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ORIGINAL ARTICLE

# THE INFLUENCE OF PRESCHOOL CHILDREN'S DIETS ON THE RISK OF LIFESTYLE DISEASES. A PILOT STUDY

*Małgorzata Kostecka*

University of Life Science, Faculty of Food Science and Biotechnology,
Department of Chemistry, Lublin, Poland

## ABSTRACT

**Background.** A healthy diet in early life not only contributes to physical and intellectual development, but it can also reduce the risk of disease in adulthood. There is growing evidence to indicate that childhood diets are highly correlated with health in adult years. Eating habits formed in childhood persist in later life.

**Objective.** The objective of this study was to evaluate the diets of preschool children aged 3 to 6 years and to identify statistical correlations between dietary factors and the risk of lifestyle diseases.

**Material and methods.** The described survey was conducted based on the paper and pencil interviewing method. The study was conducted on 380 children from Lublin and Świętokrzyskie regions. The risk of lifestyle diseases in the studied population was evaluated based on the answers to 17 selected questions. The questionnaires were processed statistically in SPSS and Statistica programs.

**Results.** Eating irregular meals increased the risk of lifestyle diseases, and the lower the number of meals per day, the greater the relevant risk ($p=0.002$). Children who did not eat regular breakfasts or afternoon teas and ate sweet and salty snacks were at significantly higher risk of lifestyle diseases. Consumption of milk and dairy product was an important predictor of lifestyle diseases. Children who did not drink milk every day were at significantly higher risk of developing lifestyle diseases than their peers who drank milk at least once a day ($p<0.0001$).

**Conclusions.** Eating habits formed in childhood can contribute to the risk of lifestyle diseases in adulthood. Particularly dangerous are nutritional habits leading to overweight and obesity. Both children and parents require nutritional education to develop healthy eating habits.

**Key words:** *lifestyle disease, preschool children, nutrition*

## STRESZCZENIE

**Wprowadzenie.** Właściwa dieta w pierwszych latach życia człowieka nie tylko wpływa na prawidłowy rozwój fizyczny i intelektualny, ale może być również jednym z ważniejszych czynników powodujących obniżenie ryzyka rozwoju chorób w wieku dojrzałym. Istnieje coraz więcej dowodów na ścisły związek pomiędzy odżywianiem w okresie dzieciństwa, a zdrowiem człowieka dojrzałego.

**Cel.** Celem badań była ocena żywienia dzieci w wieku przedszkolnym, w wieku od 3 do 6 lat oraz próba poszukiwania statystycznych zależności pomiędzy wskazanymi w literaturze elementami sposobu żywienia, a ryzykiem zachorowania na choroby cywilizacyjne.

**Materiały i metody.** Badania przeprowadzono za pomocą autorskiego kwestionariusza ankiety wśród 380 dzieci z województwa lubelskiego i świętokrzyskiego. Ryzyko wystąpienia chorób cywilizacyjnych wśród badanych dzieci oceniono na podstawie 17 wybranych pytań ankiety. Wypełnione kwestionariusze poddano analizie statystycznej za pomocą programów komputerowych SPSS i Statistica 10.

**Wyniki.** Nieprawidłowy rozkład posiłków w ciągu dnia był czynnikiem zwiększającym ryzyko wystąpienia chorób cywilizacyjnych, stwierdzono, że im mniejsza liczba posiłków w ciągu dnia tym oceniane ryzyko jest wyższe ($p=0,002$). Istotnie wyższym ryzykiem wystąpienia chorób cywilizacyjnych obarczone były dzieci, które nie jadły regularnie śniadań oraz podwieczorku oraz te, które pojadały słodkie lub słone przekąski ($p<0,05$). Bardzo ważnym czynnikiem ryzyka okazało się niskie spożycie mleka i jego przetworów, dzieci spożywające mleko rzadziej niż raz dziennie miały istotnie statystycznie wyższe ryzyko rozwoju chorób cywilizacyjnych niż rówieśnicy pijący mleko przynajmniej raz w ciągu dnia ($p<0,0001$).

