

SELECTED PERSONAL RESOURCES AND NUTRITIONAL BEHAVIOURS OF POLISH HANDBALL PLAYERS

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ABSTRACT

Background. Diet, as one of the factors influencing exercise capacity depends, among others, on individual conditions.

Objective. The aim of the study was to analyse the nutritional behaviours of Polish handball players depending on their level of generalised self-efficacy as well as disposable optimism and satisfaction with life.

Material and methods. The study was carried out among a group of 142 men, aged 20-34, professionally training handball, using the author's original nutritional behaviour questionnaire and the Generalised Self-Efficacy Scale (GSES), the Life Orientation Scale (LOT-R) and Satisfaction with Life Scale (SWLS). Statistical analysis of the results was conducted by estimating Spearman's signed rank correlation coefficients, assuming the significance level of $p < 0.05$.

Results. To the highest degree, the handball players fulfilled recommendations regarding the regular consumption of at least 3 meals a day, adequate fluid supplementation in conditions of physical exercise and eating the most caloric meal before or after main training sessions. Along with the increase in sense of efficacy (GSES), the scale of reducing sweet and salty snacks increased ($p < 0.05$). Increasing optimism was conducive to proper hydration ($p < 0.05$) and avoidance of sweet and salty snacks ($p < 0.05$). With the increase in sense of satisfaction with life, the implementation of recommendations regarding the consumption of dairy products and vegetable fats, as well as adequate fluid supplementation in conditions of physical exercise, increased ($p < 0.05$).

Conclusion. In the studied group of handball players, a limited scale of implementing qualitative nutritional recommendations for athletes was demonstrated. Moreover, positive correlations were noted between the analysed personal resources and some rational nutritional behaviours of the athletes, especially in terms of avoiding non-recommended products and correct fluid replenishment.

Key words: *nutritional behaviours, handball players, feeling of generalised self-efficacy, dispositional optimism, satisfaction with life*

STRESZCZENIE

Wstęp. Sposób żywienia, jako jeden z czynników wpływających na zdolności wysiłkowe, zależy m.in. od cech osobniczych. **Cel.** Celem badań była analiza związków pomiędzy nasileniem poczucia uogólnionej skuteczności, dyspozycyjnego optymizmu i satysfakcji z życia a zachowaniami żywieniowymi polskich piłkarzy ręcznych.

Material i metody. Badania przeprowadzono w grupie 142 mężczyzn w wieku 20-34 lata, wyczynowo trenujących piłkę ręczną, z zastosowaniem autorskiego kwestionariusza zachowań żywieniowych oraz Skali Uogólnionej Własnej Skuteczności (GSES), Skali Orientacji Życiowej (LOT-R) oraz Skali Satysfakcji z Życia (SWLS). Analizę statystyczną przeprowadzono poprzez oszacowanie współczynników korelacji rang Spearmana, na poziomie istotności $p < 0,05$.

Wyniki. Piłkarze ręczni w najwyższym odsetku realizowali zalecenia dotyczące regularnego spożywania przynajmniej 3 posiłków dziennie, odpowiedniej podaży płynów w warunkach wysiłku fizycznego oraz spożywania najbardziej kalorycznego posiłku przed lub po głównym treningu. Wraz z nasilaniem się poczucia uogólnionej skuteczności zwiększała się skala ograniczania słodkich i słonych przekąsek ($p < 0,05$). Wyższe nasilenie optymizmu było związane z prawidłowym uzupełnianiem płynów ($p < 0,05$) oraz unikaniem słodkich i słonych przekąsek ($p < 0,05$). Wraz z nasilaniem się poczucia satysfakcji z życia zwiększała się realizacja zaleceń dotyczących spożywania produktów mlecznych i tłuszczów roślinnych oraz prawidłowego uzupełniania płynów w czasie wysiłku fizycznego ($p < 0,05$).

Wnioski. Wśród badanych piłkarzy ręcznych wykazano ograniczoną skalę realizacji jakościowych zaleceń żywieniowych dla sportowców oraz pozytywne związki pomiędzy analizowanymi zasobami osobistymi a racjonalnymi zachowaniami żywieniowymi, szczególnie w zakresie ograniczania produktów o niskiej gęstości odżywczej i prawidłowego uzupełniania płynów.

