

Selected nutritional behaviors in children and youth at school age – preliminary study

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A - Conception and study design, **B** - Data collection, **C** –Data analysis, **D** - Writing the paper, **E** – Review article, **F** - Approval of the final version of the article

ABSTRACT

Purpose: To evaluate diet, frequency and type of products consumed and offered at school shops.

Materials and methods: Studies were conducted in 2014 among 159 pupils of three randomly selected schools in Białystok (elementary school, middle school, and high school). The original anonymous questionnaire was used as a research tool. Analysis of results depending on age of the respondents was performed using contingency tables and Pearson's chi-squared test. For hypothesis testing evaluation, significance level of 0.05 was assumed.

Results: Consumption of four or more meals during the day was declared by more than half of respondents. Three meals were consumed by 41.5% of middle school pupils, 29.8% of primary school children, and 27.1% of secondary school pupils. Percentage of pupils eating meals outside the home

increased with age. Elementary school pupils (91.5%) took water to school significantly more often than middle school or high school pupils (64.2% and 54.2% respectively) ($p < 0.05$). The highest percentage of pupils buying fast food at school was elementary school children, while sweet rolls were mostly bought by middle school pupils (75.5%). Elementary school pupils (78%) are provided information on healthy eating habits from family and school, while middle school (66%) and high school pupils (74.6%) receive this information from the media and magazines.

Conclusions: Dietary mistakes reported in the group of pupils were more pronounced with age of respondents. Buying at school shops was associated with an increase in the amount of junk food at the cost of nutritious food.

Key words: School shops, diet, children, youth

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INTRODUCTION

Proper nutrition is one of the most important environmental factor affecting health and development of a child [1]. Health behaviors are formed in early childhood and are strengthened in adolescence and further in adulthood [2,3].

Starting school is often associated with deterioration of eating habits [4]. Lesser control of parents or guardians, the need for individuality and acceptance in a peer environment, are manifested in many dietary errors [5].

The school, apart from a family, is a place of knowledge transfer and development of proper behavior of children and youth. Through appropriate actions, prevention programs may change the lifestyle of pupils, simultaneously promoting healthy dietary habits [6,7]. At schools, it is necessary to organize a facility providing students with the opportunity to consume healthy breakfasts or lunches while staying at school [1]. Many previous studies have shown that the product range of school shops is still not satisfactory [1, 8-13]. Up to this year, school shops offered mainly sweets, salty snacks, fast food products, soft drinks, which are durable, easy to carry and were used as snacks between meals [8,14]. However, these were not products recommended in the diet of children and youth [1,9].

In Poland, up to now no regulations controlling the product range of school shops were applied [15]. From 1 September 2015, the situation has changed, as a result of the amendment to the Act of 25 August 2006 on food and nutrition safety [16]. It is possible that formal act will contribute to the improvement of diet among children and youth, as a result of introduction of appropriate products to school shops instead of those unhealthy ones [6, 15].

The objective of this study was to evaluate diet, frequency and type of products consumed by school children and youth offered at school shops.

MATERIALS AND METHODS

The study was conducted in 2014 among 159 pupils from three randomly selected schools in Białystok. Elementary school pupils accounted for 29.6% of the respondents while middle school and high school pupils constituted 33.3% and 37.1% of respondents, respectively. Prior to the study, a written consent of each participant and his parents or legal guardians, was obtained. The study was approved by the Bioethics Committee of the Medical University of Białystok.

Anonymous questionnaire consisting of 43 closed-ended questions was used as a research tool. The questions contained in the questionnaire were divided into two parts. In the first part

(demographics) they related socio-economic status of pupils under study and their families. In the second part, eating habits were evaluated (including the amount and regularity of meals, eating outside home and at school, selection of products at school shops, influence of parents on the incidence of buying in shops by children as well as the information source used by the pupils).

The results obtained were subjected for statistical analysis using Statistica 10 (StatSoft). Analysis of results depending on age of the respondents was performed using contingency tables and Pearson's chi-squared test. For hypothesis testing evaluation, significance level of 0.05 was assumed.

