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Assessment of eating habits and the effectiveness of programs promoting proper eating habits among early school children in the Lublin province

Urszula Fałkowska[1], Katarzyna Wołk[2], Tomasz Zuzak[3], Julita Poleszak[1,*], Halina Piecewicz-Szczęsna[4]

[1]Student Scientific Circle at the Department and Department of Epidemiology and Methodology of Clinical Research, Medical University of Lublin, Poland

[2]Department of Theory of Education, Institute of Pedagogy and Psychology, Maria Curie-Skłodowska University in Lublin, Poland

[3]Student Scientific Circle at the Chair and Institute of Normal Anatomy, Medical University in Lublin, Poland

[4]Chair and Department of Epidemiology and Clinical Research Methodology, Medical University of Lublin, Poland

*E-mail address: julita.poleszak@wp.pl

ABSTRACT

Obesity is a significant social and health problem of societies world wide. Nowadays, the percentage of children suffering from overweight is increasing. This is the result of nutrition mistakes done during the first years of a young person's life, and the lack of parental knowledge about the rules of proper nutrition. School-aged children suffering from overweight are clearly exposed to obesity in adulthood. The authors undertook to assess the nutritional habits of children attending primary schools located in the province of Lublin. The survey was conducted among a group of 150 students from three primary schools in the Lublin province. As a research method, the authors set up a survey in the printed version. The data obtained were compiled and analyzed in the Statistica 13™ (DellSoftware, USA). Over one-third (36.7%) of the children taking part in the study eat the recommended daily number of meals. Eating in the intervals between the main meals is often observed among the respondents (77.3%). Daily consumption of dairy products was declared by 20.8% of girls and 35.6%

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of boys. In questions about the promotion of healthy eating programs carried out at schools, the “Fruit and Vegetables at School” program was the most popular. The children who took part in the study showed mostly incorrect eating habits. The current situation requires further research and taking decisive steps by healthcare professionals, educators and parents. Consistent steps in existing programs promoting a healthy eating style will improve the epidemiological situation of abnormal nutrition among early-childhood children in the near future.

***Keywords*:** obesity, prevention programs, public health, nutrition habits

1. INTRODUCTION

The epidemic of overweight and obesity is a serious and urgent challenge to the health and prevention of chronic diseases in the world population. Economic growth, industrialization, transport mechanization, urbanization and, most importantly, the increasingly sedentary lifestyle and the change of nutrition profile towards a high-calorie diet based on highly processed products were the reasons for observing the increasing trend of obesity and increasing the overall number of obese people among citizens of many countries in a two-, three- and even fourfold dimension over the last 30 years (1).

Obesity is a complex multifactorial disease with proven genetic, behavioral, socio-economic and environmental origin. Epidemiological data indicate that one-third of the world's population is affected by overweight or obesity to varying degrees. If this trend continues, by 2030 38% of the world's population will be overweight and another 20% obese. In the United States, the worst estimates estimate the percentage of overweight or obesity among 85% of citizens in 2030. Along with expert alarms, several years ago appropriate anti-obesity programs were adopted and adopted in many countries around the world. In a few of them, trends are slowly stabilizing, but in many countries around the world, the prevalence of obesity is still increasing in many countries around the world, including among the pediatric population (1).

Abnormal nutritional habits, shaped already in childhood, reproduced in adulthood are one of the most important causes of overweight as well as obesity, which the World Health Organization (WHO) has recognized as the most serious chronic disease. Many studies have shown that obesity in pre-school and school children is associated with an increased risk of obesity in adulthood (2-5). About 50% of adolescents with BMI above the 95th percentile of a normal distribution (2) become obese adults. Obese teenagers tend to become obese adults. According to Goodman et al., 69% of obese children from 6 to 8 years of age and even 83% of obese adolescents from 10 to 14 years of age are obese in adulthood (6). Must et al. Found that obese adolescents are characterized by increased morbidity and mortality after the fifth decade of life, regardless of body weight in adulthood (4). According to Fichna and Skowrońska, attention is drawn to the fact that obesity appears in increasingly younger children and significantly contributes to the increase in the incidence of other diseases and thus becomes both a social and an economic problem (7).

Obesity is the basis for the development of many diseases, such as hypertension and atherosclerosis, night sleep apnea syndrome, non-alcoholic fatty liver disease, cholelithiasis, and endocrine disorders. In addition, it leads to posture defects, flat feet, valgus knees, limited exercise tolerance, significantly increases the risk of developing most cancers. Precise

qualitative and quantitative assessment of food intake among children is necessary to conduct epidemiological studies on dietary-health connections (8).

