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EATING HABITS OF POLISH CHILDREN

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- A. Study design/planning
- B. Data collection/entry
- C. Data analysis/statistics
- D. Data interpretation
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Abstract:

Background: Unhealthy eating habits in childhood, usually based on a Western diet, can lead to overweight and obesity. They are also an important factor in the increased risk of developing many diet-related diseases later in life. Early identification of school-aged children with poor eating habits can help reduce the risk of obesity and the development of chronic diseases in adulthood. The aim of the present study was to analyze selected dietary habits of school-aged children and adolescents.

Methods: The study involved data collected from 2,986 children and adolescents aged 10 to 18 attending selected schools in Poland as part of the e-PE program.

Results: In the study group, 76% of children and adolescents reported consuming 3-4 meals per day. A little over 11% restricted themselves to fewer meals, while the remainder adopted a pattern of 5 or more meals. Irregular eating patterns were reported by 40.7% of respondents.

Conclusion: In view of the more frequent occurrence of nutritional abnormalities in children and adolescents, and thus a greater risk for the emergence of numerous consequences in later years of life, it is necessary to systematically monitor diet as a risk factor for the development of overweight and obesity to implement interventions to counteract weight gain at an early stage of adverse changes.

Introduction

For several decades, healthy nutrition of children and adolescents has remained a significant global health and social concern [1,2]. Combined with physical activity, balanced nutrition constitutes a fundamental component of a healthy lifestyle. It facilitates normal growth, maturation, and development, contributes to overall well-being, supports learning, and plays a crucial role in preventing overweight and obesity. Unfortunately, in recent years, the number of overweight children has been on the rise in most countries. Even more concerning is that this issue now affects the youngest members of society [3]. The prevalence of childhood overweight and obesity has escalated to the level of a global epidemic, posing a grave public health concern [2,4-6]. In 2020, WHO estimated that approximately 39 million children under the age of five would be overweight or obese [7].

Poland also faces an unsatisfactory nutritional status of children and adolescents, ranking among the highest in Europe for overweight children. Forecasts indicate that by 2030, up to every fifth Polish child aged 5-9 may be obese [8].

According to the World Health Organization (WHO) European Childhood Obesity Surveillance Initiative (COSI), Poland ranks 8th in the number of overweight children and 10th in the number of obese children out of 34 surveyed countries [9].

Research indicates that the majority of weight in children diagnosed with obesity is gained during the first five years of life [10]. Thus, early childhood plays a pivotal role in the development of obesity, emphasizing the importance of interventionist prevention programs targeting the youngest members of society [3,11]. The primary cause of overweight and obesity is excessive calorie intake with inadequate physical activity. Unhealthy eating habits formed in early childhood have adverse effects on health in later life [1]. Obese children and adolescents are approximately five times more likely to develop obesity in adulthood [12]. The early years are critical for the development of overweight and obesity, with an estimated 55% of obese children remaining obese into adolescence, and about 80% of adolescents still obese in adulthood [13]. Metabolic syndrome may affect up to 30% of obese children and adolescents [14]. Childhood obesity is frequently associated with non-alcoholic fatty liver disease (NAFLD), obstructive sleep apnea, and asthma [15]. The long-term consequences of childhood obesity can be disabling and lead to premature mortality from conditions like type 2 diabetes, cardiovascular disease, and certain cancers [7,10]. The consequences of obesity in childhood can also be disability for adults [16].

According to the Muscatine Study, childhood obesity can trigger the early onset of coronary artery calcification in young adults [15]. Additionally, obese children are more vulnerable to health issues such as hypertension, dyslipidemia, glucose intolerance, and depression. Contrary to popular belief, most obese adolescents do not naturally outgrow obesity; approximately 80% continue to face this issue into adulthood. This is exacerbated by an increasingly obesogenic environment characterized by advertising, easy access to sugary beverages, highly processed foods rich in simple sugars and fats, fast food, and the widespread use of computers, tablets, and other electronic devices promoting sedentary leisure time [8].

Thus, a well-balanced diet, both in terms of quantity and quality, is crucial for achieving optimal growth, and physical, intellectual, and emotional development, not only during childhood and adolescence but throughout human development [17]. Numerous studies have highlighted that children and adolescents are highly sensitive to various nutritional factors, particularly nutrient deficiencies, which, if persistent, predispose them to diet-related diseases later in life [18-24]. Poor dietary choices during adolescence can lead to lasting bodily changes that are challenging to rectify in later life [22]. Despite widespread efforts in prevention and nutritional education, many dietary irregularities persist. Common dietary errors among children and adolescents include excessive consumption of animal fats, salt, and simple sugars, coupled with insufficient intake of fish, fruit, vegetables, whole-grain bread, as well as milk and dairy products. The situation is made worse by unhealthy snacks [25]. These observations underscore that the current diets of children and adolescents often fall short of ideal standards. The underlying reasons encompass environmental, cultural, demographic, and economic factors. Therefore, it is imperative to implement systematic monitoring of dietary habits in early life stages since childhood represents the most opportune period for instilling proper eating habits.