RESULTS

The study involved a group of 159 pupils aged 11 – 17. Within the age range of 11–12, 47 pupils (29.6%, 33 girls, 14 boys) were surveyed; within the age range of 14–15, 53 pupils (33.3%, 30 girls, 23 boys) and within 16–17 years of age, 59 pupils (37.1%, 31 girls, 28 boys) were evaluated. Most of the pupils were living in the city (78.6%), while 21.4% of the respondents were living in the village.

More than half of the students declared the consumption of four or more meals throughout the day. Three meals were consumed by 41.5% of the middle school pupils, 29.8% children of the primary school and 27.1% of high school youth. A small percentage of pupils at the schools under investigation consumed two or fewer meals per day, however this percentage increased with age of the respondents.

Increased tendency with age in terms of the lack of regularity of meals' consumption and frequent consumption of meals outside home was observed among the pupils surveyed. The vast majority of surveyed pupils from the middle school (64.2%) and high school (66.1%) admitted the lack of consumption of regular meals every 3–4 hours. Only 48.9% of the primary school pupils consumed regular meals (Fig. 1).

Consumption of meals outside home was mostly observed among pupils from the high school (40.5%), a slightly smaller percentage was reported among the middle school pupils (32.5%) while the lowest – for the primary school children (27.0%).

Lunch was brought from home to school by most pupils of all age groups, however this percentage decreased with pupils' age. Pupils who did not bring lunch from home usually bought it at school. This practice was popular in 20.3% of high school pupils as well as among 20.8% and 8.5% of middle school and primary school pupils, respectively. Among the pupils surveyed, there were also individuals who did not consume lunch at

all. This group was dominated by the high school pupils (16.9%) followed by primary school pupils (12.8%) and middle school pupils (7.5%).

The studies have shown that 91.5% of the primary school pupils took water to school. In the

group of middle and high school youth this behavior was observed significantly less often, particularly at 64.2% and 54.2%, respectively ($p < 0.05$) (Fig. 2).

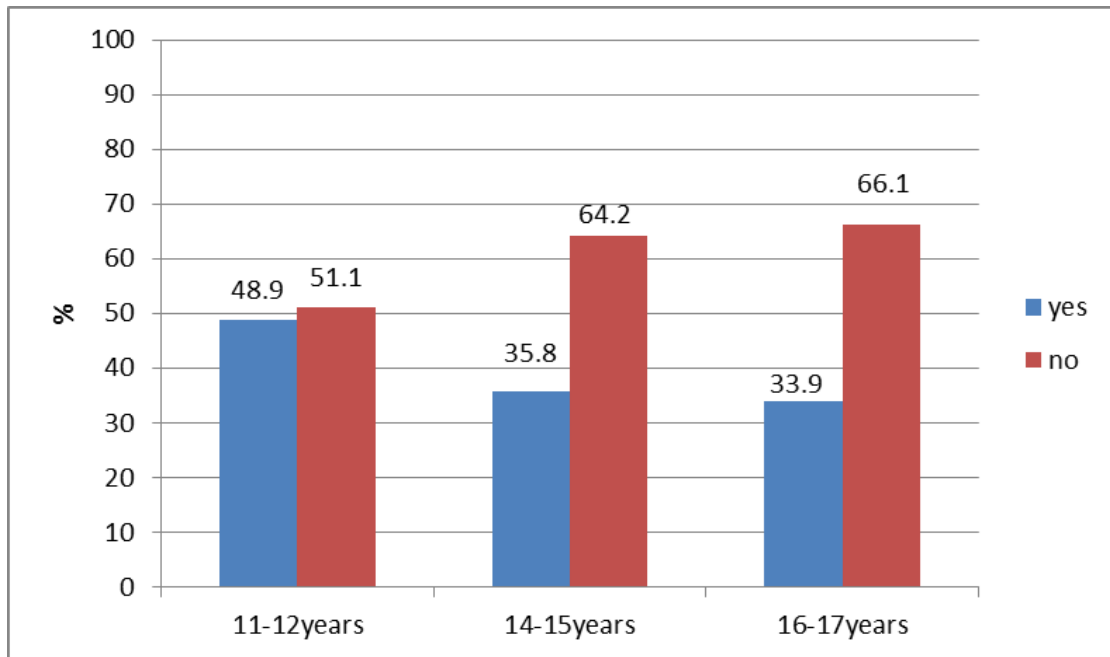


Figure 1. Histogram representing the percentage of regularity of meals' consumption among pupils surveyed within three age ranges

