguese referees, irregularities were also demonstrated regarding insufficient consumption of high nutrient density products, affecting the unbalanced supply of some antioxidant vitamins, group B vitamins, dietary fibre, calcium and magnesium (Teixeira et al., 2014). The results of the authors' research, which showed a low consumption of fish and nuts, correspond to the results of research conducted among the Portuguese referees, in whom an insufficient supply of polyunsaturated fatty acids was described (Teixeira et al., 2014). In a different study among 82 female central level Polish football referees, an incomplete implementation of quality nutritional recommendations for physically active people was also shown, especially in the area of consuming vegetables and low-density cereal products and dairy products (Gacek, 2016a). Similar errors related to the inadequate consumption of some groups of high-density food products, including vegetables and fruits, whole-grain cereal products, dairy products and fish, have also been described among Polish athletes training team sports (Frączek et al., 2013; Gacek, Frączek, 2013; Gacek, 2015), and among English and Australian footballers (Ono et al., 2012; Jenner et al., 2018) as well as American football players in NCAA Division III (Abbey, Wright, Kirkpatrick, 2017).

In the discussed studies, relationships were also shown between the age and experience of judges and the frequency of consuming selected product groups, with an indication of the tendency to make more rational choices along with the referees' age and experience (these variables were not significantly correlated, $R = 0.023$, $p = 0.876$). Trends for both variables particularly concerned the more frequent consumption of recommended products, including fruit, milk and dairy products with reduced fat, poultry meat and cold-cuts (as well as nuts in the case of experience), and the less frequent consumption of less recommended light cereal products (and carbonated drinks in the case of experience). At the same time, however, different trends were described regarding the lower incidence of fish consumption (along with age and seniority) and more frequent consumption of alcoholic beverages (along with experience). Therefore, the indicated trends were ambiguous, nonetheless, they may suggest greater nutritional awareness and/or attaching greater attention to food choices with age, in relation to the state of health and an increase in belief in the significant role of diet for exercise capacity, determining the effective performance of refereeing functions. Trends indicating more rational nutritional behaviours along with age (as well as experience and sports level) have also been described among athletes training team sports (Kopeć et al., 2013; Gacek, 2018a) and individual disciplines (Gacek, 2019). Among athletes training individual disciplines, it has been shown that with age, the players significantly more often included poultry and mineral water in their diet, and significantly less often milk with high fat content, pork, sweets and confectionery products (Gacek, 2019). Other research on the conditions dictating the consumption of alcoholic beverages among Polish athletes professionally training team sports showed that with age, the consumption of wine, including dry wine, increased (Gacek, 2016b). Also in another professional

group – men aged 18–65 employed at one of Kraków industrial plants – more rational food choices could be observed with age (Gacek, Chrzanowska, Matusik, 2007).

In the discussed research, a relationship was also shown between the sense of self-efficacy and the frequency of consuming selected product groups, with an indication of a tendency towards making more rational choices as self-efficacy increased. These trends concerned, in particular, the more frequent consumption of recommended products, such as milk and dairy products with reduced fat content, fermented dairy products, eggs and mineral water, as well as dry red wine, and less frequent consumption of pork, fast foods and sweetened carbonated drinks. The demonstrated correlations, indicating the importance of a high level of self-efficacy for the development of more correct nutritional choices among football referees, may find their justification in the characteristics of this personality dimension and relate to the results of other studies. The more rational food choices of referees with a high sense of self-efficacy can be explained by their belief in the possibility of achieving specific goals, including health-related objectives, for which a rational nutrition model plays a significant role. Similar tendencies towards more rational dietary choices among those with higher levels of self-efficacy were obtained in other groups of people representing increased physical activity, including Polish American football players (Gacek, 2015) and those practising individual sports disciplines (Gacek, 2019). For example, Polish American football players with high self-efficacy significantly more often than those with low levels consumed the recommended number of vegetable portions (54% vs. 26%) (Gacek, 2015). In turn, among athletes training individual sports disciplines, a positive correlation was found between the intensification of the generalised sense of self-efficacy and the frequency of consuming high nutritional density products (legumes, semi-skimmed milk, poultry) and isotonic drinks (Gacek, 2019). The diversity of food choices depending on the level of their generalised self-effectiveness (maintaining the indicated trends) has also been described in other groups, such as Polish professional soldiers (Gacek, 2018b) and adults from the Dutch population (Brug, de Vet, de Nooijer, Verplanken, 2006).