**Wnioski**. Zachowania i nawyki żywieniowe w okresie dzieciństwa mogą być czynnikiem ryzyka zachorowania na choroby cywilizacyjne w przyszłości. Szczególnie niebezpieczne są zachowania żywieniowe prowadzące do rozwoju nadwagi i otyłości. Konieczna jest edukacja żywieniowa zarówno rodziców jak i dzieci mająca na celu wprowadzenie prozdrowotnych nawyków żywieniowych.

**Słowa kluczowe:** *choroby cywilizacyjne, dzieci przedszkolne, żywienie*

**Corresponding author**: Małgorzata Kostecka, University of Life Science, Faculty of Food Science and Biotechnology, Department of Chemistry, Akademicka street 15, 20-950, Lublin, Poland, phone: +48 81 445 68 46, e-mail; julka-portal@wp.pl

## INTRODUCTION

A healthy diet in early life not only contributes to physical and intellectual development, but it can also reduce the risk of disease in adulthood. There is growing evidence to indicate that childhood diets are highly correlated with health in adult years. Eating habits formed in childhood persist in later life. Unhealthy diet, stress, sedentary lifestyle, substance abuse and environmental pollution are the main causes of lifestyle diseases. Children grow and develop rapidly during preschool years. Preschoolers are at high risk of nutritional deficiencies, which is why their nutrient intake should closely match nutrient recommendations in different stages of physiological development.

Preschoolers should eat 4-5 meals per day at intervals not exceeding 3-4 hours. A child's diet should be varied and well-balanced. The inclusion of various food products in a diet will guarantee that a child's nutritional needs are adequately met. Children eating a varied diet will also be able to develop a liking for different types of foods [7].

An unbalanced diet can disrupt physical growth and development, weaken immunity and contribute to insufficient or excessive body weight. The recommended daily calcium dose for preschoolers is estimated at 800 mg. Diets deficient in calcium lead to rickets in early childhood and loss in bone density and mass in later life [13,18].

Lifestyle diseases originate in early childhood, and they are caused by a sedentary lifestyle and unhealthy eating habits. Overweight and obese individuals are more frequently diagnosed with diseases such as type 2 diabetes, hypertension, bile duct stones, gastroesophagal reflux and asthma [11].

The objective of this study was to evaluate the diets of preschool children aged 3 to 6 years and to identify statistical correlations between dietary factors and the risk of lifestyle diseases.

## MATERIAL AND METHODS

The described survey was conducted based on the paper and pencil interviewing method. The analytical tool was an anonymous questionnaire developed by the authors. The questionnaire was composed of 35 questions, including 28 close-ended or multiple choice questions and 7 open-ended questions. The questions addressed the surveyed children's diets, health status, anthropometric and sociodemographic data, gender, age and family size. The respondents were asked to describe the children's diets in the past month and the eating habits in the family home. The questions addressed eating habits on both school and non-school days.

The study was conducted in kindergartens between September 2016 and November 2016 on 380 children from Lublin and Świętokrzyskie regions. The inclusion criteria were the participants' age, absence of chronic diseases or diseases that require an elimination diet. A total of 320 correctly completed questionnaires were returned by the children's parents. The studied population consisted of 51.2% of girls and 48.8% of boys.

The participants' nutritional status was evaluated based on anthropometric measurements of height to the nearest 0.1 cm and body weight to the nearest 0.1 kg. The participants' nutritional status was evaluated based on anthropometric measurements. The results were used to calculate the body mass index (BMI) and develop a percentile chart adjusted for the participants' gender and age, based on the recommendations of the Institute of the Mother and Child in Warsaw. BMI values between the $5^{th}$ and $85^{th}$ percentile on the chart represented the normal weight range. Values below the $5^{th}$ percentile denoted underweight subjects, values above the $85^{th}$ percentile and below the $95^{th}$ percentile denoted overweight subjects, and values above the $95^{th}$ percentile denoted obese subjects [3].

The risk of lifestyle diseases in the studied population was evaluated based on the answers to 17 selected questions (Table 1) about for example: regular meals, consumption of milk, fruits, fish and snacks. Behaviors and attitudes that contribute to lifestyle diseases scored 1 point, and parents could score maximum 17 points for the above questions. The results were expressed in percentage terms to indicate the risk of lifestyle diseases on a scale of 0 to 100%. The higher the result, the greater the associated risk in the surveyed population.

