



## Nutritional regimen and physical activity of schoolchildren from urban and rural areas

### Sposób żywienia i aktywność fizyczna dzieci szkolnych ze środowisk miejskiego i wiejskiego

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#### ABSTRACT

**INTRODUCTION:** Balanced nutrition guarantees the harmonious development of schoolchildren. Proper eating habits and physical activity should prevent diet-dependent diseases. The aim of the paper was to specify the nutritional mistakes, physical activity and differences in the nutritional regimen of urban and rural schoolchildren.

**MATERIAL AND METHODS:** The study was conducted in September 2015 in Częstochowa among schoolchildren from the 4<sup>th</sup> to 6<sup>th</sup> grade of primary school from urban and rural areas. It was conducted with the authors' own questionnaire.

**RESULTS:** The majority of the surveyed children (79.33%) eat the first breakfast daily. The biggest examined group (82.69%) eat a sandwich prepared at home for the second breakfast. 32.69% of the schoolchildren do not eat a snack. The largest number of them drink mineral water (35.10%), 87.02% always take part in Physical Education classes. 47.12% regularly attend additional sports classes, yet 52.88% do not engage in regular physical activities.

**CONCLUSIONS:**

1. Some of the nutritional mistakes made by the children include: not eating the first breakfast or not eating the first breakfast at home, eating dinner both at school and home, not eating a snack and a low intake of mineral water during the day.
2. The differences found in the nutritional regimen of schoolchildren depending on their place of residence regard: food consumed for the second breakfast, time of eating supper and beverages drunk during the day.
3. Children from urban areas significantly more often take part in physical activities after school.

**KEY WORDS**

children, city, village, nutritional mistakes, physical activity

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## STRESZCZENIE

**WSTĘP:** Prawidłowe i zbilansowane żywienie dzieci w wieku szkolnym gwarantuje harmonijny rozwój młodych organizmów. W tym okresie kształtują się nawyki żywieniowe, które w połączeniu z odpowiednią aktywnością fizyczną powinny zapobiegać chorobom dietozależnym. Celem pracy było określenie błędów żywieniowych, aktywności fizycznej oraz różnic w sposobie żywienia dzieci w wieku szkolnym ze środowisk miejskiego i wiejskiego.

**MATERIAŁ I METODY:** Badanie przeprowadzono we wrześniu 2015 r. na terenie powiatu częstochowskiego, wśród uczniów klas IV–VI szkół podstawowych ze środowisk miejskiego i wiejskiego. Narzędziem badawczym był autorski kwestionariusz ankiety.

**WYNIKI:** Większość ankietowanych dzieci (79,33%) codziennie spożywa pierwsze śniadanie. Również najliczniejsza grupa badanych (82,69%) najczęściej na drugie śniadanie w szkole spożywa kanapkę przygotowaną w domu. Podwieczorku nie zjada 32,69% badanych uczniów. Najwięcej ankietowanych pije wodę mineralną (35,10%). Na lekcjach wychowania fizycznego w szkole zawsze ćwiczy 87,02% uczniów. Poza szkołą regularnie na dodatkowe zajęcia fizyczne uczęszcza 47,12% dzieci, natomiast 52,88% nie wykazuje systematycznej aktywności fizycznej.

### WNIOSKI:

1. Do błędów żywieniowych popełnianych przez nieliczną grupę dzieci należą: niespożywanie pierwszego śniadania lub spożywanie pierwszego śniadania poza domem, spożywanie obiadu zarówno w szkole, jak i w domu, niespożywanie podwieczorku oraz niska ilość wody mineralnej wypijana w ciągu dnia.
2. Różnice w sposobie żywienia dzieci w zależności od miejsca zamieszkania dotyczą: spożywanego posiłku na drugie śniadanie, pory spożywania kolacji oraz spożywanych w ciągu dnia napoi.
3. Istotnie częściej dzieci z miasta podejmują regularną aktywność fizyczną po szkole, w obu środowiskach najbardziej popularną formą jest piłka nożna oraz taniec.