The described nutritional errors, which may reduce the nutritional value of the diet among the examined group of regional-level football referees, confirmed the legitimacy of monitoring and rationalising the diet of people semi-professionally (and professionally) associated with sports, for whom diet is one of the factors contributing to professional success. Other authors also point to the need for nutritional education of football referees (Teixera et al., 2014; Schenck et al., 2018). At the same time, they draw attention to the need to develop nutritional recommendations for football referees, because the nutritional needs of this group may differ in certain areas from the nutritional needs of athletes training football (Schenk et al., 2018). Nutritional recommendations for footballers have been the subject of many scientific publications (Bangsbo et al., 2006; Holway, Spriet, 2011; Carling, Le Gall, Dupont, 2012; Heaton et al., 2017; Kerkisick et al., 2017).

The significance of the presented work is related to undertaking the subject of unexplored research on the conditions of nutrition choices for football referees, with the results only applicable to the studied group of men. Subsequent studies should include a larger group of referees (also from other regions representing different sports levels) and a larger number of analysed variables.

Conclusions

1. Qualitative nutritional errors related to the low frequency of consuming recommended food products, especially vegetables and fruit, whole grain cereal products, low fat and fermented natural dairy products, fish and nuts, were found in the examined group of regional-level football referees.

2. In the examined group of regional level football referees, the correlation between age, refereeing experience and generalised sense of self-efficacy, as well as the frequency of consuming certain product groups, was demonstrated with a tendency towards more rational choices along with age, experience and sense of self-efficacy, while the most explicit tendencies concerned relationships with their sense of generalized self-efficacy.

3. The results suggest the legitimacy of monitoring and rationalising the diet of people professionally (and semi-professionally) associated with sports, including those representing a lower sport level.

References

- Abbey, E.L., Wright, C.J., Kirkpatrick, C.M. (2017). Nutrition practices and knowledge among NCAA Division III football players. *Journal of the International Society of Sports Nutrition*, 14, 13. DOI: 10.1186/s12970-017-0170-2.
- Bangsbo, J., Mohr, M., Krstrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. *Journal of Sports Sciences*, 24 (7), 665–674.
- Brug, J., de Vet, E., de Nooijer, J., Verplanken, B. (2006). Predicting fruit consumption: cognitions, intention, and habits. *Journal of Nutrition Education and Behavior*, 38 (2), 73–81.
- Burke, L.M. (2008). A food pyramid for Swiss athletes. *International Journal of Sport Nutrition and Exercise Metabolism*, 18 (4), 430–437.
- Carling, C., Le Gall, F., Dupont, G. (2012). Are physical performance and injury risk in a professional soccer team in match-play affected over a prolonged period of fixture congestion? *International Journal of Sports Medicine*, 33 (1), 36–42. DOI: 10.1055/s-0031-1283190.
- Castagna, C., Abt, G., D'Ottavio, S. (2007). Physiological aspects of soccer refereeing performance and training. *Sports Medicine*, 37 (7), 625–646.
- Cronin, O., O'Sullivan, O., Barton, W., Cotter, P.D., Molloy, M.G., Shanahan, F. (2017). Gut microbiota: implications for sports and exercise medicine. *British Journal of Sports Medicine*, 51 (9), 700–701. DOI: 10.1136/bjsports-2016-097225.
- da Silva, A.I., Fernandes, L.C., Fernandez, R. (2008). Energy expenditure and intensity of physical activity in soccer referees during match-play. *Journal of Sports Science & Medicine*, 7 (3), 327–334.
- Frączek, B., Brzozowska, E., Morawska, M. (2013). Ocena zachowań żywieniowych zawodników trenujących gry zespołowe w świetle rekomendacji piramidy żywieniowej dla sportowców. *Problemy Higieny i Epidemiologii*, 94 (2), 280–285.
- Gacek, M. (2015). Association between self-efficacy and dietary behaviors of American football players in the Polish clubs in the light of dietary recommendations for athletes. *Roczniki PZH*, 66 (4), 361–366.
- Gacek, M. (2016a). Dietary behaviors in a group of female top-class football referees. *Medycyna Sportowa*, 32 (2), 105–112.
- Gacek, M. (2016b). Selected personality – related determinants of alcohol beverage consumption among Polish elite team sport athletes. *Roczniki PZH*, 67 (3), 263–269.
- Gacek, M. (2018a). Analiza wybranych zachowań żywieniowych grupy piłkarzy nożnych juniorów i seniorów w świetle jakościowych zaleceń dla sportowców. *Problemy Higieny i Epidemiologii*, 99 (3), 289–293.
- Gacek, M. (2018b). Poczucie własnej uogólnionej skuteczności a wybrane aspekty stylu życia grupy żołnierzy zawodowych. *Problemy Higieny i Epidemiologii*, 53 (1), 79–84.
- Gacek, M. (2019). Selected personal conditions determining the frequency of consuming groups of products among athletes professionally training individual sport disciplines. *Human Movement*, 20 (3), 56–65. DOI: <https://doi.org/10.5114/hm.2019.83997>.
- Gacek, M., Chrzanowska, M., Matusik, S. (2007). Wybrane zachowania żywieniowe aktywnych zawodowo mężczyzn z populacji krakowskiej w wieku 18–65 lat. *Roczniki PZH*, 58 (3), 549–559.
- Gacek, M., Frączek, B. (2013). Nutritional evaluation of junior football players depending on the global level of self-efficacy of the athletes. *Medicina Sportiva*, 17 (2), 72–75.
- García-Rovés, P.M., García-Zapico, P., Patterson, A.M., Iglesias Gutiérrez, E. (2014). Nutrient intake and food habits of soccer players: analyzing the correlates of eating practice. *Nutrients*, 6 (7), 2697–2717. DOI: 10.3390/nu6072697.
- Gillingham, L.G., Harris-Janz, S., Jones, P.J. (2011). Dietary monounsaturated fatty acids are protective against metabolic syndrome and cardiovascular disease risk factors. *Lipids*, 46 (3), 209–228. DOI: 10.1007/s11745-010-3524-y.

