DOI: 10.22630/TPFP.2023.1.5051

ORIGINAL PAPER
Received: 24.07.2023
Accepted: 30.10.2023

CONSUMPTION OF SELECTED FOODS BY ADOLESCENTS IN GDYNIA AS DETERMINANTS OF HEALTH BEHAVIOUR: A PILOT STUDY

Anna PLATTA[1]✉, Anna MIKULEC[2]✉, Agnieszka ŻUKOWSKA[3]

[1]Gdynia Maritime University, Poland
[2]University of Applied Science in Nowy Sącz, Poland
[3]Specialized Clinic – Dietetics, Poland

Abstract: The aim of the study was to assess the dietary habits of adolescents aged 15–18 years, including the frequency of consumption of products that are an important source of dietary fibre, saturated fatty acids and products containing nutrients recommended for the prevention of depression, as well as the self-assessment of the study group regarding the frequency of symptoms characteristic of depression, including depression and/or irritability and the ability to concentrate. Purposive group selection was used. The empirical study was conducted in 2022 in a group of adolescents (n = 242) attending secondary schools in Gdynia. Three aspects of dietary behaviour were assessed using the food frequency questionnaire method: 1. Consumption of products that are important sources of dietary fibre; 2. Consumption of products high in saturated fats or important sources of dietary fat; 3. Consumption of selected foods containing nutrients recommended for the prevention of depression. The study results presented are limited by the small sample size and scope of the study. However, the analysis of the consumption of selected food groups by the respondents showed that gender, BMI, and dietary habits have an impact on the type of selected foods consumed by adolescents and, therefore, on the satisfaction of individual nutrient requirements and the occurrence of symptoms characteristic of depression: depression and/or irritability. It is useful and legitimate to carry out research on the nutritional behaviour of adolescents, since there is an established need to take action in the field of health and to pay more attention to the mental and physical state of adolescents and their parents (families).

Key words: health behaviour, eating behaviour, quality of life, adolescents

INTRODUCTION

The analysis of changes in consumer behaviour around the world allows us to hypothesise that trends in food consumer behaviour are a consequence of the risks that are occurring, which translate into food and food security [1]. The above values are known to be closely linked to the Sustainable Development Goals (SDGs), providing a roadmap for transforming and reshaping the world [2]. Caring for health and the environment is becoming an important part of

✉ Anna Platta – Faculty of Management and Quality Science; 81-225 Gdynia, 81–87 Morska St., Poland; e-mail: a.platta@wznj.umg.edu.pl; https://orcid.org/0000-0002-7963-1889
✉ Anna Mikulec – Faculty of Engineering Sciences, University of Applied Science in Nowy Sącz; 33-300 Nowy Sącz, 1a Zamenhofa St., Poland; e-mail: amikulec@ans-ns.edu.pl; https://orcid.org/ 0000-0002-2737-5967
Agnieszka Żukowska – Specialized Clinic – Dietetics, Poland; https://orcid.org/0009-0003-8805-8150

the life of societies [3, 4]. The choice of food for consumption is strongly focused on its beneficial effects on human health [5, 6, 7, 8] and on the selection of products free from chemical contaminants and synthetic additives [9, 10].

According to the World Health Organization, depression is one of the most common diseases in the world [11]. The diet of whole populations and individuals affects many aspects of life, including symptoms and risk of depression [12]. A systematic review of randomised trials confirmed the beneficial effect of dietary interventions in reducing symptoms of depression [13, 14]. There are publications in the literature on the role of diet and specific nutrients in the development and treatment of depression [12, 15, 16]. The rationale for research in this area is particularly influenced by the growing consumer awareness of the link between people's dietary behaviour and their health status.

Regarding specific dietary nutrients and their effects on depressive symptoms, beneficial effects in the treatment of depression have been demonstrated for n-3 fatty acids [17], zinc [18, 19], N-acetylcysteine [20], B vitamins (including folate) [21] and vitamin D [22]. According to Wawer [16], magnesium deficiency is an important factor in the development of depression, and dietary magnesium supplementation may improve the efficacy of antidepressant medication [15, 16, 23]. In addition, dietary selenium deficiency has been shown to affect depressive mood [12, 16]. The literature suggests that consumption of foods containing B vitamins, particularly vitamins B_1, B_2, B_6, B_{12} and folic acid, may benefit nervous system function. These vitamins are most abundant in foods such as meat, cereals, legumes, dairy products, eggs, fish, and leafy vegetables [24]. Long-chain polyunsaturated fatty acids of the n-3 family, found in fish and vegetable oils, have also been shown to be responsible for neuronal maturation and brain myelination, and are involved in synaptogenesis and neurogenesis. It has been reported that supplementation with n-3 fatty acids may have some beneficial effects in alleviating symptoms of depression [23]. Unfortunately, there is no precise data on the effect of antioxidant supplementation on the reduction or prevention of depressive symptoms [25]. According to Lai et al. [26], a diet rich in fruit, vegetables, and fish was associated with a lower risk of depression, whereas a diet high in simple carbohydrates and highly processed foods was associated with a higher risk of depression. A Mediterranean diet and higher fish consumption have been confirmed to be associated with reduced serum [27] and urinary markers of oxidative stress [28]. An analysis of the literature revealed a lack of data on potential associations between the frequency of consumption of selected foods and the absence of depressive symptoms in adolescents and adults, as well as improvements in the health of patients with mental disorders. The aim of this study was to assess the dietary habits of adolescents aged 15–18 years, including the frequency of consumption of products that are an important source of dietary fibre, saturated fatty acids and products containing nutrients recommended for the prevention of depression, as well as the self-assessment of the study group regarding the frequency of symptoms characteristic of depression, including depression and/or irritability and the ability to concentrate.

MATERIAL AND METHODS

To achieve the intended purpose, a survey was conducted from September to December 2022 using the CAWI (computer-assisted web interview) technique for data collection. Purposive group selection was used. The empirical survey was conducted among a group of young people aged between 15 and 18 years (n = 242) attending secondary schools in Gdynia: II High School, Academic High School, XIV High School, Refrigeration Technical School, Economics Technical School, and Hotel Technical School. Respondents gave informed and voluntary consent to participate in the study. The parents or legal guardians of the adolescents agreed to their children's participation in the study. They also confirmed that they were aware of the risk factors associated with administering the CAWI survey. The young people and their parents were informed that the results would be made available in publications and presentations. The results made available will be aggregated (grouped) data, without individual results. The students and their parents were also informed that all electronic data would be encrypted and stored on a computer that was password-protected. Our research focused on the expression of opinions by respondents belonging to a specific age group, but participating in the survey voluntarily and anonymously, about which the survey participants were informed. The survey itself was not related to their health status and was not carried out in units of the broader health service. The study did not have the character of medical research.