### SŁOWA KLUCZOWE

dzieci, aktywność fizyczna, miasto, wieś, błędy żywieniowe

## INTRODUCTION

The proper and balanced nutrition of schoolchildren guarantees the harmonious development of young human bodies. At this time, eating habits, which are acquired skills connected with nutrition, are formed and they are repeated automatically and unconsciously. The eating habits of parents and peers have an influence on the formation of schoolchildren's eating habits [1,2]. They can lead to the development of overweight and obesity due to excess food intake or just the opposite they can result in nutritional deficiencies. Bad eating habits and an insufficient level of physical activity can lead to growth and puberty disorders and in the future to diet-dependent diseases such as diabetes mellitus type 2, hypertension, atherosclerosis or osteoporosis [3,4]. Schoolchildren is the social group most affected by nutritional mistakes. The biggest nutritional mistakes include: eating between meals, insufficient intake of vegetables, fruit, whole-meal bread, milk and dairy products and also excessive consumption of fizzy drinks. Proper eating habits should be formed on the basis of rational nutrition rules, compatible with the "Pyramid of healthy nutrition and physical activity" recommended by the National Food and Nutrition Institute, and these rules refer to the meal schedule, eating between meals, the

consumption of vegetables, fruit, meat, fish, dairy and cereal products [5,6].

The aim of the paper was to specify the nutritional mistakes, physical activity and differences in nutritional regimen of schoolchildren from urban and rural areas.

## MATERIAL AND METHODS

The study was conducted in September 2015 in the Silesian voivodeship, in the Częstochowa county, in two primary schools in rural and urban municipalities. The research group consisted of students from the 4<sup>th</sup> to 6<sup>th</sup> grade of primary school. It was conducted using the author's own survey questionnaire. The school headmasters' and parental written consent for the children's participation in the study was obtained. The pupils completed the survey on their own during classes. The survey included the respondent's particulars: age, sex and place of residence (city/village). The survey contained further questions regarding consumption of the main meals during the day, frequency and form of eating between meals and physical activity (in school and out-of-school). The criteria of participation in the study included school age and a state of health which did not require a special diet or long-lasting treatment. The excluding criteria were diseases



which required a special diet among others: allergies, food intolerance, cystic fibrosis, coeliac disease and diabetes mellitus.

226 children took part in the study, yet 18 questionnaires had to be excluded because of mistakes in completing the respondent's particulars. As a result, 208 correctly completed questionnaires were qualified for the statistical analysis. In the research group there were 105 boys (50.48%) and 103 girls (49.52%), 113 children from urban areas (54.33%) and 95 children from rural areas (45.67%). The biggest age group consisted of children at the age of 11 years (40.87%) and the smallest group included children at the age of 10 years (31.25%) and 12 years (26.44%). The average age of the surveyed children equalled 10.9 years (9–12 years, SD ± 0.8). The average age of children living in rural areas equalled 10.8 years (SD ± 0.8) and the average age of children living in urban areas equalled 11 years (SD ± 0.8).

The obtained data was analysed with the use of Microsoft Office Excel 2010 and were subject to a statistical analysis with the use of Statistica 12.0. The nutrition of the children was analysed with regard to the place of residence based on Pearson's Chi<sup>2</sup> test. For all the statistical analyses the value of p < 0.05 was considered statistically significant.

## RESULTS

Table I and Table II show the answers on nutrition which were given by the surveyed schoolchildren. Among the surveyed group, the biggest number of children – 165 (79.33%) said that they daily ate the first breakfast. The smallest number of schoolchildren – 4 (1.92%) of them gave a positive reply to this question, yet they very rarely eat the first breakfast.