Słowa kluczowe: *zachowania żywieniowe, piłkarze ręczni, poczucie własnej uogólnionej skuteczności, dyspozycyjny optymizm, satysfakcja z życia*

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Publisher: National Institute of Public Health NIH - National Research Institute

INTRODUCTION

One of the current models of sports nutrition is the Swiss Pyramid, which recommends adequate hydration and daily consumption of vegetables and fruits, whole grains, dairy products and vegetable fats. It also indicates other sources of complete proteins for consumption, including fish, as well as limiting animal fats and salty and sweet snacks [3].

A group with increased and specific nutritional needs comprises professional handball players, whose training effectiveness depends on the level of various motor characteristics, including speed, agility, strength and physical endurance [41, 42]. In handball, interval efforts and body contact occur, requiring players to, e.g. acquire high muscle strength [10]. Emotional state and coping with stress also play significant roles in the sports performance [25] and intellectual abilities of the athletes [46]. The significance of personal resources has also been confirmed, including a high level of disposable optimism, which increases the motivation to achieve success in sports [39].

Vigorous exercise during handball games necessitates meeting increased nutritional demands [24]. A rational diet (possibly enriched with supplementation) increases exercise capacity, and thus, the effectiveness of training and rate of post-exercise regeneration, while reducing the risk of injury [36]. Meanwhile, in a new systematic literature review, it was found that athletes performing team sports do not meet nutritional recommendations, especially in terms of energy and carbohydrate supply [5, 26].

Health behaviours, including those related to nutrition, are conditioned by numerous environmental and personality factors [37]. Among the psychological features essential in shaping health culture, personal resources occupy an important place, including sense of generalised self-efficacy and level of disposable optimism, as well as satisfaction with life. The construct of self-efficacy, developed as part of Bandura's social learning theory, expresses the belief in the ability to achieve intended goals, including those concerning health and sports, which are achieved, e.g. by rational eating behaviours [2, 8, 9, 28]. It is worth adding that the achieved success, including those sport-related, significantly strengthens sense of generalised self-efficacy [2]. Dispositional optimism is an expression of generalised expectations concerning the positive effects of an individual's activity [4, 43]. Therefore, it is an important individual resource that stimulates motivation, perseverance and determination in achieving goals, including sports objectives. Satisfaction with life, in turn, is a subjective measure of well-being related to the cognitive assessment of quality of life [11, 28]. Within this context, the above-mentioned personal resources are important

personality traits with a potentially predictive role for the quality of health behaviours, including nutritional ones, important for the optimisation of sports training. In previous studies, relationships have been demonstrated between the various personal resources and eating habits of competitive athletes [13-17, 20], football referees [18] and physical education students [19]. Research in the field of psychological determinants of athletes' nutrition also concerned personality traits [21, 22].

Nutritional choices are important for the health and exercise capacity of handball players. The available studies concern nutrition of handball players competing at the Super-league level [7], the influence of nutritional education on the nutritional status indices and eating habits of these athletes [35], the use of sports supplements in professional handball depending on gender and level of competition [36], assessment of energy and nutrient supply in the diet of Slovenian semi-professional handball players [47], the relationships between diet and physical activity performance of juniors training handball [30] and determinants of knowledge level regarding nutrition among Turkish handball players [23]. The latest works of Spanish authors concern the relationship between adherence to the recommendations of the Mediterranean diet and the body composition and physical capacity of beach handball players [32, 40], between nutrient intake and body composition and physical capacity of female beach handball players [31] and eating disorders among elite beach handball players [33].

Due to the fact that a relationship between personal resources and nutritional behaviour of athletes who train professionally in team sports has been shown in previous studies [13, 14, 15, 16, 20], research has been undertaken on selected individual determinants of food choices among handball players, who are a group under-researched in this area.