The questionnaire consisted of thematic blocks, including information characterising the study population (gender, age, height, body weight), expression of the respondents' opinions on the individually implemented dietary recommendations recommended by the National Institute of Public Health-National Institute of Hygiene (NIPH-NIH); (Poland) for their population group, assessment of the frequency of consumption of selected food groups (including foods containing saturated fatty acids, fibre, B vitamins, selenium, zinc, and magnesium, whose intake is recommended in sufficient quantities to prevent depressive symptoms) as well as an assessment of the prevalence of feelings of depression and/or irritability and problems concentrating on daily tasks.

Three aspects of dietary behaviour were assessed using the food intake frequency questionnaires: 1. intake of foods that are important sources of dietary fibre intake; 2. intake of foods high in saturated fats or important sources of dietary fat; 3. intake of selected foods containing nutrients recommended for the prevention of depression. Two validated questionnaires were used for the assessment: 1. the Block Screening Questionnaire for Fruit/Vegetable/Fibre Intake (BSQFVF) [19]; 2. the Block Screening Questionnaire for Fat Intake (BSQF) [28] as modified by Czarnocińska et al. [29].

The Block Screening Questionnaire for Fruit/Vegetable/Fibre Intake was used to obtain data on the usual frequency of consumption of 9 food groups that are sources of dietary fibre. Respondents were asked about their intake of salads, legumes, potatoes, other vegetables, fruit and vegetable juices, fruit, coarse grains, and wholemeal bread. Five categories of intake frequency were used for scoring: less than once a week – 0 points, once a week – 1 point, 2–3 times a week – 2 points, 4–6 times a week – 3 points, daily – 4 points. Fibre intake was expressed on a point scale (0–36 points). Based on the sum of the points, people with a fibre intake were distinguished: very low (<20 points), insufficient (20–29 points), sufficient (≥30 points).

The Block Screening Questionnaire for Fat Intake was used to collect information on the usual frequency of consumption of 13 food groups that are either separate fats or important sources of fat in the diet. Questions were asked about: burgers/cheeseburgers/lasagne/pizza/casseroles, red meat, fried poultry, sausages/frankfurters/ /kabanos, fatty sausages/pâté/black pudding/minced meat/bacon, salad dressings/mayonnaise, margarine/butter, yellow cheese/processed cheese, 3.2% fat milk, and crisps/chips. Five categories of frequency of consumption were used to assign points: "less than once a month" (0 points), "2–3 times/month" (1 point), "1–2 times/week" (2 points), "3–4 times/week" (3 points), "5 or more times/week" (4 points). Fat intake was expressed on a point scale (0–44 points). Based on the sum of the points, individuals were classified as having very high (>27 points), high (25–27 points), moderately high (22–24 points), low (18–21 points), or very low (best) (<18 points) fat intake.

In order to assess the frequency of consumption by adolescents of selected products containing nutrients recommended for the prevention of depression, information was collected on the usual frequency of consumption of 6 food groups. Questions were asked about the frequency of consumption of: fish and fish products, legumes, cereal products, fresh fruit and vegetables, milk and dairy products, and eggs. Five categories of frequency of consumption were assessed and scored: very often (4 points), often (3 points), rarely (2 points), very rarely (1 point), never (0 points). Product consumption was expressed on a point scale ranging from 0 to 24 points. Based on the sum of the points, individuals were distinguished with regard to their consumption of products recommended for the prevention of depression: high (best); (>16 points), medium (8–16 points), low (<8 points).

The inference was performed according to the methodology for assessing the frequency of consumption of selected food groups developed and validated by Czarnocińska et al. [29]. The study used the questionnaire based on the works of Lai et al. [26], Leszczyńska and Pisulewski [24], Łojko et al. [15], Majkutowicz, Tyszko and Okręglicka [23], Psaltopoulou et al. [30], Rahe, Unrath and Berger [31], Szczygieł and Samochowiec [12], Wawer [16], and Wolski et al. [25], which indicate that foods such as fish and fish products, legumes, cereals, fresh fruits and vegetables, milk and dairy products, and eggs provide nutrients (B vitamins (B1, B2, B6, B12, folic acid), selenium, zinc, magnesium, polyunsaturated fatty acids of the n-3 family) that are beneficial for the functioning of the human nervous system.

The degree to which respondents implemented the dietary recommendations [32] was determined by the sum of the points awarded for each behaviour implemented. Each statement describing a single behaviour was assigned 1 point. In total, the daily implementation of 8 dietary recommendations was assessed: I eat my meals at regular times, I wait 3–4 hours between meals, I do not eat sweet and salty foods between meals, I eat my last meal no later than 2 hours before bedtime, I avoid excess salt in my diet, I avoid excess fat in my diet, I avoid excess sugar in my diet, I read product labels. Implementation of the dietary recommendations was expressed on a scale of 0 to 8 points. Based on the sum of the points, the respondents were divided into 3 groups. A range of 1/3 and 2/3 points was used as a criterion for division: low level of implementation of recommendations (<1/3 range: 1–2.99 points), moderate level of implementation of recommendations (1/3 to 2/3 range: 3.00–5.66 points), high level of implementation of recommendations (> 2/3 range: 5.67–8 points).

The adolescents were asked about the frequency of feeling depressed or irritable and having problems concentrating on school and homework. Five response categories were used to assess the frequency of feeling depressed or irritable: every day, several times a week, 1–2 times a week, several times a month, never. In response to the question "Are you able to concentrate on your lessons and homework?", students could give 1 (out of 3) answers: yes, no – I have always had a problem with this, no – it has been difficult for me for some time.

Body mass index (BMI) was calculated based on the anthropometric indices of the respondents: height and body weight. Height and weight were recorded in duplicate by trained staff. Height was measured using an ultrasonic body height measuring device. The subject was in the standing upright position (no shoes), with hips and shoulders perpendicular to the central axis, heels against the footboard, knees together, arms hanging loosely at the sides, and the head in the Frankfurt plane. Height was recorded to the nearest millimetre; if the difference between measurements exceeded 4 mm, a third measurement was taken. Body weight was recorded in light underwear to the nearest 0.05 kg, using a digital medical scale (Charder MS 4202L, Poland). A third measurement was taken in the case of a difference between measurements equal to or exceeding 0.3 kg. The students' privacy was guaranteed during the anthropometric measurements in the schools.

