

ASSESSMENT OF NUTRITIONAL BEHAVIOURS OF CHILDREN AGED 3-7 FROM SELECTED KINDERGARTENS IN BIALA PODLASKA COUNTY¹

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ABSTRACT

Background. Children constitute a group that is particularly susceptible to the effects of improper nutrition. The knowledge of parents and guardians about proper nutrition affects their children's nutritional habits and behaviours. Children develop their patterns of nutritional behaviours on the basis of their observations of nutritional habits of adults, nutrition trends and nutritional education.

Objective. The aim of the study was to assess nutritional behaviours of children aged 3-7 from selected kindergartens in Biała Podlaska county.

Material and methods. The research included 549 children, i.e. 258 girls (47%) and 291 boys (53%) aged 3-7 years. The study was conducted in 2015 within the county health prevention and promotion programme titled "Together for heart" in several selected kindergartens in Biała Podlaska county. A questionnaire prepared by the authors and distributed among parents of the examined children was used in the study. The questions regarded the frequency and number of meals, types of products consumed between the meals and the frequency of consuming fruit and vegetables, sweets, fizzy drinks, fast foods and milk or dairy products (natural yoghurt, kefir, cottage cheese). Differences between the responses to the questions in groups divided according to sex were analysed with the use of χ^2 test (G function).

Results. It was revealed that 219 girls (84.9%) and 273 boys (93.8%) had at least four meals a day while 23.7% of the children left home without breakfast. The main meal, i.e. dinner, was eaten by 227 girls and 256 boys every day, which constituted 88% of each gender group. In turn, 20 girls and 27 boys (8% and 9% of the study participants, respectively) regularly skipped supper. The most common products consumed between the main meals were fruit and vegetables (eaten by 44% of the girls and 39% of the boys). It was declared that dairy products (milk, natural yoghurt and/or kefir) were consumed once a week or less frequently by 43% of the girls and 45% of the boys. Cottage cheese was equally rarely eaten, i.e. 48% of the girls and 44% of the boys reported having it once a week or less frequently. The study also revealed insufficient consumption of fish. It was eaten once a week or less frequently by 60% of the girls and 50% of the boys.

Conclusions. The assessment of nutritional behaviours revealed mistakes which may negatively affect proper development if they are repeated. It seems necessary to implement nutritional education among children and their parents in order to shape proper nutritional behaviours and correct mistakes.

Key words: *eating behaviours, preschool children, assessment of consumption, children nutrition*

STRESZCZENIE

Wprowadzenie. Dzieci w wieku przedszkolnym to grupa szczególnie podatna na skutki niewłaściwego żywienia. Na kształtowanie postaw i zachowań żywieniowych w dużym stopniu ma wpływ wiedza rodziców i opiekunów na temat prawidłowego odżywiania się. Dzieci budują swoje wzorce na podstawie zauważonych nawyków żywieniowych osób dorosłych, poprzez modę żywieniową oraz poziom edukacji żywieniowej.

Cel pracy. Celem pracy była ocena zachowań żywieniowych dzieci w wieku 3-7 lat uczęszczających do kilku wybranych placówek przedszkolnych z terenu powiatu białskiego.

Material i metody. Badaniem objęto 549 dzieci, w tym 258 dziewcząt (47%) i 291 chłopców (53%) w wieku 3-7 lat. Badania zrealizowano w 2015 roku w ramach powiatowego programu profilaktyki i promocji zdrowia pn. „Razem dla serca” w kilku przedszkolach powiatu białskiego. Wykorzystano autorski kwestionariusz ankiety rozdawany rodzicom badanych dzieci. Pytania w ankiecie dotyczyły częstotliwości i liczby spożywanych posiłków, rodzaju produktów spożywanych między posiłkami, a także częstotliwości spożycia

¹ The study was conducted within the county health prevention and promotion programme aimed at reducing cardiovascular diseases morbidity and mortality among the inhabitants of Biała Podlaska county titled "Together for heart" and financed from the resources of the Norwegian Financial Mechanism 2009-2014 and the national budget.

warzyw i owoców, słodczy, napojów gazowanych, produktów typu fast-food oraz mleka i produktów mlecznych (jogurtu naturalnego, kefiru, serów twarogowych). Analizę różnicowania odpowiedzi udzielonych na pytania zawarte w ankiecie w grupach wyodrębnionych na podstawie płci przeprowadzono za pomocą testu χ^2 w postaci funkcji G.