The questionnaires were processed statistically in SPSS and Statistica programs. Differences between mean values were determined with the use of the $\chi^2$ test, *Mann-Whitney* U test and the *Kruskal-Wallis* test at a significance level of $p<0.05$.

*Description of the surveyed population*

In the studied population of preschoolers, 31.25% children were aged 3-4 years, and 68.75% were aged 5-6 years. The average body weight was determined at 20.46±3.89 kg, and it ranged from 14 kg to 35 kg. The average body weight of younger children was significantly lower than the average body weight of older subjects.

The average height was determined at 115.86±7.65 cm in the range of 90 cm to 132 cm. Children aged 5-6 years were significantly taller than children aged 3-4 years, and the observed differences represented normal age-related variations in height.

Body mass index values ranged from 9.91 to 27.16 (Table 2). Based on BMI values, more than 1/3 of children aged 4-5 years were classified as underweight, whereas children aged 3-4 years were significantly more often overweight ($p=0.0002$).

Table 1. Risk of lifestyle diseases – answer key

| Question number | 4 | 6 | 7 | 9 | 12 | 13 | 15 | 16 | 18 | 20 | 21 | 23 | 24 | 25 | 26 | 27 | 32 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Response | overweight or obese | b | b | a | b | d | b | a | a | b | a | b | d | b | a | a | b |

Table 2. Description of the surveyed population

| | | Age | | | | Total | | p |
|---|---|---|---|---|---|---|---|---|
| | | 3 - 4 years | | 5 - 6 years | | | | |
| | | n | % | n | % | N | % | |
| Gender | Female | 62 | 62 | 102 | 46.4 | 164 | 51.25 | 0.0666 |
| | Male | 38 | 38 | 118 | 53.6 | 156 | 48.75 | |
| Body weight [kg] | | 18.68±3.41 | | 21.26±3.84 | | 20.46±3.89 | | 0.0001 |
| Height [cm] | | 110.34±5.6 | | 118.37±7.14 | | 115.86±7.65 | | <0.0001 |
| BMI [kg/m$^2$] | | 15.32±2.32 | | 15.20±2.72 | | 15.24±2.60 | | 0.4671 |
| BMI | underweight | 19 | 19 | 74 | 33.6 | 93 | 29 | 0.3200 |
| | normal weight | 46 | 46 | 100 | 45.5 | 146 | 45.6 | |
| | overweight | 29 | 29 | 36 | 16.4 | 65 | 20.3 | |
| | obese | 6 | 6 | 10 | 4.5 | 16 | 5 | |
| Family members | 2 | 0 | 0 | 6 | 2.7 | 6 | 1.9 | 0.1138 |
| | 3 | 42 | 42 | 54 | 24.5 | 96 | 30 | |
| | 4 | 46 | 46 | 128 | 58.2 | 174 | 54.4 | |
| | 5 and more | 12 | 12 | 32 | 14.5 | 44 | 13.8 | |
| Financial status | very high | 18 | 18 | 28 | 12.7 | 46 | 14.4 | 0.3242 |
| | high | 54 | 54 | 146 | 66.4 | 200 | 62.5 | |
| | average | 28 | 28 | 46 | 20.9 | 74 | 23.1 | |
| | low | 0 | 0 | 0 | 0.0 | 0 | 0.0 | |

## RESULTS

The majority of the parents (60.0%) claimed that their children consumed 4-5 meals per day, and only every tenth child ate less than 3 meals per day (Table 3). Significant differences between the children's age and the number of meals per day were not observed (p=0.6286). Meal frequency was not correlated with age (p=0.4133), and only 38.1% of children ate meals at regular times throughout the day.