Body mass index (BMI) was calculated as the ratio of weight in kilograms and the square of height in metres. Age and gender-specific point estimates of the prevalence of being underweight, normal body weight, or overweight (including obesity) were calculated according to the centile grids of the weight/height ratio of girls and boys aged 3–18 years (OLAF and OLAF study; measurements of children and adolescents in 2007–2012 in Poland) [33]. The data analysis made it possible to divide the respondents into three groups: group 1 – respondents who are underweight; group 2 – respondents with normal body weight; group 3 – respondents who are overweight or obese.

A reliability test – Cronbach's alpha coefficient – was carried out. A result of $\alpha = 0.76$ was obtained, which indicates that the test is reliable.

The results were analysed taking into account qualitative variables: gender, BMI, and the degree of implementation of the dietary recommendations recommended for adolescents in Poland. The collected data were analysed using Statistica 13.3 (Tibco Software, Palo Alto, USA). The results of the study were presented using percentages (%). The mean and median were calculated from the numerical values assigned to each frequency of use category of each product group. The mean values of the characteristics were compared. The Mann-Whitney U test was used to compare gender, and the Kruskal-Wallis test was used to compare BMI and adherence to dietary recommendations. The chi-squared test of independence with Yates's correction was used to assess differences in the percentage distribution of responses between groups categorised by gender, BMI, and level of implementation of dietary recommendations. Spearman's rank correlation coefficient was used to examine the correlation between gender and level of adherence to dietary recommendations. The results were significant at a p-value < 0.05.

RESULTS AND DISCUSSION

A total of 242 respondents participated in the study, including 140 girls (representing 57.9% of the study population) and 102 boys (representing 42.1% of the study population). 19.4% of the respondents, including 18.6% of the boys and 20.0% of the girls, were characterised by being underweight. The majority of respondents (63.2%), including 63.7% of boys and 62.9% of girls, were of normal body weight. 17.4% of respondents were found to be overweight or obese, including 17.6% of boys and 17.1% of girls (Table 1). The mean BMI in the study group was 22.0 ±3.6 [kg/m^2].

Table 1. Study sample characteristics

Parameters	Number of Respondents [n]	Percentage [%]
Gender		
Female	140	57.9
Male	102	42.1
Age		
15	63	26.0
16	72	29.8
17	68	28.1
18	39	16.1
BMI		
Underweight	47	19.4
Normal body weight	153	63.2
Overweight or obese	42	17.4

Source: own elaboration.

Consumption of foods that are sources of dietary fibre, saturated fatty acids and nutrients that are recommended for the prevention of depression

Among the items that were sources of dietary fibre intake, cooked potatoes had the highest mean frequency of intake (2.38 points), but at a moderate level. Moderate mean intake frequencies were also found for day-old fruit and vegetable juices (1.69 points), raw and frozen fruit (1.92 points), raw vegetables and vegetable salads (1.96 points), other vegetables (cooked, frozen, pickled); (1.71 points) and flour products made from wholemeal, rye flour or bran or groats (1.69 points) and dark rye bread (1.60 points). When assessing the average frequency of intake of fibre sources, boys were significantly more likely than girls to report consumption of brown rice and quinoa (1.36 points), and underweight subjects were significantly more likely to report consumption of cooked potatoes (2.75 points). Subjects with high or moderate levels of implementation of dietary recommendations were significantly more likely than those with low levels to report consumption of raw and frozen fruit (2.33 and 2.31 points, respectively), raw vegetables and vegetable salads (2.75 and 2.44 points), and legumes (1.42 and 1.43 points). In addition, those with a moderate level of implementation of dietary recommendations were significantly more likely to report consumption of flour products (2.0 points) and dark rye bread (2.01 points); (Table 2). Consumption of fibre products is associated with a number of health benefits, including a reduction in the incidence of cardiovascular disease, diabetes, obesity, colorectal cancer and certain gastrointestinal disorders. Fibre intake also appears to improve immune function [34, 35]. As a result of the inadequate dietary fibre intake of the survey respondents, it can be concluded that they may be at risk of developing many noncommunicable diseases and immune dysfunction in the future.

Table 2. Frequency of consumption of products that are sources of fibre in the diet (in points)

Products	Gender			BMI				Level of implementation of dietary recommendations			
	Boys	Girls	*p***	Underweight	Normal body weight	Overweight and obesity	*p****	Low	Moderate	High	*p****
Day-old fruit/vegetable juice	1.86*	1.56	0.13	1.45	1.76	1.71	0.60	1.63	1.78	2.00	0.57
Raw and frozen fruit	1.89	1.94	0.78	1.59	2.03	1.86	0.16	1.71	2.31	2.33	**<0.01**
Raw vegetables and vegetable salad	1.85	2.04	0.28	2.00	1.99	1.82	0.73	1.68	2.44	2.75	**<0.01**
Cooked potatoes	2.31	2.42	0.39	2.75	2.24	2.45	**0.03**	2.37	2.40	2.25	0.99
Legumes (beans, peas, lentils)	1.32	1.06	0.07	1.30	1.20	0.98	0.43	1.03	1.43	1.42	**0.04**
Other vegetables (cooked, frozen, pickled)	1.59	1.81	0.16	1.70	1.78	1.53	0.43	1.61	1.97	1.50	0.09
Flour products made from wholemeal, rye flour or bran or groats	1.74	1.66	0.72	1.70	1.72	1.61	0.82	1.59	2.00	1.17	**0.02**
Dark rye bread	1.62	1.58	0.84	1.70	1.59	1.53	0.83	1.39	2.01	1.83	**<0.01**
Brown rice or quinoa	1.36	1.01	**0.05**	1.34	1.12	1.14	0.81	1.03	1.40	1.42	0.07

Explanatory notes: *mean, **Mann-Whitney U-test, ***Kruskal-Wallis test.

Source: own elaboration.