This meal is eaten at home by the largest number of children – 166 surveyed children (79.81%). More children from urban areas (82.30%) than from rural areas (76.84%) eat their first meal at home. However, this difference is not statistically significant (p = 0.47). The biggest group of examined children (172 children – 82.69%) most often eat a sandwich prepared at home for the second breakfast, the smallest number of surveyed children (1.44%) eat a sandwich bought in the school shop or in a shop. The results of the analysis show that children from rural areas in a bigger number (89.47%) than children from urban areas (76.99%) consume sandwiches prepared at home for the second breakfast, yet more children from the city (15.93%) consume fruit. Statistically significant dif

**Table I.** Answers given by schoolchildren on nutritional regimen with reference to place of residence part I  
**Tabela I.** Odpowiedzi udzielane przez ankietowane dzieci na pytania dotyczące sposobu żywienia z podziałem na miejsce zamieszkania cz. I

Question	Possible answer	Place of residence						Pearson's Chi <sup>2</sup> test
		Village		City		Total		
		N = 95	%	N = 113	%	N = 208	%	
Do you eat the first breakfast?	Yes, every day	72	75.79	93	82.30	165	79.33	p = 0.38
	Yes, sometimes, a few times a week	18	18.95	15	13.27	33	15.87	
	Yes, very rarely	1	1.05	3	2.65	4	1.92	
	I do not eat the first breakfast at all	4	4.21	2	1.77	6	2.88	
Where do you usually eat the first breakfast?	At home	73	76.84	93	82.30	166	79.81	p = 0.47
	At school	18	18.95	18	15.93	36	17.31	
	I do not eat it	4	4.21	2	1.77	6	2.88	
What do you usually eat for the second breakfast?	A sandwich made at home	85	89.47	87	76.99	172	82.69	p < 0.05
	A sandwich bought in the school shop/shop	2	2.11	1	0.88	3	1.44	
	A chocolate bar/chips/a bun/a doughnut	3	3.16	3	2.65	6	2.88	
	Fruit	3	3.16	18	15.93	21	10.10	
	I do not eat it	2	2.11	4	3.54	6	2.88	
Where do you eat dinner?	At home	61	64.21	71	62.83	132	63.46	p = 0.88
	At school, in canteen	10	10.53	12	10.62	22	10.58	
	At school and at home	22	23.16	29	25.66	51	24.52	
	I do not eat it	2	2.11	1	0.88	3	1.44	



**Table II.** Answers given by schoolchildren on nutritional regimen with reference to place of residence part II  
**Tabela II.** Odpowiedzi udzielane przez ankietowane dzieci na pytania dotyczące sposobu żywienia z podziałem na miejsce zamieszkania cz. II

Question	Possible answer	Place of residence						Pearson's Chi <sup>2</sup> test
		Village		City		Total		
		N = 95	%	N = 113	%	N = 208	%	
What do you most often eat for a snack?	Fruit/ vegetables	28	29.47	29	25.66	57	27.40	p = 0.54
	Pudding/jelly	31	32.63	28	24.78	59	28.37	
	Sweets (chocolate/cakes)	6	6.32	11	9.73	17	8.17	
	Chips/crisps/salty cracknels	3	3.16	4	3.54	7	3.37	
	I do not eat it	27	28.42	41	36.28	68	32.69	
What do you eat between meals when you are hungry?	Fruit/vegetables	28	29.47	30	26.55	58	27.88	p = 0.26
	Yoghurt, cream cheese	30	31.58	30	26.55	60	28.85	
	Cakes/chocolate bars/sweet buns	11	11.58	10	8.85	21	10.10	
	Chips/French fries/hamburgers	3	3.16	3	2.65	6	2.88	
	Soup/ a sandwich	22	23.16	31	27.43	53	25.48	
	I do not eat between meals	1	1.05	9	7.96	10	4.81	
What time do you eat supper before you go to sleep?	1–2 hours before going to sleep	56	58.95	85	75.22	141	67.79	p < 0.05
	3–4 hours before going to sleep	31	32.63	21	18.58	52	25.00	
	Just before going to sleep	8	8.42	7	6.19	15	7.21	
What do you mainly drink during the day?	Tea	35	36.84	33	29.20	68	32.69	p < 0.05
	Mineral water	26	27.37	47	41.59	73	35.10	
	Fruit juice	19	20.00	26	23.01	45	21.63	
	Fizzy drinks	15	15.79	7	6.19	22	10.58	

ferences were found between the type of food consumed for the second breakfast and the place of residence of the surveyed schoolchildren ( $p < 0.05$ ).