Table 3. Age and regular meals

| Regular meals | | Age | | | | p |
|---|---|---|---|---|---|---|
| | | 3 - 4 years | | 5 - 6 years | | |
| | | n | % | n | % | |
| Breakfast | no | 34 | 34.0 | 42 | 19.1 | 0.0400 |
| | yes | 66 | 66.0 | 178 | 80.9 | |
| Second breakfast | no | 62 | 62.0 | 146 | 66.4 | 0.5917 |
| | yes | 38 | 38.0 | 74 | 33.6 | |
| Lunch | no | 20 | 20.0 | 40 | 18.2 | 0.7848 |
| | yes | 80 | 80.0 | 180 | 81.8 | |
| Afternoon tea | no | 74 | 74.0 | 144 | 65.5 | 0.2823 |
| | yes | 26 | 26.0 | 76 | 34.5 | |
| Dinner | no | 28 | 28.0 | 82 | 37.3 | 0.2524 |
| | yes | 72 | 72.0 | 138 | 62.7 | |

An evaluation of the surveyed children's appetite revealed that 5- to 6-year-olds were significantly more eager (71.8%) to eat, but only the foods that they enjoyed, than 3- to 4-year-olds (42.0%), whereas a significantly higher number of children in the group of 3- to 4-year olds had very good appetite or were fussy eaters (p=0.0032).

According to 70.6% of the parents, their children enjoyed eating in the school cafeteria, and this group of respondents did not differ significantly in age (p=0.5274). In the surveyed population, 64.4% of children ate breakfast at home, whereas every 6 child did not eat breakfast at home or ate it sporadically. Children aged 3-4 years were more prevalent in the latter group (p=0.0425). On non-school days, all children ate breakfast, whereas only every fourth child aged 4-5 years and every other younger child ate second breakfast. Breakfast consumption was significantly differentiated by age (p=0.001).

More than 1/4 of the respondents declared that children ate fruit and vegetables 2-3 times a day, 40.6% respondents consumed fruit and vegetables once a day, whereas more than 20% of children ate fruit and vegetables 2 to 3 times a week. Five- to 6-year-olds were significantly more (47.3%) likely to eat fruit and vegetables once a day than 3- to 4-year-olds, most of whom ate fruit and vegetables once a week or less often (p=0.0241). The children's favorite fruits were bananas and apples in all age groups, tangerines in the group of 4- to 5-year olds, and kiwis in the group of 3- to 4-year olds (p=0.0023).

According to the parents, 63.1% (N=202) of the surveyed children consumed milk and dairy beverages every day. Children drank pure milk (65.8%), flavored milk (24.3%) and plant milk (9.9%). Flavored milk was more frequently consumed by 4- to 5-year olds

(p=0.002). In the studied population, 36.9% of the respondents did not drink milk or dairy beverages daily due to the children's or the parents' dislike for such products or intolerance. None of the evaluated children were allergic to cow's milk proteins. Significant differences in daily consumption of milk and dairy beverages were not observed between age groups.

Based on the collected data, 68.1% of children ate cheese, yogurt and other dairy products on a daily basis. Daily consumption of dairy products did not differ significantly between age groups. Children had a preference for homogenized cheese and sweetened yogurt, and age was not a differentiating factor. Only 18.8% of the respondents ate plain yogurt, and this product was significantly more popular among 3- to 4-year olds (p=0.0005). The most popular types of cheese were hard cheese, semi-skimmed cottage cheese and granulated cottage cheese. The least popular cheeses were full-fat cheese and ricotta-type cheeses. Children ate cheese and dairy products during every meal, excluding lunch, mostly during breakfast, afternoon tea and dinner.

Most parents (N=143, 89.4%) declared that their children snacked between meals. Only 10.6% (N=17) of the respondents gave the opposite answer. In the studied population, 86.0% of 3- to 4-year-olds and 90.9% of 5- to 6-year-olds snacked between meals. The differences between age groups were not statistically significant (p=0.3503). Children most often snacked on sweets (60.1%, p=0.0034) and least often on raw vegetables or salads (3.5%, p=0.0012). Most children had a preference for sweet snacks (p=0.0023), but the preferred types of snacks did not differ significantly between age groups. The frequency of daily snacking was correlated with age (36.4% of 5- to 6-year-olds vs. 14% of 3- to 4-year-olds). According to questionnaire data, 56.3% of the surveyed parents made attempts to limit or control the number of snacks consumed by their children.