Among the items that are sources of saturated fats, the highest moderate average consumption frequency was found for melted and yellow cheese (2.07 points), milk (3%); (2.03 points), eggs (2.0 points), confectionery (1.72 points), fried chicken or turkey (1.7 points), margarine or butter (1.91 points), salad dressings and mayonnaise (1.39 points), and crisps and chips (1.35 points). Pizza, casseroles, lasagne, and burgers (1.08 points), beef, steak, and roasted meat (1.00 point), sausages, frankfurters, and kebabs (1.14 points), ice cream (0.94 points), and fatty sausages (0.94 points) were found to be consumed less frequently on average. When assessing the mean values of frequency of consumption of products that are a source of saturated fat in the diet, boys were significantly more likely to consume pizza, casseroles, lasagne, and burgers (1.24 points), beef, steak, and roasted meat (1.28 points), fried chicken or turkey (2.02 points), sausages, frankfurters, and kabanos (1.37 points), fatty cold cuts (1.17 points),

and whole milk (2.34 points). When the respondents were divided into three BMI groups, significant differences were observed only for the frequency of consumption of beef, steak, and roasted meat (underweight subjects – 1.11 points, normal body weight – 1.07 points and overweight and obesity subjects – 0.69 points). Regarding the level of implementation of dietary recommendations, those with low implementation were characterised by the highest value of the average frequency of consumption for most products. The groups differed significantly in the frequency of consumption of pizzas, casseroles, lasagne, and burgers (1.18 points), beef, steak, and roasted meat (1.10 points), sausages, frankfurters, and kebabs (1. 27 points), fatty cured meats (1.06 points), margarine or butter (2.05 points), melted yellow cheese (2.23 points), whole milk (2.17 points), crisps and chips (1.56 points), and ice cream (1.15 points) (Table 3). It is encouraging that the fat intake of the adolescent group studied was moderate to low. It is important to remember that noncommunicable diseases are the leading cause of death worldwide, and cardiovascular disease is the leading cause of death [36, 37]. Cardiovascular disease is multifactorial. Modifiable factors include a high intake of saturated fat and a low intake of fruit and vegetables [38, 39].

Table 3. Frequency of consumption of products that are sources of saturated fatty acids in the diet (in points)

Specifications	Gender			BMI				Level of implementation of dietary recommendations			
	boys	girls	*p***	underweight	normal body weight	overweight and obesity	*p****	low	moderate	high	*p****
Pizza, casserole, lasagne, hamburger	1.24*	0.97	**0.04**	1.09	1.14	0.92	0.42	1.18	0.99	0.42	**0.02**
Beef, steak, roasted meat	1.28	0.79	**<0.01**	1.11	1.07	0.69	0.05	1.10	0.89	0.33	**0.04**
Chicken or fried turkey	2.02	1.47	**<0.01**	1.98	1.56	1.86	0.10	1.70	1.76	1.33	0.54
Sausages, frankfurters, kabanos	1.37	0.97	**0.01**	1.11	1.08	1.33	0.34	1.27	1.01	0.17	**<0.01**
Fatty cold cuts, pâté, black pudding, mince, bacon	1.17	0.78	**<0.01**	1.09	0.89	0.96	0.56	1.06	0.81	0.17	**0.02**
Salad dressings, mayonnaise	1.50	1.31	0.28	1.48	1.33	1.49	0.69	1.40	1.43	1.00	0.61
Margarine or butter	2.10	1.78	0.14	2.16	1.86	1.84	0.52	2.05	1.78	0.92	**0.04**
Eggs	2.11	1.93	0.28	2.09	1.95	2.10	0.69	1.94	2.19	1.75	0.28
Processed and yellow cheeses	2.27	1.91	**0.04**	2.20	1.94	2.31	0.21	2.23	1.81	1.42	**0.03**
Whole milk (3%)	2.34	1.80	**<0.01**	2.25	1.95	2.06	0.43	2.17	1.83	1.33	0.05
Potato chips and French fries	1.45	1.27	0.28	1.32	1.32	1.45	0.62	1.56	1.00	0.67	**<0.01**
Ice cream	0.99	0.98	0.89	0.98	1.06	0.76	0.26	1.15	0.65	0.83	**0.01**
Doughnuts, cakes, cookies, waffles and other confectionery products	1.72	1.72	0.92	1.70	1.79	1.53	0.48	1.82	1.63	1.00	0.07

Explanatory notes: *mean, **Mann-Whitney U-test, *** Kruskal-Wallis test.

Source: own elaboration.

Among the items that were sources of dietary intake of nutrients recommended for depression prevention, fresh fruit and vegetables (3.18 points), milk and dairy products (3.10 points), cereals (2.9 points), and eggs (2.69 points) had the highest average frequency of intake. For the other products identified in the survey, a moderate frequency of consumption was found, based on an average score of 1.83 points for legumes and 1.68 points for fish and fish products.

When assessing the average frequency of consumption of products that are a source of nutrients in the diet for the prevention of depression, girls were significantly more likely than boys to report consumption of fresh fruit and vegetables (3.35 points), and those with a normal body weight and those with a high level of implementation

of dietary recommendations were significantly more likely to report consumption of pulses (1.93 points and 2.25 points, respectively). Those with a moderate level of implementation of dietary recommendations were significantly more likely to report consumption of cereals (3.04 points), and respondents with a high level of implementation of dietary recommendations were significantly more likely to report consumption of fresh fruit and vegetables (3.58 points); (Table 4). A meta-analysis of observational studies suggests that a Mediterranean-style diet has a protective effect against the onset of depression, whereas a dietary pattern described as a Western diet, characterised by a high intake of saturated fatty acids and a low intake of fibre, increases the likelihood of developing depression [30, 31].

Consumption of selected foods and prevalence of symptoms characteristic of depression in the study group of adolescents

According to Beyer and Payne [40], the type of food consumed and the body's nutritional status affect a person's mental health. For the functioning of the brain and the maintenance of its morphology (structure), it is necessary to provide energy (which represents a significant part of the total energy contained in food) and many nutrients (lipids, vitamins, macro- and micronutrients, cofactors of antioxidant reactions, catalysts – synthesis of neurotrophic factors and many others). Thus, dietary patterns and the closely related development of eating habits indirectly influence the onset and course of many psychiatric disorders and could, therefore, be a target for therapeutic intervention and prevention [15].