The biggest group of schoolchildren eat dinner at home (63.46%). Among the surveyed schoolchildren there were those who had a “double” dinner during the day – both in the school canteen and at home, and that was 24.52%.

The snack turned out to be the most frequently skipped meal by the children during the day. 32.69% of the surveyed schoolchildren do not eat it. Yet 7 of the surveyed children (3.37%), who were the smallest group, said that they ate salty snacks (Tab. II). The biggest number of children from the urban area said that they did not eat snacks at all (36.28%) and among the children from the rural area the biggest group ate pudding or fruit jelly for a snack (32.63%).

When they start feeling hungry the biggest number of the surveyed children eat yoghurts, cream cheese (28.85%), the smallest number of children (2.88%) – chips, hamburgers and French fries. Analysing this issue with reference to the place of residence, the

children from urban areas, when they start feeling hungry most often eat soup or a sandwich (27.43%), yet children from rural areas most often choose yoghurts or cream cheese (31.58%)

The surveyed children were asked about the time they consume supper. The biggest number of the surveyed children, and that is 141 (67.79%) eat supper 1–2 hours before going to sleep, yet 15 children (7.21%) eat it just before going to sleep. There is a high percentage of schoolchildren from urban areas in comparison to those from the village (75.22% vs 58.95%) who eat supper 1–2 hours before going to sleep, yet more children from rural areas eat it 3–4 hours before going to sleep (32.63% vs 18.58%). Significant statistical differences were found between the place of residence and the time of supper consumption ( $p < 0.05$ ). Analysis of the question concerning the intake of liquids showed that the biggest number of the surveyed schoolchildren drink mineral water during the day (35.10%) and the smallest number (10.58%) – fizzy drinks. Among the surveyed children from the urban areas, the highest percentage of them drink



mineral water (41.59%) and the biggest percentage of children from rural areas drink tea (36.84%). Children from the rural areas choose fizzy drinks twice as often as children from the urban areas. Significant statistical differences were found between the children from rural and urban areas ( $p < 0.05$ ).

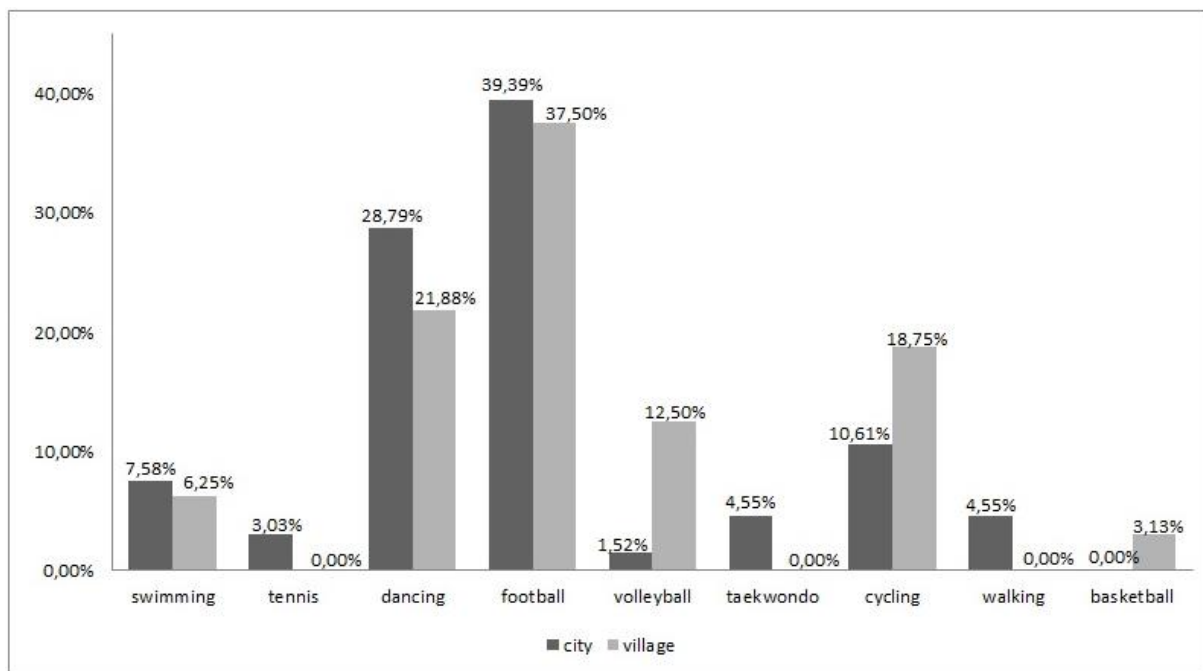
Table III shows the schoolchildren's answers to the questions regarding physical activity. Among the surveyed children 87.02% declared that they always took part in Physical Education classes unless they were ill. Only 3 schoolchildren do not take part in Physical Education classes at all and 24 (11.54%) do not do exercises when they do not feel like doing them. More children from rural areas (14.74%) than