Fruit juice and soft drinks were consumed by 68.8% of preschoolers, in particular younger children (p=0.0148). Every sixth child drank more than 500 ml of juice daily, and overweight children were significantly more prevalent in this group (p=0.0012). The vast majority of parents (71.8%) served juice 2-3 times a week, and average juice consumption was determined at 1050±234 ml per week. Only 11.25% of parents served freshly squeezed fruit juice, whereas 9.5% diluted juice with an equal amount of water (p=0.003). According to 58.8% of the respondents, their children drank still mineral water every day, and the number of older children was significantly higher in this group (p=0.0106). Children were significantly more likely to drink water in kindergarten (p=0.0012), whereas juice consumption was significantly higher during afternoon tea or between meals at home (p=0.01).

The vast majority of children eagerly participated in physical activities in kindergarten (83.1%), and 74.3% of the surveyed parents declared that their children also participated in extracurricular sports. The most popular extracurricular activities were swimming (45 minutes per week), playing with peers (120 minutes per week on average) and ballet (45 minutes per week). Five- to 6-year-olds were significantly more likely to participate in extracurricular activities than 3- to 4-year-olds (p=0.0113).

The parents were also asked about the perceived need to modify their children's diets (Figure 1). According to 55.6% of the respondents, the child's diet should be improved, whereas 22.5% of the parents recognized the need for improvement in the eating habits of the entire family. A significant difference was observed only for vegetables, where the parents of older children were hoping to introduce more vegetables to the diet (p=0.0281). The remaining responses did not differ significantly between age groups.

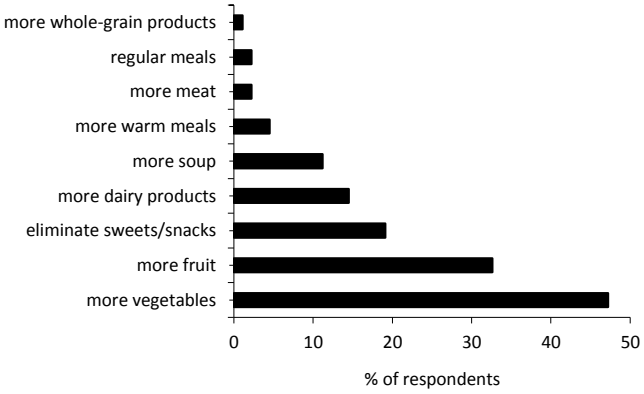


Figure 1. Possible improvements in the child's diet

The average risk of lifestyle diseases was determined at 30.26%±10.63% (p=0.002) in the range of 5.88% to 52.94%. In 50% of the surveyed population, the risk of lifestyle diseases did not exceed 29.41%. In more than 1/4 of the surveyed children, the relevant risk was estimated at 35.29% (Figure 2).

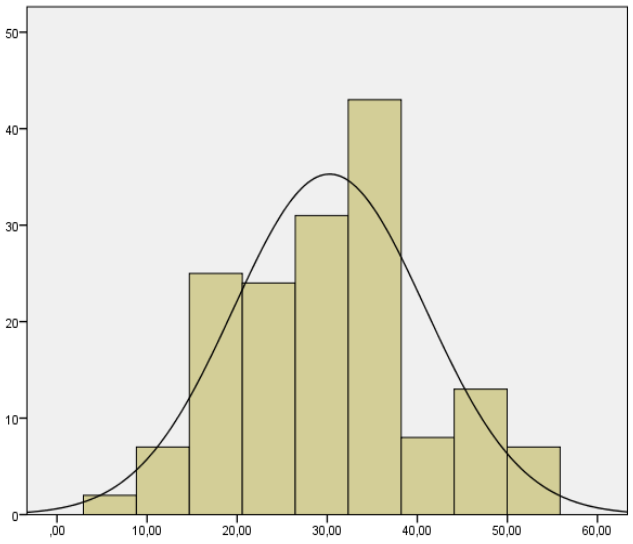


Figure 2. Risk of lifestyle diseases in the studied population.

The risk of lifestyle diseases was higher among boys than girls, but the noted difference was not significant (p=0.3870). Age was not a differentiating factor either (p=0.5327). An analysis of the results revealed the highest risk of lifestyle diseases in children from families with 5 or more members (p=0.0457) and in families with average financial status (p=0.0324).