Given the higher likelihood of poor nutritional habits among children and adolescents, and the potential for severe consequences in later life, our study focused on school-aged children. The study aimed to examine specific dietary habits in this age group, addressing the following research questions:

1. Do the surveyed children and adolescents maintain regular eating patterns throughout the day?
2. How many servings of fruit do children and adolescents typically consume daily?
3. How many servings of vegetables do children and adolescents typically consume daily?

Material and Methods

Participants

The study involved data collected from 2,986 children and adolescents aged 10 to 18 attending selected schools in Poland as part of the e-PE program. This program is an innovative tool that enables physical education teachers to operate both in traditional and remote settings. Its primary purpose is to leverage modern technology for diagnosing fitness levels, assessing performance, and monitoring the physical activity of children and adolescents. The e-PE platform also provides educators with free access to a comprehensive database of educational resources. Notably, this project received support from both the Ministry of Education and Science and the Ministry of Sport. The research itself was conducted in selected schools during the period from September to October 2022.

To gather data, a diagnostic survey method was employed, using a self-administered questionnaire. This questionnaire was designed to capture information about specific dietary habits. The study used simple statistical analysis.

Results

When assessing overweight and obesity, it is essential to consider not only body weight but also dietary habits. In the study group, 76% of children and adolescents reported consuming 3-4 meals per day. A little over 11% restricted themselves to fewer meals, while the remainder adopted a pattern of 5 or more meals. Irregular eating patterns were reported by 40.7% of respondents, while the remaining individuals maintained fairly consistent eating schedules, with 12.2% adhering to fixed meal times. A similar trend was observed concerning the regularity of meal intervals, with 81.1% of children and adolescents reporting daily eating. About half of the respondents had breakfast within an hour of waking up, while the rest typically had their first meal 2 or more hours later. Within the study group, approximately one-third did not adhere to recommendations regarding the timing of their last meal of the day (Table 1).

Table 1. Frequency of food intake in the study group

Do the children and adolescents surveyed eat regularly throughout the day?		
Question	Answer	% of respondents
Number of meals per day	1-2 meals	11.4%
	3-4 meals	76.0%
	5 or more meals	12.6%
Meals are eaten at fixed times	not	13.3%
	rather not	27.4%
	rather yes	47.0%
	yes	12.2%
Regular breaks between meals	not	46.0%
	yes	54.0%
Consumption of the first breakfast	up to an hour after waking up	52.0%
	within 2 hours after waking up	28.9%
	more than 2 hours after waking up	19.1%
Dinner consumption	1 hour before bedtime	27.4%
	2-3 hours before bedtime	52.4%
	more than 3 hours before bedtime	13.8%
	just before going to bed	6.4%
Do you occasionally eat* between meals? (occasional consumption of foods between meals, mostly in small amounts)	not	18.9%
	yes	81.1%

Despite the abundance of various fruits, young people most often consumed two servings of fruit per day (31.6%). One serving was chosen by 23.8%, and a small percentage did not eat fruit at all (5.3%) (Table 2).

Table 2. Fruit consumption in the study group

How many servings of fruit per day do school children and adolescents consume?		
Question	Answer	% of respondents
How many servings* of fruit do you usually consume a day? * Serving – the amount of product to be consumed at one time (about 100 g, such as one medium apple or half a cup of strawberries/raspberries).	0	5.3%
	1	23.8%
	2	31.6%
	3	22.7%
	4	9.9%
	5 and above	6.7%

Only 10.2% of young respondents met the recommended number of 4-5 servings of vegetables. The largest percentage (36.4%) reported eating only two servings of vegetables per day. Five or more servings were consumed by only 3.8% of children and adolescents (Table 3).

Table 3. Consumption of vegetables in the study group

How many servings of vegetables per day do school children and adolescents consume?		
Question	Answer	% of respondents
How many servings* of vegetables do you usually eat a day?	0	6.4%
*Serving – the amount of product intended for one-time consumption (about 100 g, such as one medium tomato or half a glass of salad).	1	26.4%
	2	36.4%
	3	20.6%
	4	6.4%

Discussion

Promoting healthy dietary practices is fundamental in the pursuit of improved health and disease prevention [26]. Recent literature has underscored the pivotal role of proper nutrition in the well-being of future generations [27]. Eating habits often persist throughout one's life, with childhood dietary patterns holding significance not only in the short term but also in the long term [28,29].

There are currently shifts in the global dietary habits of young people, largely influenced by changing lifestyles. Given that eating habits form during childhood, it is crucial to establish healthy dietary patterns before adolescence and adulthood [27,30].