children from the city (8.85%) stated that they skipped Physical Education classes.

47.12% of the schoolchildren attend additional Physical Education classes, yet 52.88% of them does not engage in regular physical activities. A significantly larger number of children from urban areas participates in regular out-of-school physical activities ( $p < 0.0001$ ). The biggest number of children both from the city and the village choose football and dancing, respectively for the urban area: 39.39% and 28.79% and for the rural area 37.50% and 21.88%. Less frequently chosen forms of physical activity include martial arts, tennis, volleyball or basketball (Fig. 1).

**Table III.** Answers given by schoolchildren about physical activity with reference to place of residence  
**Tabela III.** Odpowiedzi udzielane przez ankietowane dzieci na pytania dotyczące aktywności fizycznej z podziałem na miejsce zamieszkania

Question	Possible answers	Place of residence						Pearson's Chi <sup>2</sup> test
		Village		City		Total		
		N = 95	%	N = 113	%	N = 208	%	
Do you take part in Physical Education classes?	Yes, always when I am not ill	80	84.21	101	89.38	181	87.02	p = 0.39
	It depends, sometimes I do not feel like doing it	14	14.74	10	8.85	24	11.54	
	No, I have a medical excuse for the whole school year	1	1.05	2	1.77	3	1.44	
Do you regularly take part in out-of-school sports activities?	Yes, I take part in:...	32	33.68	66	58.41	98	47.12	p < 0.0001
	No	63	66.32	47	41.59	110	52.88	



**Fig. 1.** Type of regular physical activity undertaken by children from city and village.  
**Ryc. 1.** Forma regularnie podejmowanej aktywności fizycznej przez dzieci z miasta i wsi.



## DISCUSSION

Research on children's nutrition at school age is obligatory due to the current data about overweight and obesity epidemics which result among others from nutritional mistakes and an improper lifestyle. Many authors in their works emphasize the nutritional mistakes made by children and teenagers and the insufficient level of Physical Education. Thus, these are the most important factors influencing the development of overweight, obesity and an increased risk of diet-dependent diseases.