Eating irregular meals increased the risk of lifestyle diseases, and the lower the number of meals per day, the greater the relevant risk (p=0.002).

Children who did not eat regular breakfasts or afternoon teas were at significantly higher risk of lifestyle diseases, and these findings were correlated with the number of meals consumed per day (Table 4).

Table 4. Regular meals and the risk of lifestyle diseases

| Regular meals | | Risk of lifestyle diseases | |
|---|---|---|---|
| | | Mean | SD |
| Breakfast | no | 35.14 | 11.07 |
| | yes | 28.74 | 10.07 |
| p | | 0.0036 | |
| Second breakfast | no | 29.98 | 11.31 |
| | yes | 30.78 | 9.32 |
| p | | 0.4868 | |
| Lunch | no | 26.67 | 8.13 |
| | yes | 31.09 | 10.99 |
| p | | 0.0589 | |
| Afternoon tea | no | 32.00 | 10.66 |
| | yes | 26.53 | 9.66 |
| p | | 0.0030 | |
| Dinner | no | 31.87 | 11.36 |
| | yes | 29.41 | 10.19 |
| p | | 0.2570 | |

The results also indicate that children who were poor and fussy eaters were at significantly higher risk of lifestyle diseases than eager eaters (p=0.0186). Significant differences in the risk of lifestyle diseases were not observed between children who were and were not eager to eat in the school cafeteria (p=0.607).

Consumption of milk and dairy product was an important predictor of lifestyle diseases. Children who did not drink milk every day were at significantly higher risk of developing lifestyle diseases than their peers who drank milk at least once a day (p<0.0001).

An analysis of preschoolers' snacking habits revealed that sweet and salty snacks also significantly contributed to the risk of lifestyle diseases (Table 5).

Table 5. Snacking and the risk of lifestyle diseases

| Snack | | Risk of lifestyle diseases | |
|---|---|---|---|
| | | Mean | SD |
| Sweets | no | 27.76 | 10.65 |
| | yes | 32.15 | 11.00 |
| p | | 0.0228 | |
| Sandwiches | no | 30.48 | 11.29 |
| | yes | 29.76 | 9.18 |
| p | | 0.9646 | |
| Fruit | no | 31.55 | 11.07 |
| | yes | 28.81 | 10.64 |
| p | | 0.0847 | |
| Vegetables/salads | no | 30.39 | 11.18 |
| | yes | 30.59 | 6.44 |
| p | | 0.8493 | |
| Salty snacks | no | 24.97 | 7.31 |
| | yes | 29.27 | 8.99 |
| p | | 0.01783 | |
| Sweetened yogurt | no | 24.48 | 10.52 |
| | yes | 32.41 | 11.01 |
| p | | 0.0010 | |
| Crisps | no | 29.12 | 11.69 |
| | yes | 33.47 | 8.67 |
| p | | 0.0184 | |
| Other | no | 30.03 | 10.97 |
| | yes | 32.82 | 11.49 |
| p | | 0.4477 | |

## DISCUSSION

In child nutrition, regular eating is as important as a well-balanced diet. In this study, 60% of the surveyed children ate 4-5 meals a day, which is consistent with dietary recommendations for this age group. In the work of *Stankiewicz* et al. [18], a similar percentage of respondents ate 4-5 meals a day, but only 38% of children consumed meals regularly throughout the day. Children should eat breakfast at home before going to kindergarten. Many parents are convinced that children do not need to eat breakfast at home because this meal is served in kindergarten. However, breakfast is served only at 8:30 a.m., whereas most students arrive at kindergarten already before 7:30 a.m. A prolonged interval between dinner and breakfast can lead to hypoglycemia and low levels of physical and mental activity in the morning hours [15].

The family's socioeconomic status and the educational attainment of the parents, in particular the

mothers, significantly influence the family's eating habits, including the tendency to eat regular breakfasts and higher consumption of vegetables, fruit, fish and whole-grain products which decrease the risk of lifestyle diseases [17].

A statistical analysis of the results noted in this study revealed that children from families with very high financial status were significantly more likely to eat breakfast at home (p=0.001) and consumed whole-grain products (p=0.0045) and vegetables (p=0.034) more often than their peers from families with average financial status.