Recent decades have been associated with adverse changes in lifestyle regarding both eating habits and physical activity. This, in turn, translates into disturbing epidemiological indicators. World Obesity Federation (WOF) and the World Health Organization (WHO), however, estimate that medical costs associated with treating the consequences of excessive body mass in the world population may amount to as much as USD 1.2 trillion annually. Too large body weight affects not only the physical health of the obese child but also often affects his emotional and psychosocial zone. He is characterized by low self-esteem and attractiveness. In addition, there are problems with self-acceptance and lack of faith in one's own abilities. Obese children often experience unpleasantness from their peers and feel rejected. Depressive symptoms are also more and more common. They are more strongly expressed, the higher the BMI value (6). In psychology, due to the significant correlation between depression and obesity, a theory of "bidirectional" theory was introduced between these diseases. A frequent consequence is limiting contact with peers and a sense of loneliness. The time gap is filled by spending time playing a computer or watching TV, which also creates favorable conditions for further weight gain in the "vicious circle" mechanism (9). Stankiewicz et al. Showed that there is a relationship between the time spent in front of the TV and the incidence of obesity (10). According to Giammattei et al., There is also a relationship between the time of watching TV and an increased amount of drinking sweet drinks and eating more meals (11).

Puhl and Latner used the concept of "social stigmatization of obese children" (12). Stigmatization and accusation of laziness deepen the low self-esteem of children with a higher BMI value. The presented problems may be a source of personality disorders, and may even lead to the development of anorexia or bulimia in children (13). Available studies indicate that incorrect eating habits, which are formed in childhood, have a significant impact on the further years of human life. This article presents an analysis of the eating habits of students in the early school period. The authors also addressed the subject of nutritional education of students from grades 1-3.

Correct eating habits include the right choice of food products. A child starting school education becomes more and more independent. This is a very important and difficult period of change for both parents and children. Students start to decide to a large extent what meal or snack they will choose. In the school shop, during class trips, school trips, extra-curricular activities or during meetings with colleagues, they face the situation of choosing specific products. There is no doubt that for a few-year-old child this is not an easy choice. School shops "tempt" with a variety of colorful sweets and snacks. Peers encourage people to try foods they prefer - not necessarily healthy ones.

Educational institutions take part in many programs aimed at the direct promotion of healthy eating habits. The most popular include programs organized by the Agricultural Market Agency: "Glass of milk" and "Fruit and vegetables at school". The Bank Ochrony Środowiska Foundation, as part of the "Actively for health" program, implements the following projects: "like mother, like children", "I eat happily, I know more", "Get better", "School shops - healthy reactivation, time for health", "Health-promoting school". In addition, it should be remembered that the curriculum contains content about healthy nutrition. Education about proper eating habits is extremely important because of the consequences of unhealthy nutrition during puberty and then in adulthood.

2. THE OBJECTIVE OF THE WORK

The aim of the study was to assess the eating habits of children in early school age attending three primary schools located in the province of Lublin.

3. MATERIAL AND METHODS

The study was conducted among 150 students. The study group consisted of 77 girls and 73 boys at the level of early school education. Two of the schools participating in this study are located in the city of Lublin, and one in the county town of Janów Lubelski. The research tool was an anonymous questionnaire consisting of 20 open and closed questions, also multiple-choice questions. Standardized questions related to selected eating behaviors.

4. RESULTS

4. 1. Regularity of meals

Table 1. Frequency of eating regular meals.

Question	Answers	Girls		Boys		Together
		N	%	N	%	%
How many meals you consume daily?	mess than 3	4	5,20%	2	2,70%	**4**
	3	20	26%	19	26%	**26**
	4	25	32,50%	25	34,20%	**33,3**
	5	19	24,70%	21	28,80%	**26,7**
	More than 5	9	11,60%	6	8,30%	**10**
Do you eat meals regularly?	yes	39	50,60%	40	54,80%	**52,7**
	no	38	49,40%	33	45,20%	**47,3**
Do you eat breakfast before going to school?	yes, always	41	53,20%	42	57,50%	**55,3**
	often	12	15,60%	9	12,30%	**14**
	sometimes	9	11,70%	10	13,70%	**12,7**
	rarely	7	9,10%	7	9,60%	**9,3**
	no	8	10,40%	5	6,90%	**8,7**