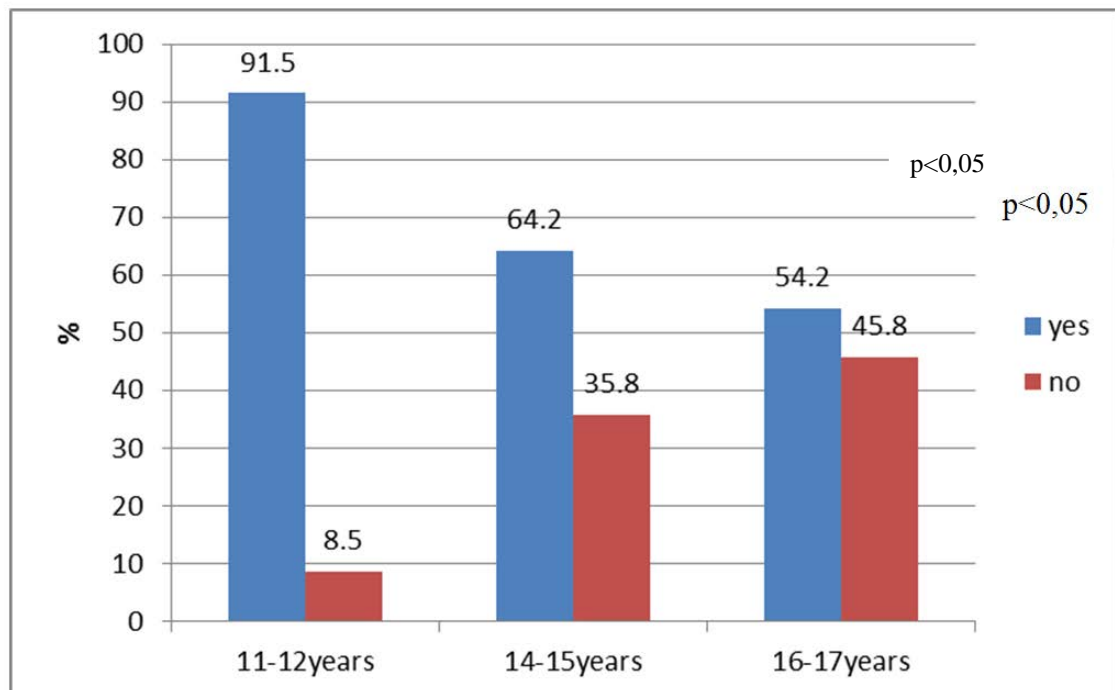


Figure 2. Histogram representing the percentage of bringing water to school by pupils under study within three age ranges

In each of the schools surveyed, there was a school canteen and a school shop. The primary school pupils significantly often used the school

canteen in comparison to the middle and high school pupils (46.8%) and thus only 13.2% of

middle school pupils and 25.4% of high school pupils used the school canteen.

The percentage of students using the offer of school shop was the highest at primary school (97.9%), slightly lower in middle school (90.6%) and the lowest in high school (84.8%), indicating a greater interest in the offer of school shop among the youngest children. Analysis of food products available at the school shops showed that fast food, salty and sweet snacks were the most abundant, in addition fruit drinks, mineral water and fruits were also available. Sandwiches could be bought at the primary school and high school, while milk drinks in the middle school and high school. None school shop offered salads.

Among the pupils surveyed, statistically significant decrease in the trend of buying fast-food with age ($p < 0.05$) was observed. The highest percentage of pupils who bought fast-food at school shop was attributed to children from the primary school (57.4%) (Fig. 3). Water (60.4%), fruit juices (36.5%) and fruit beverages (24.5%) were the products bought most frequently by the pupils surveyed. The least popularity was attributed to vegetable juices (4.1%), coffee, tea and hot chocolate (5.0%).

Along with age, percentage of pupils buying salty snacks at school shops was decreasing. The highest percentage of respondents choosing salty snacks at the school shop was found at the

primary school (55.3%); lower percentage was reported at the middle school (37.7%) and the lowest at high school (18.6%) ($p < 0.05$) (Fig. 4). It was demonstrated that buying certain types of sweets, among others: chocolate, candies, lollipops, jelly beans, ice creams and chewing gum, was age-dependent ($p < 0.05$) (Table 1).