An Irish study of children aged 1-4 years demonstrated that vegetables and fruit are the main sources of dietary fiber, vitamin C and *beta*-carotene in the diet, but they cater to only 35-50% of the requirements for these nutrients in preschoolers' diets [12]. The economic factor often plays roles in the amount of fresh fruits and vegetables consumed by children [1].Vegetables contain compounds with antioxidant properties, and they can prevent cardiovascular diseases [2]. Diets that are abundant in calcium-rich food products such as milk and dairy products promote bone formation in children and prevent osteoporosis in later life. In our study, milk consumption was significantly higher among children who ate breakfast at home (p=0.0021) and children who had siblings (p= 0.0047). In a study by *Newerli-Guz* and *Kulwikowska*, kindergarten children consumed more milk and dairy products than the respondents surveyed in our study. In the cited study, only 13.7% of children consumed milk and dairy products less than once daily [11].

Salty snacks increase the intake of dietary sodium and contribute to the risk of lifestyle diseases, in particular obesity, cardiovascular diseases and hypertension [5]. In our study, the consumption of salty snacks was higher among 5- to 6-year-olds and children who had siblings (p=0.023).

Frequent snacking has a negative influence on regular eating patterns and disrupts physiological mechanisms of hunger and satiety. According to *Kelishadi* et al. (2017), snacking disrupts regular eating and the frequency of meal consumption [4]. In our study, children who snacked on salty foods and sweetened yogurt were less likely to eat afternoon tea (p=0.001), and children who snacked on sweets at least once a day were significantly more likely to eat irregular meals at different time intervals (p=0.023).

The results of this study indicate that more than 60% of parents approve of sweet snacking, and similar findings were reported by *Platta* and *Martul* [14]. *Kozłowska-Wojciechowska* also found that 85% of kindergarten children from Warsaw and the Region of Mazowsze enjoyed salty snacks (crisps, etc.), according to *Kozioł-Kozakowska*, 91% of children from Kraków area consumed salty snacks such as crisps and crackers [8,9]. In a study by *Kolarzyk* et al. [6], sweets were the most frequent snack among children with normal weight as well as children who were overweight and obese. Excessive consumption of sweets has never been directly correlated with obesity, but prolonged consumption of high-energy foods that exceed the daily recommended caloric intake can contribute to weight gain [19]. In addition to sweets such as cookies, candy bars and lollipops, significant amounts of sugar are found in fruit juice and soft drinks whose consumption has increased considerably in recent years. Research has demonstrated that daily consumption of large amounts of juice and soft drinks can significantly increase daily calorie intake, but it does not directly affect the BMI of kindergarten children [12]. A study analyzing juice consumption among 2-year-olds in the United States demonstrated that daily consumption of 100% juice can increase BMI at the age of 2 to 4 years [16]. In the surveyed population, more than 2/3 of children drank juice, mostly sweetened carrot, orange and multifruit nectars (p=0.0023). High juice consumption was significantly correlated with lower milk intake. Children who drank milk at least once a day drank significantly less juice (p=0.001).

Physical activity contributes to healthy growth and development from the earliest age, and it minimizes the risk of lifestyle diseases in later life [10]. Physical activity is vital for healthy physical, cognitive, emotional and social development in early life. Special emphasis should be placed on the interactions between physical activity and motor skills, as well as on physical activities that promote healthy weight gain [20].

In our study, 74.3% of the surveyed children participated in physical activities in kindergarten as well as in extracurricular sports. According to recommendations, preschoolers should participate in at least 60 minutes of active play daily. In our study, the physical activity levels of the surveyed children were not correlated with gender or family size. The only exception was noted in children from families with average financial status which were less likely to participate in organized sports outside kindergarten (p= 0.001).

## CONCLUSIONS

1. Eating habits formed in childhood can contribute to the risk of lifestyle diseases in adulthood.
2. Children who eat breakfast at home have healthier eating habits.
3. Age and gender did not influence snacking behaviors which were relatively similar in the entire surveyed population.
4. Both children and parents require nutritional education to develop healthy eating habits.

**Conflict of interest**
*The Author declare no conflict of interest.*

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