- Heaton, L., Davis, J., Rawson, E., Nuccio, R., Witard, O., Stein, K., Baar, K., Carter, J., Baker, L. (2017). Selected In-Season Nutritional Strategies to Enhance Recovery for Team Sport Athletes: A Practical Overview. *Sports Medicine*, 47, 2201–2218. DOI: 10.1007/s40279-017-0759-2.
- Holway, F.E., Spriet, L.L. (2011). Sport-specific nutrition: practical strategies for team sports. *Journal of Sports Sciences*, 29 (Suppl. 1), 115–125. DOI: 10.1080/02640414.2011.605459.
- Jenner, S.L., Trakman, G., Coutts, A., Kempton, T., Ryan, S., Forsyth, A., Belski, R. (2018). Dietary intake of professional Australian football athletes surrounding body composition assessment. *Journal of the International Society of Sports Nutrition*, 5 (1), 43. DOI: 10.1186/s12970-018-0248-5.
- Juczynski, Z. (2012). *Narzędzia pomiaru w promocji i psychologii zdrowia*. Warszawa: Pracownia Testów Psychologicznych.
- Kerksick, C.M., Arent, S., Schoenfeld, B.J., Stout, J.R., Campbell, B., Wilborn, C.D., Taylor, L., Kalman, D., Smith-Ryan, A.E., Kreider, R.B., Willoughby, D., Arciero, P.J., Van Dusseldorp, T.A., Ormsbee, M.J., Wildman, R., Greenwood, M., Ziegenfuss, T.N., Aragon, A.A., Antonio, J. (2017). International society of sports nutrition position stand: nutrient timing. *Journal of the International Society of Sports Nutrition*, 14, 33. DOI: 10.1186/s12970-017-0189-4.
- Kopeć, A., Nowacka, E., Klaja, A., Leszczyńska, T. (2013). Częstotliwość spożycia wybranych grup produktów spożywczych przez sportowców trenujących piłkę nożną. *Problemy Higieny i Epidemiologii*, 94 (1), 151–157.
- Kreider, R.B., Wilborn, C.D., Taylor, L., Campbell, B., Almada, A.L., Collins, R., Cooke, M., Earnest, C.P., Greenwood, M., Kalman, D.S., Kerksick, C.M., Kleiner, S.M., Leutholtz, B., Lopez, H., Lowery, L.M., Mendel, R., Smith, A., Spano, M., Wildman, R., Willoughby, D.S., Ziegenfuss, T.N., Antonio, J. (2010). ISSN exercise & sport nutrition review: research & recommendations. *Journal of the International Society of Sports Nutrition*, 7, 7. DOI: 10.1186/1550-2783-7-7.
- Mallo, J., Navarro, E., Garcia-Aranda, J.M., Gilis, B., Helsen, W. (2007). Activity profile of top-class association football referees in relation to performance in selected physical tests. *Journal of Sports Sciences*, 25 (7), 805–813.
- Metz, L., Deleuze, T., Pereira, B., Thivel, D. (2015). Nutritional adaptations in elite soccer referees: first evidence and perspectives. *Journal of Human Kinetics*, 10 (46), 77–83. DOI: 10.1515/hukin-2015-0036.