The aim of the study was to assess the nutritional behaviours of Polish handball players depending on basic personal resources (level of generalised self-efficacy, dispositional optimism and satisfaction with life) in relation to the recommendations of the Swiss Food Pyramid for athletes.

MATERIAL AND METHODS

The study was carried out among a group of 142 men, aged 20-34 (22.9 ± 4.2) and, training handball competitively (1st, 2nd, 3rd league and Super-league). The basic criterion for the open selection of participants was playing sports professionally for at least 3 years. The participants' professional sports experience was between 3 and 23 years (9.6 ± 4.4). The studied players, in relation to the current classification of the level of

activity and sports abilities [34], can be assigned to Tier 3 (Highly Trained/National Level).

In the study, an author-created, validated nutritional behaviour questionnaire was used. It refers to the qualitative recommendations of the Swiss Food Pyramid for people demonstrating increased physical activity, presented in the literature [3]. The questionnaire consists of 22 items on rational eating behaviours, with a 5-point *Likert* response scale (1 to 5, from 'definitely not', 'rather not', 'difficult to say', 'rather yes' to 'definitely yes'). The scale is constructed in such a way that the higher the score, the more intense the rational eating behaviour. The questionnaire enquiries concerned: regular consumption of at least 3 meals a day, recommended frequency of consuming vegetables and fruits, whole grains, dairy products, other nutritional sources of protein, adequate hydration before, during and after training, preferred fats and limiting non-recommended products (sweets, fast-food products, carbonated and non-carbonated sweetened beverages and energy drinks). The questionnaire is a reliable research tool, which was confirmed via the validation procedure (high internal consistency, *Cronbach's* α coefficient totalling 0.79).

Sense of efficacy was measured using the Generalised Self-Efficacy Scale (GSES) by *Schwarzer, Jerusalem* and *Juczyński* [28]. The GSES, containing 10 items, is 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 of raw scores on the GSES scale of the examined handball players was 32 ($M=31.6$, $SD=3.27$). The level of disposable optimism was measured using the Life Orientation Test (LOT-R) by *Scheier, Carver* and *Bridges*, in the adaptation by *Poprawa* and *Juczyński* [28]. On the LOT-R scale, consisting of 10 statements (6 diagnostic), the higher the result (within the range of 0-24), the higher the level of optimism. The median of raw scores on the LOT-R scale for the studied handball players totalled 16 ($M=16.12$; $SD=3.35$). Satisfaction with life was measured via the Satisfaction with Life Scale (SWLS) by *Diener, Emmons, Larsen* and *Griffin*, in the adaptation by *Juczyński* [28]. On the SWLS scale consisting of 5 items, the higher the score (within the range of 5-35), the higher the level of satisfaction with life. The median of raw SWLS scores among the assessed handball players was 29 ($M=28.6$, $SD=1.85$).

Research has been conducted in accordance with the principles found in the Declaration of Helsinki, after obtaining informed consent from the participants.

Statistical analysis of the results was performed using the PQStat ver. 1.8.0.444. The relationships between the level of generalised self-efficacy, dispositional optimism as well as satisfaction with life

and the level of rational food choices were analysed by estimating the *Spearman's* signed rank correlation coefficients. The test probability at the level of $p<0.05$ was considered significant, while $p<0.01$, highly significant.

RESULTS

The assessment of intensity regarding rational eating behaviours (on a scale of 1-5), according to the median value, allowed to confirm that the handball players under study fulfilled recommendations concerning the consumption of at least 3 meals a day, adequate fluid replenishment during exercise and the preference of water for hydration ($Me=5.00$ i.e. 'definitely yes'). They also largely complied with the recommendations for regularity of meals and the consumption of the most caloric meal before or after the main training ($Me=4.00$, i.e. 'rather yes'). Other recommendations were implemented to a lesser extent ($Me=3.00$, i.e. 'difficult to say') (Table 1).