One of the basic rules of proper nutrition is eating the first breakfast. The results of the authors' present study showed that it is eaten daily by 79.33% of the surveyed schoolchildren, in the city it is 82.30% and in the village it is 75.79%. The report carried out by the Institute of Mother and Child in 2013/2014 shows that in a group of schoolchildren at the age of 11 to 15, the first breakfast is regularly eaten by a smaller percentage of participants than in the current study, and that is 63.9% of schoolchildren [7]. The research conducted by Kostecka shows that 16% of the surveyed children do not eat breakfast and do not drink tea or milk at home which means that the first meal eaten by a child is the second breakfast, eaten at school after 10.00. She suggests that children's behaviors result from their parents' behaviors who also eat their first meal in the workplace [4]. According to another study, the first breakfast is eaten by 90.7% of children [8]. The study conducted in the area of three voivodeships: Pomeranian, Lesser Poland and Greater Poland shows that the first breakfast is always eaten by 73% of schoolchildren at the age of 6 to 18 years, 16% sometimes eat it and 10% never or almost never eat it [9]. According to the present study a similar percentage of children sometimes eat the first breakfast (15.87%), a significantly smaller percentage of children does not eat the first breakfast (2.88%) which compared with other studies is a satisfactory result.

The current study showed that among children from the city, 82.30% of them daily eat the first breakfast and 13.27% do it sometimes. According to other authors who investigated the nutrition of children from the city, the first breakfast is eaten by 96.18% of the surveyed children [10]. Other researchers claim that 69.6% of schoolchildren regularly eat the first breakfast, 24.5% of them do it sometimes and 5.9% of them never [11].

A schoolchild apart from a wholesome breakfast should also eat another meal and that is the second breakfast at school, which ensures maintaining a steady glucose level and as a result enables proper functioning during the day. The second breakfast is daily eaten by 50–80% of children and in the majority

of cases that is breakfast prepared at home and taken to school [11,12,13,14]. The present study shows that almost all of the surveyed schoolchildren eat the second breakfast at school (97.12%). The majority of them eat the second breakfast which was prepared at home (82.69%). 96.46% children from the urban areas eat this meal at school and 76.99% of them eat sandwiches which they brought from home. According to other authors 83% of schoolchildren eat the second breakfast in school, 60% of them eat food which they brought from home and 40% of them buys the second breakfast in the shop [15]. The authors who examined the nutrition of children at the age of 10 to 12 years from Olsztyn obtained lower results and they found that the second breakfast is eaten by 73.61% of children [10]. In Łódź the second breakfast is regularly eaten by 78.8% schoolchildren and 21.2% never do it. Similar to the current study, the majority of children from Łódź brings to school sandwiches or fruit from home [11].

In the conducted research almost all of the children eat dinner. Yet, the research showed that there were few children who do not eat dinner, mainly 2 children from the village (2.11%) and one pupil from the city (0.88%). Similar results were obtained by the researchers in Olsztyn where the majority of children eat dinner (98.96%) [10], and also in Łódź where 100% of schoolchildren declared that they ate it [11]. A bit different results were obtained from the research by Wojtyła-Buciora et.al and according to them dinner is consumed by 85% of children [12]. According to the present study, the biggest number of children from urban areas (62.83%) eat dinner only at home, and 10.62% of children eat dinner only in the school canteen. What is worth emphasizing is the fact that as many as one quarter of the surveyed children (25.66%) eat a double dinner – at school and at home. In the study by Zimna et al. 12.8% of girls and 9.1% of boys eat dinner at school, and 80% of children eat dinner at home [11].

According to the current study, the snack turned out to be the most frequently skipped meal by the children. It is in total eaten by 67.31% of children, 63.72% of children from the city and 71.58% of children from village. In the research by Hałacz and Warechowska, children from urban areas more often skipped the snack and it was eaten by 70.83% of the examined population [10]. There were significant differences of snack consumption between boys and girls in the study in Łódź. Much more boys (20.0%) than girls (4.3%) skipped this meal, however, all the children were the most eager to eat fruit, than sweets and chips [11]. The current study showed that children from urban areas were the most eager to eat fruit or vegetables (25.66%), than jelly or pudding (24.78%) and sweets and salty snacks were chosen respectively by: 9.73% and 3.54%.



Not only is the regularity of meal consumption important but also the time of their consumption. Too late consumption of the last meal whose calorific value very often exceeds the recommendations may lead to gaining weight. The results from the present study show that in the Częstochowa region the majority of children eat supper 1–2 hours before going to sleep (67.79%) and in this group there are more children from the city (75.22%) than from the village (58.95%). The research by Ziemna et al. on rural children's lifestyle shows that 15% of them eat supper just before going to sleep, about 53% do it 1–2 hours before going to sleep, 21.7% of girls and 26.4% of boys do it 3–4 hours before going to sleep [11].