Wyniki. Wykazano, że 219 dziewcząt (84,9%) i 273 chłopców (93,8%) spożywało co najmniej cztery posiłki w ciągu dnia oraz, że 23,7% dzieci wychodziło do przedszkola bez spożycia I śniadania. Główny posiłek – obiad – spożywało codziennie 227 dziewcząt i 256 chłopców, co stanowiło 88% w każdej z grup uwzględniając płeć badanych. Natomiast regularnie kolacji nie spożywało 20 dziewcząt i 27 chłopców, co stanowiło odpowiednio 8 i

9% badanych. Najczęściej spożywanymi produktami pomiędzy głównymi posiłkami były owoce i warzywa; spożywało je 44% dziewcząt i 39% chłopców. Spożycie produktów mlecznych (mleka, jogurtu naturalnego i/lub kefiru) raz w tygodniu lub rzadziej deklarowało

43% dziewcząt i 45% chłopców. Równie rzadko spożywane były sery twarogowe, ich spożycie raz w tygodniu lub rzadziej dotyczyło zaledwie 48% dziewcząt i 44% chłopców. W badaniach wykazano również niedostateczne spożycie ryb. Raz w tygodniu lub rzadziej zjadało je odpowiednio 60% dziewcząt oraz 50% chłopców.

Wnioski. Ocena zachowań żywieniowych wykazała błędy popełniane przez dziewczęta i chłopców, których utrwalenie może mieć negatywny wpływ na ich prawidłowy rozwój. Koniecznym wydaje się prowadzenie edukacji żywieniowej wśród dzieci oraz ich rodziców w celu kształtowania odpowiednich zachowań żywieniowych i korygowania popełnianych w tym zakresie błędów.

Słowa kluczowe: zachowania żywieniowe, dzieci w wieku przedszkolnym, ocena konsumpcji, żywienie dzieci

INTRODUCTION

Proper nutrition of pre-school children means providing them with regular, diverse meals including all the necessary nutrients in the amounts meeting the needs of a young body. The nutrients should ensure an optimal supply of energy enabling the body to function as well as facilitating proper physical, mental, emotional and motor development [3, 11]. Children should consume a proper amount of all the necessary products, particularly fruit and vegetables as well as protein. Insufficient consumption of the above-mentioned products and eating large amounts of sweets between meals may lead to the development of nutrition-related diseases and cause improper nutritional habits in adult life [7, 19, 21].

MATERIAL AND METHODS

The research included 549 children, i.e. 258 girls (47%) and 291 boys (53%) aged 3-7 from selected kindergartens in Biala Podlaska county, which is situated in the northern part of Lubelskie province. The study was conducted in 2015 within the county health prevention and promotion programme titled "Together for heart" aimed at reducing cardiovascular diseases morbidity and mortality rate. The programme was financed from the resources of the Norwegian Financial Mechanism 2009-2014 and the national budget. The research was conducted in state kindergartens selected by Biala Podlaska County authorities on the basis of their responses to the offer of joining the programme. Out of 16 kindergartens, 11 responded positively, which constituted 68.8% of all the state kindergartens in the county. Only children whose parents gave a consent to complete the questionnaire were included in the study. The questionnaire applied in the study was prepared by the authors and included questions

regarding the frequency and number of meals eaten at home and in a kindergarten, types of products consumed between the meals and the frequency of consuming fruit and vegetables, sweets, fizzy drinks, fast foods and milk or dairy products (natural yoghurt, kefir, cottage cheese). Differences between the responses to the questions in groups divided according to sex were analysed with the use of χ^2 test (G-test).

RESULTS

Table 1 includes data regarding the type and number of meals consumed by children every day. A vast majority of them, i.e. 53% of the girls and 58% of the boys had 5 meals a day. A maximum of 3 meals a day were eaten by 39 girls (15%) and 18 boys (6%). Differences between the girls and boys regarding the number of consumed meals proved statistically significant ($G=12.43$; $p\leq 0.05$). Moreover, 191 girls (74%) and 228 boys (78%) had breakfast before going to the kindergarten, while 88% of the study participants from each group had dinner every day and the numbers (227 boys and 256 girls) were significantly higher ($G=6.03$; $p\leq 0.05$) than the remaining 31 girls and 35 boys (12% of the children from both groups) who had dinner less than 7 times a week. Supper was eaten regularly by 91-92% of the girls and boys.