Statistical analysis demonstrated significant correlations between the intensity of the analysed personality dimensions and some nutritional behaviours of athletes. It has been shown that along with the increase in sense of efficacy (GSES), the scale of rational food choices in terms of reducing sweet and salty snack consumption increased ($R=0.21$, $p<0.05$). It has also been indicated that with the increase in the level of disposable optimism (LOT-R), the implementation of recommendations on correct fluid replenishment during exercise also increased ($R=0.17$, $p<0.05$), as well as avoiding sweet and salty snacks ($R=0.14$, $p<0.05$). There was also a positive correlation between the intensity of the sense of satisfaction with life (SWLS) and the consumption of milk and dairy products at least twice a day ($R=0.14$, $p<0.05$), daily consumption of vegetable fats ($R=0.16$, $p<0.05$) and adequate hydration during exercise ($R=0.21$, $p<0.05$) (Table 2).

DISCUSSION

The discussed research allowed to demonstrated improper nutritional behaviours as well as correlations between the analysed personal resources and some aspects of nutritional behaviours among professional athletes training handball.

The revealed abnormalities concerned, in particular, the low implementation of the recommendations regarding the consumption of highly nutritional products (vegetables and fruit, cereals, including wholemeal products, dairy products, fish), restriction of products with low nutritional value (sweet and salty snacks) and the implementation of a varied diet. Also noteworthy is the limited level of implementing

Table 1. Implementing recommendations of the Swiss pyramid among athletes training handball (descriptive statistics)

Nutritional behaviours	Min	Max	Me	Q25	Q75
Consuming at least 3 meals a day	3.00	5.00	5.00	5.00	5.00
Regular meal consumption (every 3-5 hours)	1.00	5.00	4.00	3.00	4.00
Most caloric meal before or after main training	1.00	5.00	4.00	3.00	4.00
200 ml of vegetable or fruit juice every day	1.00	5.00	3.00	3.00	4.00
Vegetables with at least 2 meals a day	1.00	5.00	3.00	2.00	4.00
Raw vegetables at least once a day	1.00	5.00	3.00	2.00	3.00
2-3 servings of vegetables every day	1.00	5.00	3.00	2.00	3.00
1-2 servings of fruit every day	1.00	5.00	3.00	3.00	4.00
Cereal products with every main meal	1.00	5.00	3.00	3.00	3.00
Whole-grain cereal products at least twice a day	1.00	5.00	3.00	3.00	4.00
Milk or dairy products at least twice a day	1.00	5.00	3.00	2.00	3.00
Fish consumption 1-2 times a week	1.00	5.00	3.00	3.00	4.00
Limiting animal fats in diet	1.00	5.00	3.00	3.00	4.00
Vegetable fats every day (almost every day)	1.00	5.00	3.00	2.00	3.00
Adequate hydration during exercise	3.00	5.00	5.00	5.00	5.00
Adequate hydration after exercise	3.00	5.00	5.00	4.00	5.00
Preference of water for hydration	2.00	5.00	5.00	5.00	5.00
Avoiding sweet carbonated and non-carbonated beverages in diet	1.00	5.00	5.00	4.00	5.00
Avoiding energy drinks in diet	2.00	5.00	5.00	4.00	5.00
Avoiding fast-food products in diet	2.00	5.00	5.00	4.00	5.00
Limiting consumption of sweet and salty snacks	2.00	5.00	3.00	3.00	4.00
Varied diet	1.00	5.00	3.00	2.00	4.00

Scale: 1 – ‘definitely not’, 2 – ‘rather not’, 3 – ‘difficult to say’, 4 – ‘rather yes’, 5 – ‘definitely not’

recommendations regarding the reduction of animal fats in favour of vegetable oils and nuts. On the other hand, positive trends were found in hydration behaviours during and after exercise, which is an important area of sports nutrition, directly related to health and exercise capacity. Among others, the preference of water and other unsweetened beverages was confirmed, as well as limiting hypertonic beverages (sweet carbonated and non-carbonated beverages and energy drinks), which indicates the correct selection of fluids for hydration.