As the influence of nutrients on the functioning of the human nervous system is well documented, the influence of gender, BMI, and dietary habits on the type of selected foods consumed by adolescents, and thus on the achievement of individual nutrient requirements, and on the occurrence of symptoms characteristic of depression, including mood swings or irritability and problems concentrating in class and on daily chores, was assessed. For the total intake of products that were a source of fat, respondents differed significantly by gender and level of implementation of dietary recommendations ($p = 0.02$). Very low and low fat intakes (i.e. those most beneficial to health) were more common among girls (29.8 and 10.3%, respectively) than boys (16.5 and 4.6%, respectively). Very high fat intake was reported by 7.4% of girls and 11.9% of boys. In terms of the level of implementation of dietary recommendations, those with a low level were characterised by very low and very high intakes of products that are an important source of dietary saturated fat (27.7 and 16.1%, respectively) (Table 5). According to the literature, young women in Poland have mostly positive attitudes towards health and the health value of foods, but they do not pay attention to the cholesterol and saturated fat content of the foods they consume [41]. In addition, the prevalence of inappropriate eating behaviours, such as eating while working, and eating irregularly, has been reported among girls aged 14–19 years (in Poland) [42]. These eating behaviours are harmful because they increase the risk of metabolic and neurological diseases.

For total dietary fibre intake, the groups differed significantly in meeting dietary recommendations ($p = 0.02$). The study group was dominated by those with very low and insufficient dietary fibre intakes and was characterised by low (13.2 and 51.7%, respectively) and moderate (11.6 and 17.8%, respectively) levels of implementation of dietary recommendations (Table 5). The results of our study are in line with those of other authors. According to the literature, adolescents in Poland do not consume sufficient amounts of dietary fibre [43]. Although fibre intake is higher in girls than in boys, it is too low compared to the current recommendation for Polish adolescents, which is 21 g per day [44].

For the total intake of selected products as a source of nutrients recommended for the prevention of depression, respondents did not differ significantly by gender, BMI or level of implementation of dietary recommendations ($p \leq 0.05$).

There were significant differences between boys and girls in feeling depressed or irritable. Feeling depressed or irritable every day was reported by 23.9% of respondents, of whom 16.9% were girls. A frequency of several times a week was reported by 24.8% of respondents, of whom 15.7% were girls. In contrast, one in three respondents felt depressed or irritable several times a month, of whom 18.2% were boys. The results of our study are in line with those of other authors who reported that 25.5% of girls and 27.4% of boys felt irritable more than once a week, while depressed feelings were experienced by 15.7% and 20.6%, respectively. Over time, a greater proportion of adolescents experienced negative emotions more than once a week, and this was associated with persistent poorer well-being [45]. No significant differences ($p \leq 0.05$) were found between the groups according to gender, BMI, and level of implementation of dietary recommendations in terms of concentration in class and chores performed (Table 5). The results of our study are not confirmed by the literature; a previous study found

Table 4. Frequency of consumption of selected foods as sources of nutrients recommended for prevention of depression (in points)

Products	Gender			BMI				Level of implementation of dietary recommendations			
	boys	girls	*p***	underweight	normal body weight	overweight and obesity	*p****	low	moderate	high	*p****
Fish and fish products	1.77*	1.61	0.23	1.41	1.76	1.69	0.12	1.61	1.85	1.67	0.19
Legume seeds	1.84	1.83	0.83	1.55	1.93	1.80	0.05	1.70	2.07	2.25	**0.01**
Cereal products	2.98	2.84	0.18	2.89	2.90	2.88	0.94	2.87	3.04	2.42	0.04
Fresh fruits and vegetables	2.94	3.35	**<0.01**	3.14	3.27	2.96	0.10	3.07	3.35	3.58	**<0.01**
Milk and dairy products	3.20	3.03	0.37	3.27	3.09	2.98	0.43	3.18	3.00	2.67	0.33
Eggs	2.80	2.61	0.14	2.59	2.73	2.65	0.59	2.70	2.74	2.25	0.35

Explanatory notes: *mean, ** Mann-Whitney U-test, *** Kruskal-Wallis test.

Source: own elaboration.

Table 5. Consumption of selected foods and occurrence of symptoms characteristic of depression in the group of adolescents studied

Specification	Gender			BMI				Level of implementation of dietary recommendations			
	Percentage [%]										
	boys	girls	*p**	underweight	normal body weight	overweight and obesity	*p*	low	moderate	high	*p*
Consumption of products that are sources of saturated fatty acids in the diet											
Very high	11.9	7.4		4.6	11.6	3.3		16.1	3.3	0.0	
High	2.9	3.3		0.4	5.4	0.4		3.7	1.7	0.8	
Moderately high	6.2	7.1	0.02	3.3	6.2	3.7	0.13	8.7	4.6	0.0	0.02
Low	4.6	10.3		2.5	7.4	5.0		9.1	5.4	0.4	
Very low (best)	16.5	29.8		7.4	30.1	8.7		27.7	14.8	3.7	
Consumption of products that are sources of dietary fibre											
Adequate	1.2	0.0		0.0	1.2	0.0		0.4	0.4	0.4	
Very low	29.7	43.4	0.07	12.4	43.8	17.0	0.29	51.7	17.8	3.7	0.02
Inadequate	11.2	14.5		5.8	15.7	4.1		13.2	11.6	0.8	
Consumption of selected products that are sources of nutrients recommended in the prevention of depression											
High	16.9	20.3		5.1	24.8	7.4		21.5	14.5	1.2	
Moderate	24.4	37.2	0.46	13.2	35.5	12.8	0.18	42.6	15.3	3.7	0.09
Low	0.8	0.4		0.0	0.4	0.8		1.2	0.0	0.0	
Frequency of feeling depressed or irritated											
Daily	7.0	16.9		4.6	13.5	5.8		17.4	4.6	2.1	
Several times a week	9.1	15.7	0.02	5.0	17.4	2.5	0.26	15.6	8.3	0.8	0.39
1–2 times a week	7.9	9.9		2.9	9.5	5.4		11.6	5.8	0.4	
Several times a month	18.2	15.3		5.8	20.2	7.4		20.6	11.2	1.6	
Self-assessment of focus on lessons and duties performed											
I have no problem concentrating	22.3	28.1		9.1	30.5	10.7		30.6	16.9	2.9	
I have always had trouble concentrating	8.7	16.1	0.43	3.3	15.7	5.8	0.71	17.4	6.6	0.8	0.63
It has been difficult for me to focus for some time now	11.2	13.6		5.8	14.5	4.6		17.4	6.2	1.2	

Explanatory note: *Chi^2

Source: own elaboration.

that up to half of students in lower secondary schools (13–16 years) and technical schools (16–20 years) in Poland have problems with concentration, and in high schools it is about 30% of students [46].