Table 2 presents data regarding products eaten for breakfast by children before going to the kindergarten. Both girls and boys started their day from cereals or groats with milk most often (42% and 45%, respectively). Slightly lower numbers of girls and boys had bread or sweet rolls for breakfast (34% and 38%, respectively). Dairy products as the first meal were eaten by 19 girls (7%) and 11 boys (4%). Differences regarding types of products consumed by children for breakfast proved statistically significant ($G=6.25$; $p\leq 0.05$).

Table 1. Type and number of meals consumed by girls and boys

Question	Research category	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
How many meals does a child have a day?	More than 5 meals	19	7	27	9	12.43*
	5 meals	136	53	169	58	
	4 meals	64	25	77	26	
	3 meals	30	12	15	5	
	Fewer than 3 meals	9	3	3	1	
Does a child have breakfast before going to the kindergarten?	yes	191	74	228	78	1.42
	no	67	26	63	22	
How often does a child have dinner?	Every day	227	88	256	88	6.03*
	5-6 times a week	28	11	23	8	
	2-4 times a week	3	1	12	4	
Does a child have supper every day?	yes	238	92	264	91	3.27
	no	20	8	27	9	

Note: *p<0.05 – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 2. Types of products consumed by children for breakfast

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
What does a child's breakfast include?	sandwiches, sweet rolls	89	34	111	38	6,25*
	dairy products	19	7	11	4	
	scrambled eggs	4	2	1	1	
	cereals/groats with milk	109	42	131	45	
	other inne	11	4	12	4	

Note: *p<0.05 – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 3 illustrates data on the consumption of wholemeal bread. Statistically significant differences between girls and boys (G=10.96; p<0.05) regarding the frequency of consuming these products were revealed. Wholemeal bread was eaten daily by 19% and 20% of the examined children, while 93 girls

and 76 boys (36% and 27%, respectively) had it once a week or less frequently. White bread and rolls were consumed daily by 108 girls (42%) and 111 boys (38%), while 8% of the girls and 5% of the boys had them once a week or less frequently.

Table 3. Frequency of consuming white and brown bread and rolls

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
How often does a child eat brown bread or rolls?	every day	52	20	56	19	10.96*
	4-6 times a week	33	13	65	22	
	2-3 times a week	60	23	60	21	
	once a week or less	93	36	79	27	
How often does a child eat white bread or rolls?	every day	108	42	111	38	4.64
	4-6 times a week	74	29	105	36	
	2-3 times a week	45	17	52	18	
	once a week or less	21	8	15	5	

Note: *p<0.05 – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 4 demonstrates data concerning the consumption of products between the main meals. It was revealed that a similar percentage of girls and boys (44% and 39%, respectively) most often had fruit and vegetables between the main meals. Also, cakes and sweets were popular as 27% of the girls

and 22% of the boys consumed them. A considerably lower percentage of girls (7%) and boys (14%) chose crisps or breadsticks. The difference between types of products selected by girls and boys between the main meals was statistically significant ($G=8.08$; $p \leq 0.05$).

Table 4. Types of products eaten between the main meals

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
What types of products does a child eat between meals?	fruit and vegetables	114	44	115	39	8.08*
	sweets or cakes	70	27	66	22	
	crisps, breadsticks	19	7	42	14	

Note: * $p \leq 0.05$ – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 5 includes data on the frequency of consuming fruit and vegetables in one week. Everyday vegetable consumption was declared by 20% of the girls' parents and 18% of the boys' parents, while 19% of the girls and 21% of the boys had vegetables no more than once a week. Children had fruit considerably more

often. According to the parents' declarations, 33% of the girls and 30% of the boys had fruit every day. No significant differences between the girls and boys were found as far as the consumption of fruit ($G=2.19$) and vegetables ($G=1.43$) is concerned.