Assessment of the described choices within the context of nutritional recommendations and nutritional value of individual product groups may indicate a potentially low supply of antioxidants, potassium and magnesium (low daily level of consuming vegetables and fruits), which is negative with regard to antioxidant status, in which a diet rich in, i.e. vegetables and fruits, is important for its regulations [12]. Excessively low compliance with the recommendations regarding the consumption of wholemeal cereal and dairy products may limit the supply of dietary fibres and calcium. The risk of the low intake of probiotic products (e.g. fermented milk) in the diet should also be emphasised because it creates a risk of developing dysbiosis in

athletes [6]. In turn, a too low frequency of consuming sea fish, oils and nuts may reduce the supply of unsaturated acids, including omega 3, which positively regulate the blood lipid profile [44].

Improper nutritional decisions found in the studied group of handball players correspond with the trends described by other authors. Similar nutritional mistakes, related to the insufficient consumption of certain groups of food products with high nutritional density, including whole grain cereal and dairy products, as well as fish, have also been described among athletes training team sports [1, 13, 27, 38]. The obtained results can also be related to the study among handball players. In a trial on professional Spanish handball players (N=14), excessively low energy levels were also found, as well as low energy from carbohydrates but high from fats [35]. In another study on 2 Slovenian semi-professional handball teams (17 men and 9 women) from the 1st league, insufficient energy and carbohydrate intake as well as excessive fat intake were also found [47]. Similarly, in a study among handball players at the Superleague level, positive eating behaviours were noted with regard to the number and frequency of consuming meals, however, their diet was not balanced, as deficits

Table 2. Correlations between intensity of personal resources and national nutritional behaviours among handball players (*Spearman's* signed rank correlation coefficient value)

Nutritional behaviours	GSES	LOT-R	SWLS
Consuming at least 3 meals a day	0.02	0.13	0.10
Regular meal consumption (every 3-5 hours)	0.03	0.13	0.01
Most caloric meal before or after main training	0.04	0.13	0.09
200 ml of vegetable or fruit juice every day	0.12	0.01	0.01
Vegetables with at least 2 meals a day	0.03	0.02	0.03
Raw vegetables at least once a day	0.02	0.07	0.01
2-3 servings of vegetables every day	0.06	0.05	0.09
1-2 servings of fruit every day	0.02	0.01	0.01
Cereal products with every main meal	0.01	0.01	0.09
Whole-grain cereal products at least twice a day	0.07	0.02	0.09
Milk or dairy products at least twice a day	0.05	0.02	0.14*
Fish 1-2 times a week	0.09	0.06	0.01
Limiting animal fats in diet	0.06	0.12	0.12
Vegetable fats every day (almost every day)	0.09	0.12	0.16*
Adequate hydration during exercise	0.11	0.17*	0.21*
Adequate hydration after exercise	0.01	0.09	0.03
Preferring water for hydration	0.06	0.02	0.12
Avoiding sweet carbonated and non-carbonated beverages in diet	0.04	0.02	0.03
Avoiding energy drinks in diet	0.04	0.11	0.12
Avoiding fast-food products in diet	0.01	0.07	0.05
Limiting consumption of sweet and salty snacks	0.21*	0.14*	0.05
Varied diet	0.01	0.01	0.05

*- statistical significance at the level of $p < 0.05$

GSES - Generalised Self-Efficacy Scale, LOT-R - Life Orientation Scale, SWLS - Satisfaction with Life Scale

in energy, protein, calcium, iron and potassium were found, as well as an excess of fat, phosphorus and sodium intake [7]. In another study regarding the relationships between diet and training effectiveness of junior handball players (N=57) from Târgu Mures, a correlation was confirmed between food consumption and exercise effectiveness. It has been noted that for young athletes, diet quality is crucial for achieving a high level of training [30]. Nutritional abnormalities associated with incomplete adherence to the Mediterranean diet have also been described among Spanish beach handball players [31, 32, 40]. Thus, the results of the author's study, as well as research carried out by other authors, allow to indicate qualitative and quantitative improper nutritional behaviours among athletes training handball, regardless of gender and sports level. The described incorrect nutritional behaviours noted among the examined handball players, which could reduce the nutritional value of their diets, confirmed the validity of monitoring and rationalising the diets of athletes, as a rational diet is one of the factors contributing to achieving professional success. Other authors also

drew attention to the need for nutritional education in handball players [23, 35].