In the study group, a significant but weak positive correlation (p <0.05); (Spearman's rank correlation) was observed between male gender and consumption of selected fatty products such as beef, steak, roasted meat and chicken or roast turkey, and a weak but significant association (p <0.05) between female gender and consumption of fresh fruit (Table 6). On the other hand, taking into account the level of implementation of dietary recommendations, a significant but weak positive correlation (p <0.05) was observed between the implementation of recommendations and consumption of vegetable salads, raw vegetables, brown rice, bread and legume seeds. A weak negative correlation (p <0.05) was observed between the implementation of recommendations and the consumption of potato chips and French fries (those with a higher level of implementation of dietary recommendations were significantly less likely to report their consumption); (Table 6).

Table 6. Consumption of selected products vs. gender and level of adherence to dietary recommendations (Spearman's rank correlation)

Food products	Gender	Level of implementation of dietary recommendations
Day-old fruit/vegetable juice	0.10	0.06
Raw fruit, frozen fruit	–0.02	**0.18**
Vegetable salads, raw vegetables	–0.07	**0.34**
Potatoes boiled in water or steamed	–0.06	0.01
Legumes (beans, peas, lentils)	0.12	**0.17**
Other vegetables (cooked, frozen, pickled)	–0.09	0.11
Flour products made of graham, wholemeal or rye flour, or bran or groats	0.02	**0.13**
Dark rye bread	0.01	**0.26**
Brown rice or quinoa	0.12	**0.14**
Fish and fish products	0.08	0.09
Legume seeds	0.01	**0.21**
Cereal products	0.09	0.10
Fresh fruits and vegetables	–0.27	0.17
Milk and dairy products	0.06	–0.11
Eggs	0.10	–0.06
Pizza, casserole, lasagne, hamburger	**0.13**	–0.12
Beef, steak, roasted meat	**0.24**	–0.11
Chicken or fried turkey	**0.22**	0.04
Sausages, frankfurters, kabanos	0.18	–0.15
Fatty cold cuts, pâté, black pudding, mince, bacon	**0.19**	–0.11
Salad dressings, mayonnaise	0.07	0.00
Margarine or butter	0.10	–0.09
Eggs	0.07	0.11
Processed and yellow cheeses	**0.13**	–0.11
Whole milk (3%)	0.18	–0.15
Potato chips and French fries	0.07	**–0.28**
Ice cream	–0.01	**–0.17**
Doughnuts, cakes, cookies, waffles and other confectionery products	0.01	**–0.13**

Explanatory notes: bold indicates statistically significant correlations.

Source: own elaboration.

No significant correlations were found between the use of products recommended for depression prevention and the gender of the respondent in terms of feeling depressed, being irritable, and having problems concentrating in class or at home.

Table 7. Influence of consumption of selected foods as a source of nutrients recommended for the prevention of depression, by gender, on feelings of depression and concentration problems (Spearman's rank correlation)

Food products	Feeling depressed or irritable		Difficulty concentrating on lessons and duties performed	
	boys	girls	boys	girls
Fish and fish products	0.11	0.02	–0.06	0.11
Legume seeds	–0.01	0.13	–0.11	–0.01
Cereal products	–0.11	0.10	0.19	–0.11
Fresh fruits and vegetables	–0.04	0.01	0.13	–0.04
Milk and dairy products	–0.06	0.06	0.02	–0.06
Eggs	–0.07	0.01	–0.16	–0.07

Source: own elaboration.

CONCLUSIONS AND FUTURE PERSPECTIVES

The results of the study presented here are limited by the small sample size and scope of the study. However, the analysis of the consumption of selected food groups by the respondents showed that gender, the degree of body nutrition and dietary habits influenced the type of selected foods consumed by the adolescents and thus on the achievement of individual nutrient requirements and the occurrence of symptoms characteristic of depression: feelings of depression and/or irritability. The diet of adolescents was found to be rich in animal fats and poor in fruit and vegetables. Most of the adolescents interviewed did not follow the principles of a rational diet. The analysis showed no significant association between group differentiating factors (gender, BMI, level of implementation of dietary recommendations) and the frequency of feelings of depression and/or irritability and difficulty concentrating. According to the authors, research into the dietary choices of adolescents in Poland should be continued, as the results of the pilot study indicate that they are inappropriate and put young Poles at risk of developing depression. If adolescents do not pay attention to the impact of the products they consume on their health, do not eat a balanced diet and consume products rich in simple carbohydrates and saturated fats, their risk of developing symptoms characteristic of depression will increase significantly. It is useful and legitimate to carry out research on the nutritional behaviour of adolescents since there is an established need to take action in the field of health and to pay more attention to the mental and physical state of adolescents and their parents (families).

ACKNOWLEDGEMENTS

This research was funded by the Faculty of Management and Quality Science at Gdynia Maritime University under grant no. WZNJ/2023/PZ/01.

REFERENCES

[1] **KOZŁOWSKA-BURDZIAK M. 2019.** „Warunki bezpieczeństwa żywnościowego Polski (ze szczególnym uwzględnieniem województwa podlaskiego)'. Optimum. Economic Studies 3(97): 33–48. https://doi.org/10.15290/oes.2019.03.97.03.

[2] **WIŚNIEWSKA M.Z. 2022.** „Ewolucja trendów i zagrożeń w konsumpcji żywności w świetle celów zrównoważonego rozwoju". Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie 995(1): 63–79. https://doi.org/10.15678/ZNUEK.2022.0995.0104

[3] **DIDKOWSKA A., ORŁOWSKA B., JACHNIS A., ANUSZ K. 2017.** „Wartość odżywcza ekologicznych produktów spożywczych pochodzenia zwierzęcego jako element bezpieczeństwa żywności". *Życie* Weterynaryjne 92(03): 208–210.