During the school years, particularly, adequate nutrition plays a pivotal role not only in the proper growth, development, and health of children but also in their future psychophysical well-being. Balanced nutrition is the cornerstone of health in youth, as childhood represents a critical period for overall health and development [31]. This stage involves intensive processes in young bodies, and any deviation from a well-balanced diet, whether excessive or inadequate in macro- and micronutrients, can have serious health consequences. The need for nutrients increases during this phase, emphasizing the importance of a nutrient-rich diet. Research indicates that lifestyle, behavior, and dietary patterns adopted during this period often persist into adulthood, significantly impacting future health and well-being [26,32-35]. Furthermore, the transition from childhood to adolescence frequently entails unhealthy dietary changes. Thus, it is crucial to develop healthy eating habits from an early age, with a particular focus on the transitional phase of childhood. A healthy diet during primary school years reduces the immediate risk of diet-related health issues that concern school-aged children, such as obesity, dental caries, and physical inactivity [7,36,37]. Furthermore, young individuals who adopt these healthy habits during childhood are more likely to maintain their health, thus reducing the risk of chronic diseases in later life [37-39]. Hence, early-life healthy behaviors can play a pivotal role in achieving health and well-being goals [33].

In Poland, the problem of inadequate nutrition among young generations has been a subject of analysis, observation, and reports from various research centers. A review of the literature on this subject presents substantial evidence of irregularities in daily nutrition. The results of our study are consistent with the findings of previous studies that highlighted the prevalence of poor eating habits among children [19-21,23].

Globally, dietary recommendations for a healthy diet stress the importance of regular consumption of at least five servings of fruit and vegetables daily, limiting saturated fat and salt intake, and increasing complex carbohydrates and fiber intake [40]. However, studies indicate that most children and adolescents do not adhere to these guidelines [32,34]. The significance of regular meals is supported by population health and dietary guidelines [41]. Analysis of the results reveals some unhealthy behaviors linked to common diets in a portion of the school-age population. Current guidelines in Poland [17] recommend regular eating every 3-4 hours, totaling five meals a day for this age group. This emphasis on regular meals is rooted in research indicating that regular meal consumption helps reduce the incidence of overweight and obesity in children and adolescents [42,43]. Adequate energy and nutrient intake in well-planned meals offer greater protection against substance abuse [44] among adolescents and reduce the risk of metabolic diseases in later life [45,46]. Our study reveals that irregularities in meal consumption affected approximately 41% of the students in the observed group, with only 12.2% reporting regular meal times.

This often leads to uncontrolled eating between meals, as observed in the majority of respondents (81.1%). In contrast, an analysis of diets conducted by Duplaga et al. found that only 30.1% of respondents reported eating meals regularly [47].

Our research further found that the meals consumed were improperly composed, with incorrect food combinations and insufficient quantities of fruit and vegetables. The WHO recommends a minimum daily intake of 400 grams of fruit and vegetables [36] but unfortunately, only a few children in Europe meet this target. Vegetables are recognized as a fundamental component of a healthy diet at all stages of development [48], with scientific reviews consistently highlighting the benefits of adequate vegetable consumption. Conversely, low fruit and vegetable intake was linked to 7.8 million premature deaths worldwide in 2013 [49]. Our study demonstrates that the study group's consumption of fruit and vegetables fell below the recommended number of servings. A significant number of children and schoolchildren reported consuming both fruit and vegetables less than once a day, with vegetable consumption even lower than fruit consumption. Similar dietary patterns have been observed in other European countries [40,50].

Despite falling short of population targets for fruit and vegetable consumption, some countries have made positive strides. For instance, in Norway, the implementation of several promotional programs over the past decade has significantly increased fruit consumption [40].

Based on the findings of numerous studies, it is imperative to remember that deteriorating nutritional status, whether due to over- or underconsumption of macro- and micronutrients, can lead to severe health consequences [51,52].

Our research strongly emphasizes the need to implement nutritional prevention and treatment programs among school-aged children and adolescents. It is important to establish specific research priorities in the field of nutrition for young generations [53]. To reduce the prevalence of obesity and obesity-related diseases in the youngest population and avert the adverse health consequences associated with obesity in adulthood, further research is urgently needed to assess the nutritional status and analyze the diets of school-aged children and adolescents. Additionally, understanding the long-term consequences of childhood obesity is crucial for ensuring health in later life.

Conclusions

The analysis of the survey results has led to several important observations and conclusions:

1. A majority of the surveyed children (59.2%) reported consuming their meals at regular times, which is a positive sign for their nutritional routines. However, it is concerning that a significant portion (approximately 40.7%) do not maintain regular meal schedules. This irregularity can lead to inadequate energy and nutrient intake, potentially affecting their overall health.
2. The study group exhibited alarmingly low consumption of fruit and vegetables, falling short of the recommended number of servings. This inadequate consumption of fruit and vegetables raises concerns about the intake of essential vitamins, minerals, and dietary fiber, crucial for proper growth and health.
3. The quality of the diets among the studied group departs from the principles of a well-balanced diet. Incorrect food combinations and insufficient intake of essential nutrients were evident in the dietary patterns reported.

Conflicts of Interest: The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki. The research was approved by the Ethics Committee for research projects at the University of Szczecin (KB 26/2023).

Informed Consent Statement: Informed consent was obtained from all participants involved in the study. Written informed consent has been obtained from the participants to publish this paper.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

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