Significant differences were reported between buying sweet rolls and croissants at a school shop and the age of the pupils surveyed ($p < 0.05$). The highest percentage of pupils were middle school youth (75.5%), slightly lower was observed for high school pupils (57.6%) whereas primary school children accounted for 42.6% (Fig. 5).

In the opinion of pupils surveyed on changes which should be introduced to school shops, the most important were: the need to introduce healthy food to the shops (54.7%) and decrease in the price of sold products (52.2%).

Significant relationship ($p < 0.05$) was found between the age of surveyed pupils and the source of knowledge they used on rational nutrition. Most primary school children (78.7%) aged 11–12 were provided with the information on healthy dietary habits from family and school. In turn, a significant percentage of middle school pupils (66.0%) and high school pupils (74.6%) indicated TV, radio, the Internet and magazines as a source of information on dietary habits.

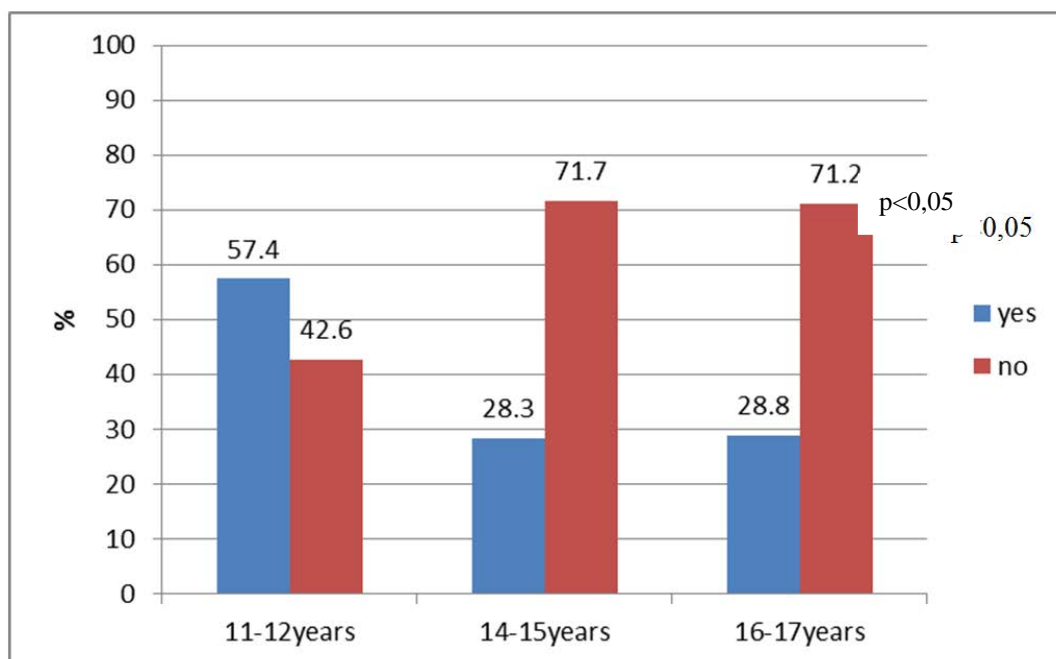


Figure 3. Histogram representing the percentage of buying fast food products at school shop within three age ranges