[4] **ŻAKOWSKA-BIEMAS S. 2011.** "Barriers to buy organic food in the context of organic food market development". Journal of Research and Applications in Agricultural Engineering 56(4): 216–220.
[5] BŁASZCZAK A., GRZEŚKIEWICZ W. 2014. „Żywność funkcjonalna – szansa czy zagrożenie dla zdrowia". Medycyna Ogólna i Nauki o Zdrowiu 20(2): 214–221. https://doi.org/10.5604/20834543.1112240.
[6] **BRYLA P. 2018.** „Uwarunkowania skłonności do płacenia wyższej ceny za żywność ekologiczną w porównaniu z produktami konwencjonalnymi". Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu 526: 203–213 http://dx.doi.org/10.15611/pn.2018.526.18
[7] **FABISIAK A., GROCHOWICZ J. 2018. „Żywność funkcjonalna – aspekty prawne i znaczenie wybranych składników bioaktywnych".** Zeszyty Naukowe Uczelni Vistula 60(3): 143–153.
[8] **KOŁODZIEJCZYK A., WOJCIECHOWSKI P. 2020.** „Nowe regulacje dotyczące znakowania żywności bez GMO". Przemysł Spożywczy 74(2): 20–23.
[9] **HERMANIUK T. 2018.** „Postawy i zachowania konsumentów na rynku ekologicznych produktów żywnościowych". Handel Wewnętrzny 2(373): 189–199.
[10] **GADOMSKA J., SADOWSKI T., BUCZKOWSKA M. 2014**. „Ekologiczna żywność jako czynnik sprzyjający zdrowiu". Problemy Higieny i Epidemiologii 95(3): 556–560.
[11] **NIK. 2022.** „Depresja – jak pomóc sobie i bliskim?". (https://www.nik.gov.pl/aktualnosci/uwaga-depresja.html, access: 01.07.2022).
[12] **SZCZYGIEŁ K., SAMOCHOWIEC J. 2019.** „Wpływ żywienia na zdrowie psychiczne w opinii psychiatry". Psychiatria 16(3): 164–153.
[13] **OPIE R.S., O'NEIL A., ITSIOPOULOS C., JACKA F.N. 2015.** "The impact of whole-of-diet interventions on depression and anxiety: A systematic review of randomised controlled trials". *Public Health Nutrition* 18(11): 2074–2093 https://doi.org/10.1017/S1368980014002614.
[14] **JACKA F.N., O'NEIL A., OPIE R., ITSIOPOULOS C., COTTON S., MOHEBBI M., CASTLE D., DASH S., MIHALOPOULOS C., CHATTERTON M.L., BRAZIONIS L., DEAN O.M., HODGE A.M., BERK M. 2017.** "A randomised controlled trial of dietary improvement for adults with major depression (the 'SMILES' trial)". BMC Medicine 15(1): 23. https://doi.org/10.1186/s12916-017-0791-y
[15] **ŁOJKO D., STELMACH M., SUWALSKA A. 2018.** "Is diet important in bipolar disorder?". Psychiatria Polska 52(5): 783–795. https://doi.org/10.12740/PP/OnlineFirst/78703
[16] **WAWER I. 2017.** „Dietetyczne niedobory mikroskładników i suplementacja w chorobach neurologicznych". Neurologia Praktyczna 6: 1–8.
[17] **MISCHOULON D., FREEMAN M.P. 2013.** "Omega-3 fatty acids in psychiatry". Psychiatric Clinics of North America 36(1): 15–23. https://doi.org/10.1016/j.psc.2012.12.002.
[18] **LAI J.S., A. MOXEY, G. NOWAK, K. VASHUM, K. BAILEY, MCEVOY M. 2012.** "The efficacy of zinc supplementation in depression: Systematic review of randomised controlled trials". Journal of Affective *Disorders* 136(1–2): 31–39 https://doi.org/10.1016/j.jad.2011.06.022
[19] **STYCZEŃ K., SOWA-KUĆMA M., SIWEK M., DUDEK D., RECZYŃSKI W., SZEWCZYK B.. 2017.** "The serum zinc concentration as a potential biological marker in patients with major depressive disorder". Metabolic *Brain Disease* 32(1): 97–103. https://doi.org/10.1007/s11011-016-9888-9
[20] **BENNETT J., STEVENS G., MATHERS C.D., BONITA R., REHM J., KRUK M.E., RILEY L.M., DAIN K., KENGNE A.P., CHALKIDOU K., BEAGLEY J., KISHORE S.P., CHEN W., SAXENA S., BETTCHER D.W., GROVE J.T., BEAGLEHOLE R., EZZATI M. 2018.** "NCD Countdown 2030: worldwide trends in non-communicable disease mortality and progress towards Sustainable Development Goal target 3.4". Lancet 392(10152): 1072–1088. https://www.doi.org/10.1016/S0140-6736(18)31992-5
[21] **FAVA M., MISCHOULON D. 2009.** "Folate in depression: Efficacy, safety, differences in formulations, and clinical issues". *Journal of Clinical Psychiatry* 70 (Suppl. 5): 12–17. https://doi.org/10.4088/JCP.8157su1c.03
[22] **EYLES D.W., BURNE T.H.J., MCGRATH J.J. 2013.** "Vitamin D, effects on brain development, adult brain function and the links between low levels of vitamin D and neuropsychiatric disease". *Frontiers* in *Neuroendocrinology* 34(1): 47–64. https://doi.org/10.1016/j.yfrne.2012.07.001
[24] **LESZCZYŃSKA T., PISULEWSKI P.M. 2004.** „Wpływ wybranych składników żywności na aktywność psychofizyczną człowieka". ŻYWNOŚĆ. Nauka. Technologia. Jakość 1(38): 12–24.
[23] **MAJKUTEWICZ P., TYSZKO P., OKRĘGLICKA K. 2014.** „Leczenie żywieniowe depresji". Family Medicine & Primary Care Review 16(1): 48–50.
[25] **WOLSKI T., KALISZ O., GERKOWICZ M., SMORAWSKI M. 2007.** „Rola i znaczenie antyoksydantów w medycynie ze szczególnym uwzględnieniem chorób oczu". Postępy Fitoterapii 2: 82–90.
[26] **LAI J.S., HILES S., BISQUERA A., HURE A.J., MCEVOY M. 2014.** "A systematic review and meta – analysis of dietary patterns and depression in community-dwelling adults". *American Journal* of *Clinical Nutrition* 99(1): 181–197. https://doi.org/10.3945/ajcn.113.069880
[27] **FITÓ M., GUXENS M., CORELLA D., SÁEZ G., ESTRUCH R., DE LA TORRE R., FRANCÉS F., CABEZAS C., DEL M., LÓPEZ-SABATER C., MARRUGAT J., GARCÍA-ARELLANO A., ARÓS F., RUIZ-GUTIERREZ**

