

## SECTION – VARIA

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## SENSE OF GENERALISED SELF-EFFICACY AND THE NUTRITIONAL BEHAVIOUR OF DISTRICT-LEVEL FOOTBALL REFEREES

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### Authors' contribution:

- A. Study design/planning
- B. Data collection/entry
- C. Data analysis/statistics
- D. Data interpretation
- E. Preparation of manuscript
- F. Literature analysis/search
- G. Funds collection

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**Keywords:** football referees, eating behaviour, level of self-efficacy

### Abstract:

**Introduction:** Nutritional behaviours are determined by numerous environmental and individual factors.

**Aim:** The aim of the study was to assess nutritional behaviours among referees of district football matches depending on sense of generalised self-efficacy.

**Materials and methods:** The study was conducted among a group of 138 men - football referees at a regional level (Małopolska and Podkarpackie Football Association) using the author's questionnaire on nutritional behaviours and the Generalised Sense of Self-Efficacy Scale (GSES).

**Results:** The surveyed football referees, at the highest percentage, consumed at least 3 meals a day (85.11%) and preferred unsweetened beverages for hydration (81.11%). The frequency of including cereal products during every meal (71.78%), avoiding fast food (70.00%), hydrating properly after training (66.44%), avoiding sweetened carbonated beverages (59.65%), consuming fish at least once a week (58.88%) and limiting sweet and salty snacks (54.98%) was also high. Referees with a high sense of self-efficacy significantly more often preferred unsweetened beverages ( $p < 0.05$ ), correctly replenished fluids during ( $p < 0.05$ ) and after training ( $p < 0.001$ ), consumed fruit ( $p < 0.001$ ), as well as vegetables ( $p = 0.001$ ), cereal products ( $p < 0.001$ ), dairy products ( $p < 0.01$ ) and fish ( $p < 0.01$ ) at the recommended frequency and avoided energy drinks more often ( $p < 0.05$ ) than referees with low self-efficacy.

**Conclusions:** A limited scale of rational nutritional behaviours and their differentiation due to the level of generalised self-efficacy was indicated in the examined group of male football referees at a regional level, with an indication of more favourable nutrition choices among men with a higher sense of self-efficacy.

### Introduction

Maintaining health and optimisation of exercise capacity is favoured by the implementation of a diet with high nutritional value [1, 2]. An illustration of the current recommendations for people with increased physical activity is the model of the Swiss pyramid, the subsequent levels of which are: unsweetened beverages, vegetables and fruits, whole grains, legumes, protein products and fats, as well as sweet and salty snacks [3]. Current nutri-

tion models emphasize the importance of unsweetened beverages for regulating water and electrolyte balance, as well as vegetables and fruits for regulating antioxidant status and acid-base balance of the body [1-4].

A professional group with increased physical activity, therefore with specific nutritional needs, are referees of football matches. They comprise an integral part of football, and their exercise capacity is important for the course of the match, regardless of the level of competition [5]. It has been shown that football referees cover

a distance of 5 to 10 km and even 11 km during a match, performing efforts of an intensity similar to those playing an assisting position [6, 7], spending up to 800 kcal of energy [8].

Health-related behaviours, including food choices, are determined by a broad spectrum of environmental and personality-related factors [9, 10]. Among psychological features important for the development of health culture, personal resources, including a sense of one's own generalised effectiveness, occupy an important place [10]. Sense of self-efficacy, derived from Bandura's social learning theory, is a belief in the ability to achieve intended goals, including those health-related, which are fostered by, among others, rational eating behaviours [10].

In literature on the subject, there are reports on the diet of athletes training football [11-13], while there are only a few publications on the nutrition of football referees. The works available regard high-class Portuguese [14] and French [15] as well as and Polish central level (female) referees [16]. Due to the fact that the relationship between sense of generalised self-efficacy and the nutritional behaviour of athletes professionally training team games has been shown in previous studies [17, 18], research has been undertaken on the psychological determinants concerning the nutritional behaviour of football referees.