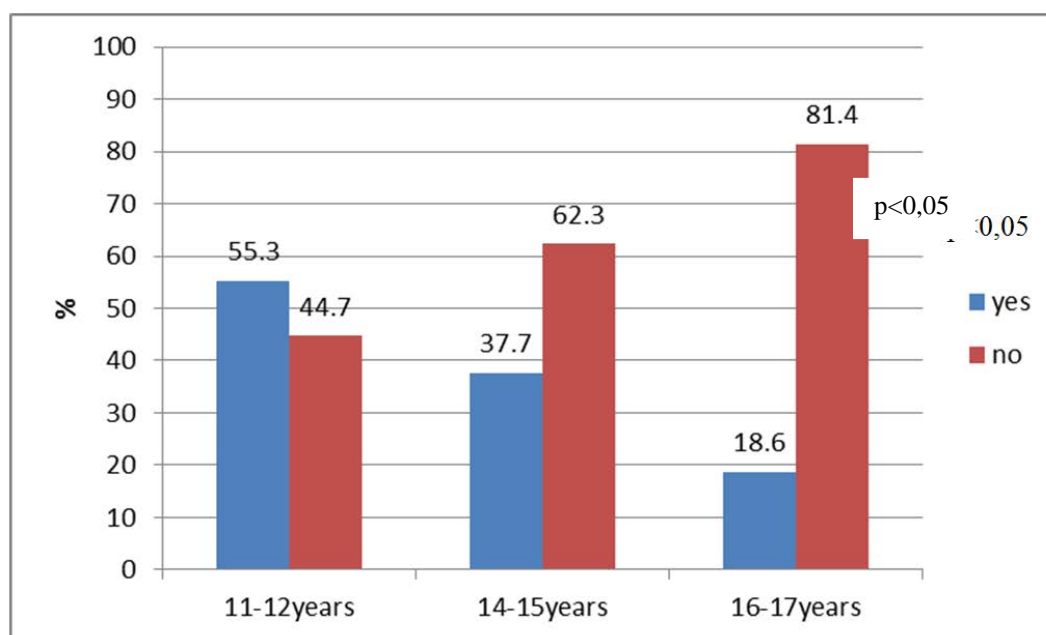


Figure 4. Histogram representing the percentage of buying salty snacks at school shop within three age ranges.

Table 1. Frequency of buying sweets at a school shop depending on age of the pupils surveyed

Sweets:	11–12 years		14–15 years		16–17 years		p*
	n	%	n	%	n	%	
Bars	16	21.6	26	35.1	32	43.2	ns
Cookies	5	19.2	14	53.9	7	26.9	ns
Chocolate	2	10.5	11	57.9	6	31.6	p<0.05
Candy, lollipops	20	55.6	10	27.8	6	16.6	p<0.05
Jelly beans	15	50	9	30	6	20	p<0.05
Ice creams	20	47.6	15	35.7	7	16.7	p<0,05
Chewing gum	11	21.2	21	40.4	20	38.4	p<0.05
Dragees	3	27.3	6	54.5	2	18.2	ns

* Statistically significant differences based on chi-squared test

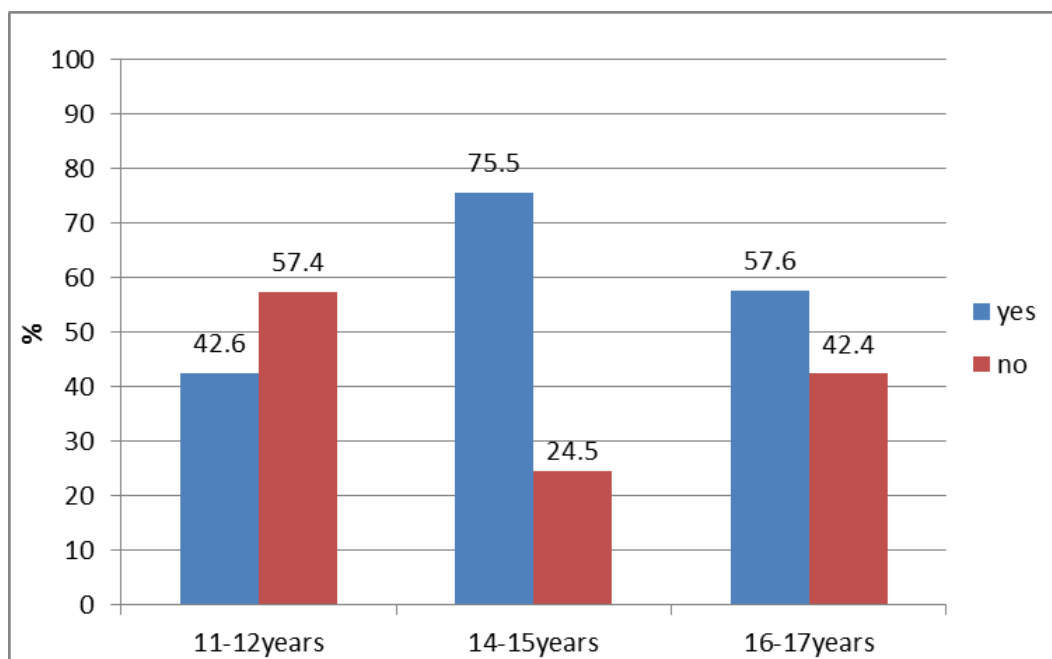


Figure 5. Histogram representing the percentage of buying sweet rolls and croissants at a school shop within three age ranges