The discussed research conducted among handball players also allowed to show a relationship between the sense of self-efficacy and the level of optimism, as well as satisfaction with life, and the implementation of certain nutritional recommendations. The observed statistically significant positive correlations concerned the tendency towards more severe reduction of sweet and salty snacks along with an increase in self-efficacy and optimism, proper fluid replenishment with an increase in optimism and life satisfaction, and also the implementation of recommendations regarding the consumption of dairy products and vegetable fats with increasing life satisfaction. The demonstrated correlations indicate the predictive importance of the analysed personality dimensions for the diet quality of handball players and, in particular, the relationship between a high level of self-efficiency, optimism and life satisfaction with more correct nutritional choices of athletes. This correlation can be explained by psychological characteristics. A high level of self-efficiency, disposable optimism and satisfaction

with life increases the belief in the possibility of achieving the set goals, increasing motivation and determination to achieve objectives. Therefore, these features constitute important individual resources that stimulate pro-health behaviours, including those related to rational eating practices [2, 4, 28, 43]. In athletes, a rational model of nutrition is a key factor in maintaining health and optimising the effects of training [3].

Similar tendencies towards more rational nutritional choices among people with a higher intensity of the analysed personal resources (self-efficacy, optimism and satisfaction with life) were also obtained in other studies among athletes, both in Poland and in other countries. For example, the relationship between sense of self-efficacy and more rational eating behaviours has been described among Polish football (American football) players [13]. Also, research among Polish basketball players showed a correlation between higher level of self-efficacy and rational eating behaviours in terms of regularity of consuming meals, preferring non-sweetened beverages, the daily consumption of fruit and vegetables, and avoiding fast food and confectionery products [20]. Overall, the meta-analysis allowed to confirm the predictive significance of a high level of self-efficacy for promoting health-related behaviours, including those nutrition-related [45]. On the other hand, among Polish athletes training team sports (252 women and 266 men, 19-34 years old), it was shown that players with a high level of optimism and satisfaction with life, consumed fruit and vegetables significantly more often, and people with a high level of optimism consumed vegetable oils and other vegetable fats at a significantly higher frequency. The statistical analysis also allowed to confirm a significant positive relationship between the level of disposable optimism and the general index of rational eating behaviours among athletes [15]. Furthermore, in research among football players, a positive correlation was noted between the level of dispositional optimism and the frequency of consuming recommended products (fruit, whole grains, nuts), and a negative correlation with the frequency of consuming non-recommended products (e.g. sweets and confectionery products, energy drinks) [14]. Similarly, in the research by Lipowski [29], a positive correlation was demonstrated between the level of optimism and some pro-health behaviours of women practicing sports.

The significance of the presented work is related to addressing the underexploited research issues regarding selected determinants of food choices among handball players. The author is aware of the limitations of the work (questionnaire research, limitations of author-designed questionnaire on nutrition, small number of analysed factors), hence, referring to them, it should be

noted that in subsequent research, a greater number of analysed variables (wider nutritional analysis, broader spectrum of psychological and environmental factors) should be taken into account.

CONCLUSIONS

In the studied group of handball players, a limited scale of implementing qualitative nutritional recommendations for athletes was demonstrated, particularly, in terms of the frequency of consuming high-nutritional products (vegetables and fruit, cereal products, including wholemeal and dairy products, fish) and applying a varied diet, which could have reduced the nutritional value of the diet.

In the studied group of handball players, the relationship between the analysed personal resources and some eating behaviours was demonstrated, with an indication of a tendency towards more rational choices along with the increase in level of self-efficacy, optimism and satisfaction with life. The positive trends concerned, in particular, limiting non-recommended products (sweet and salty snacks), consumption of recommended products (dairy and vegetable fats) and proper fluid replacement in conditions of physical exercise.

The results allow to suggest validity of the analysis concerning determinants of nutritional behaviour, as well as monitoring and rationalisation of the handball players' diet so that they could be supportive of the health and physical fitness of athletes.

Conflict of interest

None declared.

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Received: 30.01.2023

Accepted: 06.03.2023