Table 5. Weekly frequency of consuming fruit and vegetables

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
How many times a week does a child eat vegetables?	every day	51	20	53	18	2.19
	4-6 times a week	75	29	73	25	
	2-3 times a week	71	28	87	30	
	once a week or less	49	19	61	21	
How many times a week does a child eat fruit?	every day	86	33	87	30	1.43
	4-6 times a week	101	39	117	40	
	2-3 times a week	52	20	60	21	
	once a week or less	14	5	18	6	

Note: * $p \leq 0.05$ – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 6 shows data on the consumption of highly processed food. Differences regarding weekly consumption of sweets were statistically significant ($G=70.13$; $p \leq 0.05$). According to the parents' declarations, 14% of the girls and 18% of the boys had sweets every day, while 16% of the girls and 36% of the boys ate them no more than once a week. Also, differences concerning the frequency of fast food consumption proved statistically significant ($G=4.94$; $p \leq 0.05$). These products were eaten every day by 4% of the girls and 7% of the boys, while 64% of the girls and 58% of the boys consumed them once a week or less frequently. Parents also responded to the question concerning the frequency of consumption of sweet drinks. This type of beverages was consumed once a week or less frequently by 26% of the girls and 22% of

the boys. When it came to daily consumption, a reverse trend was noted, i.e. 22% of the girls and 26% of the boys drank them every day.

Data on the frequency of dairy products consumption are illustrated in table 7. Differences between the declared frequency of eating fermented dairy products by girls and boys were statistically significant ($G=15.37$; $p \leq 0.05$). 10% of the girls and 18% of the boys consumed natural yoghurt and kefir every day, while 43% of the girls and 45% of the boys consumed these products no more than once a week. The consumption of cottage cheese was at a similar level. Half of the children (44-48%) consumed this product once a week or less frequently, while 2% of the girls and 1% of the boys had it every day. Differences between the declared frequency of cottage cheese consumption by girls and boys were statistically significant ($G=3.87$; $p \leq 0.05$).

Table 6. Frequency of consuming processed food products

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
How often does a child eat sweets?	every day	36	14	52	18	70.13*
	4-6 times a week	83	32	101	35	
	2-3 times a week	91	35	28	10	
	once a week or less	40	16	106	36	
How often does a child eat fast food?	every day	10	4	21	7	4.94*
	4-6 times a week	23	9	35	12	
	2-3 times a week	36	14	41	14	
	once a week or less	165	64	168	58	
How often does a child have sweet drinks?	every day	58	22	77	26	2.21
	4-6 times a week	55	21	70	24	
	2-3 times a week	68	26	70	24	
	once a week or less	66	26	65	22	

Note: * $p \leq 0.05$ – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 7. Frequency of consuming natural yoghurt, kefir and cottage cheese

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
How often does a child have natural yoghurt and kefir?	every day	25	10	51	18	15.37*
	4-6 times a week	39	15	35	12	
	2-3 times a week	72	28	52	18	
	once a week or less	110	43	131	45	
How often does a child eat cottage cheese?	every day	4	2	4	1	3.87*
	4-6 times a week	44	17	59	20	
	2-3 times a week	75	29	76	26	
	once a week or less	123	48	129	44	

Note: * $p \leq 0.05$ – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 8 includes information regarding the frequency of consuming fat products added to meals. It was revealed that 12% of the girls and 14% of the boys had margarine every day, while 41% and 34% of the girls and boys, respectively, ate it no more than once a week. Everyday consumption of vegetable oil was declared by 7% of the girls' parents and 12% of the boys' parents. In turn, according to the declarations, this product was consumed once a week or less frequently by 34% of the girls and 21% of the boys. Differences regarding the frequency of consuming vegetable oil by girls and boys were statistically significant ($G=14.12$; $p \leq 0.05$). Daily consumption of butter was declared by one third of all the parents. In turn, 8% of the girls and 10% of the boys ate it no more than once a week. Differences concerning a weekly intake of butter by girls and boys were not statistically significant ($G=1.11$).

Table 9 demonstrates the frequency of consumption of red meat, poultry and fish. Everyday consumption of red meat was declared by 7% of the girls' parents and 5% of the boys' parents, while as many as 45% and 47% of the parents, respectively, declared that their children ate this product 2-3 times a week. Differences regarding a weekly intake of red meat by girls and boys were statistically significant ($G=6.26$; $p \leq 0.05$). According to the parents' declarations, poultry was eaten most frequently, i.e. 2-3 times a week by more than a half of the children (51-53%), and less than once a week by 13% of the girls and 15% of the boys. Differences concerning weekly consumption of fish by girls and boys were also statistically significant ($G=9.88$; $p \leq 0.05$). Fish was eaten every day by 3-5% of the girls and boys, while its consumption no more than once a week was declared by 60% of the girls' parents and 50% of the boys' parents.