The aim of the study was to analyse the nutritional behaviour of a group of district-level football referees depending on the level of generalised sense of self-efficacy in relation to the qualitative recommendations of the Swiss nutrition pyramid among people with increased physical activity.

## Materials and methods

The study was conducted within the years 2017-2019 among a group of 138 males - football referees associated in the Małopolska and Podkarpackie Football Association, aged 20 to 50 ( $31.69 \pm 8.89$  years), during the football season. Higher education degrees concerned 70.29% of subjects while 29.71% had secondary education. The highest percentage of subjects had technical and engineering education (47.04%) and degrees in physical education (23.56%), while the smaller percentage regarded humanistic (17.64%) and economic (11.76%) fields. The average refereeing experienced was  $8.44 \pm 6.39$  years, and the average number of matches was  $391.11 \pm 335.92$ . The referees' average body mass index (BMI) was  $24.62 \pm 2.44$  kg/m<sup>2</sup>. The majority of the surveyed men were convinced of the positive impact of rational diets on the results of refereeing work (58.88%).

An original nutritional behaviour questionnaire was used in the research. This questionnaire included 17

diagnostic statements referring to the qualitative assumptions of the Swiss nutrition pyramid for athletes. The claims concerned the number and regularity of consuming meals, taking recommended food products into account, limiting foods not recommended for rational nutrition, and compliance with the principles of proper fluid replenishment. With regard to subsequent claims, 2 categories of choice were adopted: yes vs. no. The applied questionnaire was subjected to validation in a group of 23 individuals, conducting a re-test after 6 weeks. The subject questionnaire on nutritional behaviours in psychometric assessment obtained high repeatability. McNemar's  $\chi^2$  test values did not show statistically significant differences between test and re-test results for any of the claims ( $p > 0.05$ ).

To measure the sense of efficacy, the standardised Generalised Self-Efficacy Scale (GSES) by R. Schwarzer, M. Jerusalem and Z. Juczyński [10] was used. The GSES scale, containing 10 statements, is constructed in such a way that the higher the test result (in the range of 10-40 points), the higher the sense of generalised self-efficacy. The median raw results on the GSES scale for the males under study was 30 ( $M \pm SD: 30.94 \pm 4.96$ , Min-Max: 22-40).

Statistical analysis of the results was carried out using the PQStat ver. 1.6 statistical package with the  $\chi^2$  dependency test. A test probability level of  $p < 0.05$  was considered significant, and highly significant at the level of  $p < 0.01$ .

## Results

Among the qualitative assumptions of the Swiss nutrition pyramid for people with increased physical activity, at a high percentage, the football referees implemented the recommendations regarding consuming at least 3 meals a day (85.11%) and preferring mineral water and other unsweetened beverages for hydration (81.11%). The men also highly included cereal products in every main meal (71.78%), avoided fast food products (70.00%), hydrated properly after training (66.44%), avoided sweetened carbonated beverages (59.65%), consumed fish at least once a week (58.88%) and limited sweet and salty snacks (54.98%). To a lesser extent, they hydrated properly during training (46.57%), avoided consuming energy drinks (45.83%), reduced animal fats in their diet (40.09%) and consumed the recommended amount of fruit (36.44%), dairy products (30.76%), whole grains (29.21%), vegetable fats (24.31%) and vegetables (20.54%) (Tab. 1).

Assessing the distribution of nutritional behaviours depending on the level of generalised self-efficacy showed that referees with a high sense of self-efficacy significantly more often preferred unsweetened beverages for

**Table 1.** Nutritional behaviours of district-level football referees depending on the level of generalised self-efficacy (%)