The type of consumed liquids is another very important factor in children's and youth's nutrition. The most frequently consumed drinks among children are: mineral water (35.10%), tea (32.69%) and less often juice in a juice box (21.63%) and sweetened fizzy drinks (10.58%). The research by Kostecka shows totally different results, according to her 56% of children drink bottled juice and 48% fizzy drinks. Only 11% of the children drink freshly squeezed juice [4].

In spite of the view that there is a growing problem of an increasing number of medical excuses, the present study does not confirm this thesis. Almost 90% of schoolchildren claimed that they took part in physical activities and the situation looks similar in the city and in the country, respectively: 89.38% and 84.21%. Only 1.44% of schoolchildren have a medical excuse for the whole year (1.05% in the village and 1.77% in the city). School children from the area of Stalowa Wola in majority take part in Physical Education classes (91%) and additional physical activity is undertaken by 60% of schoolchildren [4]. According to the research on schoolchildren's lifestyle in Łódź, 82.8% of schoolchildren do not skip Physical Education classes and 6.1% of schoolchildren have a permanent medical excuse [11]. Research conducted among children from the village showed that 21.7% of them only once or not at all participated in Physical Education classes at school. The rest of the schoolchildren attend these classes twice or three times a week [16]. The results regarding the additional physical activity of schoolchildren are alarming. The number of children who do not take part in out-of-school activities is slightly higher (52.88%), yet less than half of the respondents claimed that they regularly do sports (47.12%). In the surveyed group there are more schoolchildren from the city who regularly take part in physical exercise classes (58.41%) in comparison with the schoolchildren from the rural areas (33.68%). Such a huge disproportion results from the availability of sports facilities.

The surveyed children from the Częstochowa region regularly play football or dance after school. According to the research by Niewiadomski et al. conducted among children from the town, the majority of schoolchildren choose cycling as their favorite form of physical activity (83%) [15]. In research on preschool children there are similar outcomes to that of the current study. Up to 60% of children undertake out-of-school physical activities and more often they are boys who most often choose football, cycling, karate and swimming [4]. Children from the voivodeships: Pomeranian, Lesser Poland and Greater Poland also do sports out of school: 36.7% do it daily, 50.5% at least once a week and 12.8% less often than once a week [9].

In research analysing the level of physical activity, children stated that their average participation in Physical Education classes was 2.77 times a week. One may say that this is very little, whereas the authors found that some children take part in them even 5 times a week [17].

It is worth emphasizing the fact that the lack of physical activity is connected with the development of diet-dependent diseases, which was highlighted in the research by Väistö et al. Their results show that girls' level of physical activity was lower and at the same time they had a higher level of sedentary lifestyle which led to degradation of cardiometabolic factors [18].

## CONCLUSIONS

- Schoolchildren's nutrition is proper. A small group of children made some of the following nutritional mistakes: not eating the first breakfast or not eating the first breakfast at home, eating dinner both at school and home, not eating a snack and a low intake of mineral water during the day in comparison to other drinks.
- Differences found in the schoolchildren's nutritional regimen depending on their place of residence regard: consumed food for the second breakfast, time of supper consumption and beverages drunk during the day.
- The physical activity of children from urban and rural areas in Częstochowa county are diverse. Children from urban areas significantly more often take part in physical activities after school, in both urban and rural areas the most popular forms of sport among children are football and dance.



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**Author's contribution**

Study design – A. Stefaniak, J. Kasznia-Kocot  
Data collection – A. Stefaniak  
Data interpretation – A. Stefaniak, J. Kasznia-Kocot  
Statistical analysis – A. Stefaniak  
Manuscript preparation – A. Stefaniak, J. Kasznia-Kocot  
Literature research – A. Stefaniak

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