Table 8. Frequency of consuming fat products added to meals

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
How often does a child have margarine?	every day	30	12	40	14	5.16
	4-6 times a week	36	14	58	20	
	2-3 times a week	48	19	50	17	
	once a week or less	105	41	99	34	
How often does a child have vegetable oils?	every day	18	7	35	12	14.12*
	4-6 times a week	46	18	69	24	
	2-3 times a week	86	33	97	33	
	once a week or less	88	34	62	21	
How often does a child have butter?	every day	84	33	92	32	1.11
	4-6 times a week	90	35	100	34	
	2-3 times a week	54	21	58	20	
	once a week or less	20	8	30	10	

Note: * $p \leq 0.05$ – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

Table 9. Frequency of consuming meat and fish

Question	Research categories	Girls n [#] =258		Boys n [#] =291		G function
		n ^{##}	%	n ^{##}	%	
How often does a child eat red meat?	every day	19	7	15	5	6.26*
	4-6 times a week	77	30	103	35	
	2-3 times a week	116	45	138	47	
	once a week or less	42	16	30	10	
How often does a child eat poultry?	every day	21	8	13	4	3.72
	4-6 times a week	64	25	77	26	
	2-3 times a week	137	53	149	51	
	once a week or less	33	13	44	15	
How often does a child eat fish?	every day	9	3	14	5	9.88*
	4-6 times a week	20	8	44	15	
	2-3 times a week	68	26	81	28	
	once a week or less	155	60	145	50	

Note: * $p \leq 0.05$ – statistically significant differences between the number of responses provided by the parents of girls and boys (χ^2 test – G-test); n[#] number of participants; n^{##} number of responses

DISCUSSION

The studies conducted to date have indicated that nutritional habits of children developed in early childhood include not only behaviours observed in their parents but also in their kindergarten teachers and they determine their nutritional choices in adult life [4]. Kindergartens are obliged to provide children with 70% of daily energy requirements with an appropriate supply of particular nutrients [3, 4, 14, 23]. According to the recommendations of the Food and Nutrition Institute and Mother and Child Institute, pre-school children should eat 4-5 meals a day regularly every 3-4 hours [8, 9, 15].

A tendency to having an improper number of meals, i.e. three or even less, was noted among the observed children, mainly among the girls (15% of the girls and 6% of the boys). It may result in an insufficient daily

calorie intake, deficiency in nutrients that leads to being underweight as well as developmental disorders. Among the examined children, 88% of the girls and boys had dinner every day; however, as many as 47 children did not have supper every evening (Table 1). Similar behaviours in pre-school children were noted by *Kostecka* [11], who concluded that children attending kindergartens very often ate too few meals which were additionally badly composed. On the other hand, the data included in table 1 also showed that 7% of the girls and 9% of the boys had more than 5 meals, which may lead to excessive energy intake as well as obesity and diseases related to it, as it was pointed out by *Harton* [7]. The results presented in table 1 also indicated that main meals are eaten irregularly, which is not a unique phenomenon, as similar tendencies were noted by *Sadowska* and *Krzymska* [8, 16].

The data demonstrated in table 3 show that a small number of children, i.e. only 19-20% of all the participants followed the recommendations presented in the Healthy Diet and Physical Activity Pyramid for Children and Youth and had sandwiches with wholemeal bread every day, paying particular attention to ingredients. In the case of children having their first meal at home, the type of carbohydrates included in this meal is important. In our research, the daily intake of the recommended wholemeal products was not presented but it was revealed that less than half of both girls and boys (47% and 49%, respectively) had carbohydrates in their first meal in the form of cereals or groats (Table 2). Skipping breakfast at home, which was noted in 26% of the girls and 22% of the boys (Table 1), or an improper composition of the meal may reduce psychophysical capacities and cause morning hypoglycemia [7, 8, 16].

The study also revealed a habit of eating between meals, which is widespread among children (Table 4). It was noted in 34% of the girls and 36% of the boys who additionally had sweets, cakes, crisps or breadsticks during the day and consumed unnecessary calories coming mainly from simple carbohydrates. Similar observations were also made by Kolarzyk et al. and Kostecka [10, 11]. Tooth decay poses a serious threat to children, with all the consequences in the future. It is caused, inter alia, by increased fermentation of carbohydrates by bacteria found at dental plaque. Children with milk teeth or not fully mature permanent teeth are particularly prone to tooth decay, which was confirmed by Tkaczuk [19]. Therefore, pre-school children should be encouraged to eat nutritious meals taking into account their aversion to things they do not know or like [8, 15, 21].