Nutritional behaviours	Total (n=138)	Generalised Sense of Self-Efficacy (GSES)		p
		Low (n=69)	High (n=69)	
1. Preferring mineral water over other unsweetened beverages for hydration	81.11	73.33	88.89	0.022
2. Proper hydration during training (approx. 1 l/h)	46.57	36.00	57.14	0.013
3. Proper hydration after training	66.44	44.00	88.89	<0.001
4. Fruit everyday in the amount of 1-2 servings	36.44	17.33	55.56	<0.001
5. Vegetables everyday in the amount of 2-3 servings	20.54	9.33	31.75	0.001
6. Raw vegetables at least once a day	29.11	36.00	22.22	0.078
7. Grain products during each main meal	71.78	54.67	88.89	<0.001
8. Whole grain cereals at least twice a day	29.21	26.67	31.75	0.512
9. Dairy products at least twice a day	30.76	18.67	42.86	0.002
10. Fish once or twice a week	58.88	44.44	73.33	0.005
11. Limiting consumption of animal fats	40.09	37.33	42.86	0.509
12. Vegetable fats everyday or almost everyday	24.31	28.00	20.63	0.318
13. Limiting consumption of sweetened carbonated beverages	59.65	65.33	53.97	0.174
14. Limiting consumption of energy drinks	45.83	36.00	55.66	0.021
15. Limiting consumption of Fast-food products	70.00	73.33	66.67	0.393
16. Limiting consumption of sweet and salty snacks	54.98	56.00	53.97	0.811
17. Regular consumption of at least 3 meals a week	85.11	81.33	88.89	0.218

p – significance of statistical differences in the chi<sup>2</sup> test

hydration ( $p < 0.05$ ), properly replenished fluids during ( $p < 0.05$ ) and after training ( $p < 0.001$ ), consumed 1-2 servings of fruit ( $p < 0.001$ ) and 2-3 portions of vegetables ( $p = 0.001$ ) daily, cereal products during each meal ( $p < 0.001$ ), dairy products at the recommended frequency ( $p < 0.01$ ), fish at least once a week ( $p < 0.01$ ), and avoided energy drinks ( $p < 0.05$ ) more frequently than referees with low self-efficacy. Other analysed nutritional behaviours did not show a relationship with the level of the males' sense of generalised self-efficacy (Tab. 1).

## Discussion

With reference to the recommendations of the Swiss nutrition pyramid for people undertaking increased physical activity, the presented research has shown a limited scale of rational nutritional behaviour and their relationship with the level of self-efficacy of males - judges of district football matches.

Incorrect nutritional behaviours of the examined football referees concerned, in particular: insufficient frequency of eating fruits and vegetables, whole grain cereals, dairy products, vegetable fats and fish. In addition, incorrect habits were found associated with insufficient

hydration during training, not limiting the consumption of energy drinks and sweetened carbonated beverages as well as animal fats. Diagnosis of occurring nutritional irregularities may be important for the practice of sports nutrition, because nutrition is an important condition for maintaining health and fitness for efforts, and judges are usually not covered by professional care of nutrition consultants (nutritionists).

Low consumption of vegetables and fruits may limit, among others, the supply of antioxidant vitamins (C and carotenoids) and polyphenols, which is unfavourable within the context of oxidative stress generated under physical exercise [4]. Low consumption of fruit and vegetables as well as low-grain cereal products also increases the risk of group B vitamin (regulating metabolic processes) and fibre deficiencies. Low consumption of dairy products increases the risk of calcium deficiency, which is involved in the regulation of neuromuscular excitability and acid-base balance [19]. Low consumption of sea fish can reduce the supply of omega 3 PUFAs, which optimise the blood lipid profile [20].

Incorrect nutritional behaviours found in the examined group of football referees correspond to the trends described in other studies among this group. Research in an elite group of Portuguese referees also revealed