- Oliveira, C.C., Ferreira, D., Caetano, C., Granja, D., Pinto, R., Mendes, B., Sousa, M. (2017). Nutrition and Supplementation in Soccer. *Sports (Basel)*, 5 (2). pii: E28. DOI: 10.3390/sports5020028.
- Ono, M., Kennedy, E., Reeves, S., Cronin, L. (2012). Nutrition and culture in professional football. A mixed method approach. *Appetite*, 58 (1), 98–104. DOI: 10.1186/s12970-018-0248-5.
- Potgieter, S. (2013). Sport nutrition: A review of the latest guidelines for exercise and sport nutrition from the American College of Sport Nutrition, the International Olympic Committee and the International Society for Sports Nutrition. *South African Journal of Clinical Nutrition*, 26 (1), 6–16.
- Remick, A.K., Polivy, J., Pliner, P. (2009). Internal and external moderators of the effect of variety on food intake. *Psychological Bulletin*, 135 (3), 434–451. DOI: 10.1037/a0015327.
- Schenk, K., Bizzini, M., Gatterer, H. (2018). Exercise physiology and nutritional perspectives of elite soccer refereeing. *Scandinavian Journal of Medicine & Science in Sports*, 28 (3), 782–793. DOI: 10.1111/sms.12989.
- Teixeira, V.H., Gonçalves, L., Meneses, T., Moreira, P. (2014). Nutritional intake of elite football referees. *Journal of Sports Sciences*, 32 (13), 1279–1285. DOI: 10.1080/02640414.2014.887851.
- Thomas, D.T., Erdmann, K.A., Burke, L.M. (2016). Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *Journal of the Academy of Nutrition and Dietetics*, 116, 501–528. DOI: 10.1016/j.jand.2015.12.006.
- Weston, M., Castagna, C., Impellizzeri, F.M., Bizzini, M., Williams, A.M., Gregson, W. (2012). Science and medicine applied to soccer refereeing: an update. *Sports Medicine*, 42 (7), 615–631. DOI: 10.2165/11632360-000000000-00000.
- Vella, L.D., Cameron-Smith, D. (2010). Alcohol, Athletic Performance and Recovery. *Nutrients*, 2 (8), 781–789. DOI: 10.3390/nu2080781.
- Volpe, S. (2007). Micronutrient requirements for athletes. *Clinics in Sports Medicine*, 26 (1), 119–130.
- Yavari, A., Javadi, M., Mirmiran, P., Bahadoran, Z. (2015). Exercise-Induced Oxidative Stress and Dietary Antioxidants. *Asian Journal of Sports Medicine*, 6 (1): e24898. DOI: 10.5812/asjasm.24898.

Cite this article as: Gacek, M., Kosiba, G., Wojtowicz, A. (2020). Selected Determinants of the Frequency of Consuming Particular Food Product Groups Among Regional-Level Football Referees. *Central European Journal of Sport Sciences and Medicine*, 4 (32), 5–14. DOI: 10.18276/cej.2020.4-01.