DISCUSSION

School period is often associated with improper diet of pupils [4,17,18]. Our study confirm the occurrence of differences in the diet of children and adolescents depending on the level of education (primary school, middle school and high school).

The vast majority of pupils of all school types consumed appropriate amount of meals (four or more) a day, according to the nutritional recommendations for these age groups. Similar results were obtained by Maksymowicz- Jaroszczuk *et al.* according to which 96% of middle school students consumed three or more meals [19]. Pieszko-Klejnowska *et al.* observed that 64.6% of the middle school pupils consume meals according to the proper dietary habits [2] and similar results were also reported by Wanat *et al.* [20]. Studies conducted by Wajszczyk *et al.* showed that about 45% of youth aged 11-15 consume four meals [21]. According to Roszko-Kirpsza *et al.* 80% of respondents aged 1-14 consumed four meals a day, 2% less than three meals, while 18% consumed three meals [18]. Sosińska *et al.* observed that 56% of high school pupils consumed four or more meals and 30% of respondents consumed three meals a day [22].

Irregularity in meal consumption affects the development of bad eating habits and satisfying hunger by consuming food and products which are not recommended e.g.: fast food, sweets, salty snacks [23]. The results of the study demonstrate an

increasing trend along with age in terms of the lack of regularity of meals. Half of primary school children under study indicated irregularity of meals consumed, which was reported in 64.2% middle school students and 66.1% high school students. According to the recommendations on the nutrition of children and adolescents, meals should be consumed every 3-4 hours, and also at school a balanced meal should be provided.

Reducing regularity in the consumption of meals with age has also been observed in international surveys by Woynarowska [24]. Marcysiak *et al.* showed that among primary and middle school pupils, only 30% of children eat regular meals during the day [25]. Among the reasons of not eating an appropriate amount of food or lack of regularity in their consumption among younger pupils, the following factors are distinguished: lack of organization of households, limited awareness of parents on healthy dietary habits, too long staying of a child outside home.

Sometimes parents/guardians believe that a child at school age does not require any control in terms of a diet [26]. In turn, the causes of making mistakes in terms of dietary habits in older pupils are time-consuming communication to school or the school outside the place of residence, bored by learning, fast pace of life as well as the style of dietary habits promoted in commercials, youth magazines, youth forums, not always consistent with the principles of rational nutrition [27].

Eating meals outside home mainly in restaurants, bars and pizzerias is an adverse

phenomenon observed in children and adolescents. In our study, an increasing trend of such phenomena along with the age of respondents is observed. The reason for such nutrition behavior among youth is attributed to age-increasing independence in terms of deciding on own dietary habits.

In our study, approximately 27% primary school children, 32.5% middle school pupils and 40.5% high school pupils declared meal consumption outside their home.

Similar results were observed by Maksymowicz-Jaroszuk *et al.*, among pupils of primary and middle school, claiming that approximately 28.5% of pupils use the mass caterers (bars, restaurants, pizzerias, cafes and other) [19]. In the studies conducted by Gajda *et al.* among pupils aged 16-19 it was demonstrated that eating (especially dinner) outside home was attributed to 40% of respondents [11].

Pupils staying at school up to 6 hours should consume at least one meal, e.g. lunch or hot meal. However, in children staying at school more than 6 hours, consumption of two meals is desirable [4, 17]. According to our own observations, lunch was brought to school from home by most pupils, however this percentage decreased with age. Some respondents bought lunch at school (primary school–8.5%, middle school–20.8%, high school–20.3% of pupils). Resignation of the lunch consumption was confirmed by 16.9% respondents from the high school, 12.8% from the primary school and 7.5% from the middle school. Similar results were obtained by other authors, who observed that a greater percentage of younger pupils consume breakfast and lunch compared to the older students which is caused by the economic situation, lack of time or lack of knowledge on healthy eating habits [18,28]. According to the guidelines, each pupil should drink at school at least 0.5 liter of liquid, preferably water. The school should provide pupils with an access to drinking water or other fluids recommended in the nutrition of children [17]. In our study, we found a statistically significant relationship ($p < 0.05$) between the age of pupils and taking water to school. Almost all primary school pupils (91.5%) took water to school, the percentage of pupils in the remaining schools was lower (64.2% of middle school pupils, 54.2% of high school pupils).