Everyday diet of children should include fruit, vegetables, low-fat dairy products, wholemeal products, fish and lean meat. The assessment of the level of consumption of these products by children revealed that vegetables were eaten every day only by 20% of the girls and 18% of the boys (Table 5), which was also confirmed in the research by Kostecka, who pointed to low consumption of vegetables on a daily basis [11]. A child's diet should include fruit and vegetables [6], and, according to the WHO, children should consume approximately 400 g of fruit and vegetables every day [20].

The period of intensive growth in children is also characterised by a high demand for complete protein which can be found, inter alia, in milk and its products which simultaneously exert an influence on the intake of calcium necessary for bone mass development. The research revealed that the guidelines on providing catering for children included in the Ordinance of the Minister of Health [24], which determines the frequency of consuming particular groups of products,

e.g. two portions of milk or dairy products daily, are not followed. The examined children (both girls and boys) consumed an insufficient amount of these products and the difference between them was only slight, which was also noted by Gacek [5]. Other researchers also confirm such a low intake of milk products and at the same time they highlight the fact that calcium intake should be kept at a high level, particularly until peak bone mass is achieved [1, 15].

The Ordinance of the Minister of Health [24] also determines the consumption of fish by pre-school children. It is stressed that it should be eaten at least once a week. The study revealed that fish was eaten more than once a week by more boys than girls (48% vs. 37%). The remaining children had fish once a week or less frequently, which was also confirmed by the findings of Gacek [5, 24].

One of the determinants of excessive body mass in children and the development of diet-related diseases is the consumption of highly-processed food. It was revealed that 46% of the girls and 53% of the boys had sweets four times a week or more often (Table 6). In their guidelines concerning children, the Food and Nutrition Institute recommends limiting or excluding sweets and sweet drinks from the diet and indicates that they cause obesity and lead to the development of diet-related diseases [8]. Sochacka-Tatara and Gruszka [18] claimed that overweight and obesity are caused by excessive consumption of sweet products and, as a result, by long-lasting positive energy balance. The study also revealed considerable consumption of fast food by children (Table 6); 13-19% of the children had these products more frequently than 4 times a week. It is also confirmed by other researchers who indicated that excessive consumption of fast food resulted in the formation of improper food habits and led to the development of excessive body mass [2].

Our research also showed that 22% of the girls and 26% of the boys had sweet drinks every day (Table 6). A negative influence of excessive consumption of sweet drinks was noted by numerous authors who pointed out that products which contain simple carbohydrates in a liquid form, just like other processed products containing large amounts of sugar, change daily energy balance of a child and should be excluded or limited as quickly as possible [5, 11, 22].

In their research, *Merkiel* and *Chalcarz* [13] concluded that consuming excessive amounts of saturated fats and limiting the consumption of polyunsaturated fats in childhood increase the risk of obesity and may lead to improper brain development and learning difficulties. In our study, it was revealed that 32-33% of the children had butter every day, while vegetable oils, which are the source of unsaturated fats, were consumed only by 7-12% of the children. Fat intake was at a similar level in girls and boys.

Excessive intake of animal fats, which is mainly associated with red meat consumption (noted in 39% of the children), may lead to obesity, which was also described by *Kostecka* [11] as well as *Merkel* and *Chalcarz* [12, 13]. Moreover, our research revealed that the study participants rarely had fish which is a significant source of unsaturated fats (Table 9). As many as 60% of the examined girls and 50% of the boys had fish once a week or less frequently, which was also confirmed by other researchers. They also indicated that this may be the cause of an insufficient intake of polyunsaturated fats by children [12, 17].

1. Nutritional mistakes of the children under investigation were related to irregularity of meals, insufficient consumption of dairy products, fruit and vegetables, wholemeal products, unsaturated fats and fish as well as excessive consumption of sweets, highly processed food and sweet drinks.
2. The prevention of diet-related diseases in the nutrition of children requires limiting the consumption of simple carbohydrates and saturated fats.
3. The qualitative assessment of children's nutrition indicated the need for nutritional education of parents and children aimed at developing proper nutritional habits.

Conflict of interest

The authors declare no conflict of interest.

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