incorrect habits related to insufficient consumption of high nutrient density products, affecting the unbalanced supply of some antioxidant vitamins, group B vitamins, dietary fibres, calcium and magnesium [14]. The results of this study, which showed a small scale of reducing animal fats and salty as well as sweet snacks, and, at the same time, the consumption of vegetable fats and fish, correspond to the results of studies carried out among Portuguese referees, in whom excessive supplies of saturated fatty acids, cholesterol and sodium were described, and insufficient supplies of polyunsaturated fatty acids [14]. In turn, insufficient hydration during training among district referees referred to the tendencies shown in the group of elite Portuguese football referees, who also showed incorrect strategies for fluid replenishment [14]. Meanwhile, football referees are advised to use such hydrating strategies (before and during the match) as required by athletes to prevent loss of cognitive and physical abilities, especially when refereeing in difficult conditions [5]. Other studies among 82 women - Polish central level football referees - also showed improper implementation regarding the quality recommendations of the Swiss nutrition pyramid, especially concerning the recommended frequency of consuming vegetables and cereals from low-milling and dairy products [16]. At the same time, it was found that the scale of rational nutritional behaviours among the elite group of football referees (women) was greater than the examined district-level referees, especially in the area of daily consumption of raw vegetables (41.46% vs. 29.11%), whole grain cereals (43.90% vs. 29.21%), vegetable fats (84.14% vs. 24.31%) and the reduction of animal fats (84.14% vs. 40.09%) as well as energy drinks (67.07% vs. 45.83%) [16].

Similar, incorrect behaviours 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 [17, 18, 21], as well as among English and Australian footballers [11, 22] and Irish and British rugby players [23, 24]. The small scale of animal fat reduction described in the authors' research corresponds to studies confirming the frequent oversupply of fats, especially saturated fatty acids in the diet of Spanish [25] and American [26] footballers.

In the discussed studies, diversity was also shown regarding some eating behaviours depending on the level of generalised level of self-efficacy of football referees, with an indication of more favourable choices among men convinced of their higher sense of generalised self-efficacy. These trends particularly concerned the use of correct fluid replenishment strategies, consumption of fruit, vegetables, cereals, dairy and fish products as

well as limiting energy drinks in one's diet. The relationships found, indicating the importance of a high level of self-efficacy for the development of more correct nutritional choices among football referees, are justified in the characteristics of this personality dimension and refer to the results of other studies. The more rational food choices of judges with a high sense of self-efficacy can be explained by their belief in the possibility of achieving specific goals, including those health-related, in which a rational nutrition model plays a significant role. Similar tendencies towards more rational food choices of people with higher levels of self-efficacy were obtained in other groups of people with increased physical activity, including among juniors training football [17], Polish players of American football [18] and athletes training individual disciplines [27]. For example, Polish players of American football with high self-efficacy significantly more often than those with low levels consumed the recommended number of servings of vegetables (54% vs. 26%) and cereal products (87% vs. 50%) as well as the recommended number of meals during the day (96% vs. 70%) [18].

Incomplete implementation of qualitative nutrition recommendations in the examined group of men - football referees at a regional level, confirmed the legitimacy of monitoring and rationalising the diets of people semi-professionally (and professionally) associated with sport, for whom diet is one of the factors contributing to achieving professional success. The need for nutritional education of football referees was also pointed out by Portuguese [14] as well as Austrian, Swiss and Italian [5] authors. At the same time, authors from various centres indicate the need for education in the field of rational nutrition and fluid intake as well as prevention of nutritional deficiencies (including iron and vitamin D). Simultaneously, the authors draw attention to the need to develop nutritional recommendations for football referees [5].

The presented results can only be referred to the examined group of district-level referees, and further research should take a more representative group into account, representing different sports levels and a broader spectrum of factors determining the quality of nutritional choices.

## Conclusions

1. In the examined group of regional-level football referees, incomplete implementation of the quality recommendations of the Swiss nutrition pyramid was demonstrated, especially within the area of the recommended frequency of consuming vegetables and fruits, whole grain cereals, dairy products as well as vegetable fats and fish. Other dietary mistakes con-

cerned: incorrect fluid replenishment strategies and not restricting energy drinks or sweetened carbonated beverages and animal fats.

2. In the examined group of football referees at a regional level, differentiation of some eating behaviours was shown depending on the level of their generalised sense of self-effectiveness, with an indication of more favourable choices among men with a higher sense of self-efficacy, particularly related to the implementation of correct hydration strategies, consumption of fruits, vegetables, cereals, dairy and fish products, and reducing energy drinks in one's diet.
3. The results suggest the legitimacy of monitoring and rationalising the diet of individuals professionally (and semi-professionally) associated with sport, also at its lower levels.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Ethics Committee

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