V., ROS E., SALAS-SALVADÓ J., FIOL M., SOLÁ R., COVAS M.-I. 2007. "Effect of a traditional Mediterranean diet on lipoprotein oxidation: A randomized controlled trial". Archives of Internal Medicine 167(11): 1195–1203. https://doi.org/10.1001/archinte.167.11.1195

[28] **MITJAVILA M.T., FANDOS M., SALAS-SALVADÓ J., COVAS M.I., BORREGO S., ESTRUCH R. 2013.** "The Mediterranean diet improves the systemic lipid and DNA oxidative damage in metabolic syndrome individuals. A randomized, controlled, trial". *Clinical Nutrition* 32(2): 172–178. https://doi.org/10.1016/j.clnu.2012.08.002

[28] **THOMPSON F.E., BYERS T. 1994.** "Dietary Assessment Resource Manual". Journal of Nutrition 124: 2245–2317. https://doi.org/10.1093/jn/124.suppl_11.2245s

[29] **CZARNOCIŃSKA J., JEŻEWSKA-ZYCHOWICZ M., BABICZ-ZIELIŃSKA E., KOWALKOWSKA J., WĄDOŁOWSKA L. 2013.** „Postawy względem żywności, żywienia i zdrowia a zachowania żywieniowe dziewcząt i młodych kobiet w Polsce". Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego w Olsztynie, Olsztyn.

[30] **PSALTOPOULOU T., SERGENTANIS T.N., PANAGIOTAKOS D.B., SERGENTANIS I.N., KOSTI R., SCARMEAS N. 2013.** "Mediterranean diet, stroke, cognitive impairment, and depression: A meta-analysis". Annals of *Neurology* 74(4): 580–591. https://doi.org/10.1002/ana.23944

[31] **RAHE C., UNRATH M., BERGER K. 2014.** "Dietary patterns and the risk of depression in adults: A systematic review of observational studies". *European Journal of Nutrition* 53(4): 997–1013. https://doi.org/10.1007/s00394-014-0652-9

[32] **JAROSZ M. 2019.** „Piramida Zdrowego Żywienia i Stylu Życia Dzieci i Młodzieży". Narodowy Instytut Zdrowia Publicznego. Państwowy Zakład Higieny-Państwowy Instytut Badawczy, Warszawa (https://ncez.pzh.gov.pl/dzieci-i-mlodziez/piramidazdrowego-zywienia-i-stylu-zycia-dzieci-i-mlodziezy-2/, access: 01.07.2022).

[33] **KUŁAGA Z., LITWIN M., TKACZYK M., PALCZEWSKA I., ZAJĄCZKOWSKA M., ZWOLIŃSKA D., KRYNICKI T., WASILEWSKA A., MOCZULSKA A., MORAWIEC-KNYSAK A., BARWICKA K., GRAJDA A., GURZKOWSKA B., NAPIERALSKA E., PAN H. 2010.** Polish 2010 growth references for school-aged children and adolescents. European Journal of Pediatrics 170(5), 599–609. https://doi.org/10.1007/s00431-010-1329-x

[34] **MASLOWSKI K.M., MACKAY C.R. 2011.** "Diet, gut microbiota and immune responses". Nature Immunology 12(1): 5–9. https://doi.org/10.1038/ni0111-5

[35] **SLAVIN J. 2013.** "Fiber and prebiotics: mechanisms and health benefits". Nutrients 5(4): 1417–1435. https://doi.org/10.3390/nu5041417

[36] **BERK M., MALHI G.S., GRAY L.J., DEAN O.M. 2013.** "The promise of N-acetylcysteine in neuropsychiatry". Trends in Pharmacological Sciences 34(3): 167–177. https://www.doi.org/10.1016/j.tips.2013.01.001

[37] **WHO. 2022.** "World Health Statistics 2022: monitoring Health for the SDGs, Sustainable Development Goals". World Health Organization, Geneva.

[38] **RICCARDI G., GIOSUÈ A., CALABRESE I., VACCARO O. 2022.** "Dietary recommendations for prevention of atherosclerosis". Cardiovascular Research 118(5): 1188–1204. https://doi.org/10.1093/cvr/cvab173

[39] **VESNINA A., PROSEKOV A., ATUCHIN V., MININA V., PONASENKO A. 2022.** "Tackling atherosclerosis via selected nutrition". International Journal of Molecular Sciences 23915: 8233. https://doi.org/10.3390/ijms23158233

[40] **BEYER J.L., PAYNE M.E. 2016.** "Nutrition and bipolar depression". Psychiatric Clinics of North America 39(1): 75–86. https://www.doi.org/10.1016/j.psc.2015.10.003

[41] **PLATTA A., SAWLEWICZ K. 2022.** "Dietary behaviour and attitudes of a selected group of women (in Poland) towards health and health-promoting foods". Management and Quality – Zarządzanie i Jakość 3: 172–188.

[42] **PLATTA A., KACZMARSKA P. 2022.** "Selected health behaviours of girls aged 14 to 19 years and the risk of eating disorders: a pilot study". ŻYWNOŚĆ. Nauka. Technologia. Jakość 29, 3 (132): 100–112. https://doi.org/10.15193/zntj/2022/132/426

[43] **SITKO D.M., WOJTAŚ M., GRONOWSKA-SENGER A. 2012.** „Sposób żywienia młodzieży gimnazjalnej i licealnej". Roczniki Państwowych Zakładów Higieny, 63(3): 319–327.

[44] **WOLNICKA K., JACZEWSKA-SCHUETZ J., TARASZEWSKA A., CHARZEWSKA J., JAROSZ M.2017.** „Częstotliwość spożycia warzyw i owoców przez dzieci i młodzież w szkołach podstawowych i gimnazjach w Polsce". Żywienie Człowieka i Metabolizm 44(4): 258–267.

[45] **MAZUR J. (ED.). 2015.** „Zdrowie i zachowania zdrowotne młodzieży szkolnej w Polsce na tle wybranych uwarunkowań socjodemograficznych". Wydawnictwo Instytut Matki i Dziecka, Poland, Warszawa.

[46] **MALARA B., JOŚKO J., KASPERCZYK J., KAMECKA-KRUPA J. 2010.** „Rozpowszechnienie zaburzeń odżywiania wśród młodzieży w wybranych miastach województwa śląskiego". Problemy Higieny i Epidemiologii 91(3): 388–392.