Gajewska *et al.* evaluated the consumption of drinks offered by a school. Such an offer was provided by 31.9% of schools investigated, in which only 14.9% pupils used it [8]. As shown in this study, this may be explained by the fact of taking water to school by pupils or buying carbonated, non-carbonated beverages and fruit juices available at the school shops. In all schools investigated in this study, there was a school shop and a canteen. School canteen was used by only

27.7% of pupils whereas the school shop was visited by almost all pupils (90.6%). Based on the Sanitary and Epidemiological Stations data from 2001, Gajewska *et al.* showed that hot meals were consumed by 24.3% primary school pupils, 16.1% middle school pupils and 2–4% high school pupils [8]. Gajda *et al.* when evaluating pupils of the high schools reported that 82.2% respondents used the offer provided by a school shop [11]. The reason for a low percentage of pupils using school canteens lies in their replacement by shops school [10, 12].

A school should be a place that promotes healthy eating habits among pupils. In the schools surveyed, the product range of school shops was not satisfactory. Pupils were offered products which were not recommended in terms of dietary habits of children and adolescents. These were mostly fast food products, fruit drinks (carbonated, non-carbonated), salty snacks (chips, breadsticks, crackers, salted peanuts), sweet snacks (bars, cookies, candies, chocolate), sweet rolls and croissants. In several schools, one could find sandwiches (in primary and high school) and milk products (in middle and high school), the presence of which was an advantage. The presence of fruits and mineral water can be considered satisfactory in all schools, however there was no salads. A similar review of the product range of school shops was reported by the authors of other studies [1,8-13].

It was demonstrated that the age of pupils statistically differed the purchase of certain products offered in shops: fast food products, salty snacks, sweets (chocolates, candies and lollipops, jelly beans, ice cream, chewing gum), sweet rolls and croissants. The reason for the differences in the choice of products offered by the shop lies in taking lunch to school. A larger proportion of youth from the middle school and high school does not take a lunch to school, but buy it at the school shop, choosing sweet rolls and not snacks as for primary school pupils [12,28].

This is also confirmed by own studies. Given that pupils while staying at school are exposed to different opinions on food and nutrition, promotion of healthy dietary habits through the school shops and canteens is necessary. The presence of vending machines with beverages and highly processed food provides inconsistent message to pupils on proper nutrition and will contribute to the selection of unhealthy snacks [10, 30].

Among changes that were favored by pupils, the largest percentage of respondents indicated the introduction of healthy food (54.7%), decrease of products' prices sold (52.2%). Moreover, Gajewska *et al.* confirmed that pupils and parents expect healthy product to be sold at school shops: 32% expect milk and dairy products

while 29.9% of respondents are interested in selling fruits [29].

In our study we demonstrated that there is a relationship between the age of pupils and a source of information on healthy dietary habits. The main source of information among primary school pupils was a family and school (78.0%). Middle school pupils (66.0%) and high school youth (74.6%) collected such information from television, radio, the Internet and magazines. Similar results in primary, middle and high schools were obtained by other authors [17,22,30].

School and family are places that contributes significantly to the development of knowledge and pro-health behaviors in children and adolescents. Through undertaking the appropriate actions, prevention programs, a proper lifestyle of pupils, it is possible to work out the principles of healthy dietary habits and maintain them in adulthood [17].

CONCLUSIONS

Dietary mistakes reported in the group of investigated pupils increased with the age of respondents. The use of school shop product range was associated with an increase in junk food in the diet of the pupils at the expense of healthy food. Proper dietary habits in younger age group were developed by family and school environment and the knowledge on the principles of nutrition and healthy food in youth was mainly derived from the media and magazines.

Conflicts of interest

None declared.

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