Are you taking a packed lunch to school?	yes, always	37	48	24	32,9	**40,7**
	often	11	14,3	11	15,1	**14,7**
	sometimes	13	16,9	12	16,4	**16,7**
	rarely	5	6,5	8	11	**8,6**
	no	11	14,3	18	24,6	**19,3**
How often do you eat dinner?	every day	67	87	63	86,3	**86,7**
	5-6 times in week	8	10,4	4	5,5	**8**
	2-4 times in week	1	1,3	2	2,7	**2**
	in weekends	1	1,3	4	5,5	**3,3**
	once a week	0	0	0	0	**0**
Do you eat dinner every day?	yes	55	71,4	51	69,9	**70,7**
	5-6 times in week	11	14,3	9	12,3	**13,3**
	2-4 times in week	4	5,2	7	9,6	**7,3**
	in weekends	2	2,6	1	1,4	**2**
	once a week	1	1,3	2	2,7	**2**
	don’t eat dinner	4	5,2	3	4,1	**4,7**
Do you eat snacks between meals?	yes	56	72,7	60	82,2	**77,3**
	no	21	27,3	13	17,8	**22,7**

The analysis showed that only slightly over 1/3 (36.7%) of children eat the recommended daily number of meals. Fewer students eat only 4 meals (33.3%). 26% of children consume 3 meals a day, and 4% of students consume at most 2 meals a day. The results in the group of girls and boys are not significantly different. The study showed that 50.6% of girls and 54.8% of boys eat meals on a regular basis, while 49.4% of girls and 45.2% of boys do not eat at regular times of the day. In addition, the analysis proves that over half of children, ie 53.2% of girls and 57.5% of boys, eat breakfast before going to school. 18% of students declare that they eat breakfast rarely or not at all. It is important that it is more often overlooked by girls (10.4%) compared to boys (6.9%). Statistical dependence was estimated at $p = 0.04$.

In addition, children rarely take a second breakfast to school (40.7%). The study showed that girls (48%) more often, compared to boys (32.9%), bring a second breakfast to school. Analysis of the results showed that dinner is consumed by less than 90% of children every day, 3.3% of respondents eat lunch only during weekends. The supper is consumed by 70.7% of the respondents (71.4% of girls and 69.9% of boys). This meal is not eaten regularly by 24.6% of children: 23.4% girls and 26% boys. In addition, 5.2% of girls and 4.1% of boys do not eat at all. The statistical dependence was p = 0.03. Irregular snacking between the main meals is often observed among respondents (77.3%) (Table 1).

4. 2. Types of meals eaten

Boys (82.2%) go for snacks more often than girls (72.7%). The irregularity of parents' lives, as well as going to school in a shift mode are associated with longer breaks between regular meals, therefore children often choose snacks that are not always a reasonable alternative. The most common choice of children is fruits (49.3%) and vegetables (48.7%). Much more girls (57.1%) than boys (41.1%) eat fruit every day. In spite of this, children decide to choose sweets, ice cream, chips, and other salty snacks. As many as 21.3% of children declare that they eat sweets every day. A significant advantage in this aspect is characterized by the studied group of boys (27.4%) in relation to the group of girls (15.6%). What is also disturbing is the fact that almost half of boys (46.6%) reach for sweets at least 4 times a week. The study found that 6.8% of boys and 2.6% of girls eat fast-food products on a daily basis. Even 30% of children report that they eat this unhealthy meal at least twice a week. Statistical significance was found at p = 0.03 (Table 2). According to nutritional recommendations, 57.1% of girls and 41.1% of boys progress. Similarly, vegetables are more often consumed by girls (72.7%) - a minimum of 4 times a week - compared to boys (65.7%). 11.7% of girls and 9.6% of boys declared eating vegetables more often than once a week. More than once a week, fruit is eaten by 5.2% of girls and 5.5% of boys.

Table 2. Frequency of consumption of individual food products

Question	Answers	Girls %	Boys %	Together %
How often do you eat sweets?	everyday	15,6	27,4	**21,3**
	4-6 times in week	27,3	23,3	**25,3**
	2-3 times in week	35	26	**30,7**
	once a week or less	22,1	23,3	**22,7**
How often do you eat fast-food products?	everyday	2,6	6,8	**4,7**
	4-6 times in week	7,8	9,6	**8,7**
	2-3 times in week	14,3	19,2	**16,6**
	once a week or less	75,3	64,4	**70**

How often do you eat vegetables?	everyday	49,3	47,9	**48,7**
	4-6 times in week	23,4	17,8	**20,7**
	2-3 times in week	15,6	24,7	**20**
	once a week or less	11,7	9,6	**10,6**
How often do you eat fruits?	everyday	57,1	41,1	**49,3**
	4-6 times in week	26	26	**26**
	2-3 times in week	11,7	27,4	**19,4**
	once a week or less	5,2	5,5	**5,3**
How often do you eat milk / yogurt natural / kefir?	everyday	20,8	35,6	**28**
	4-6 times in week	24,7	19,2	**22**
	2-3 times in week	29,8	20,5	**25,3**
	once a week or less	24,7	24,7	**24,7**
How often do you eat cottage cheese?	everyday	7,8	6,8	**7,4**
	4-6 times in week	23,4	15,1	**19,3**
	2-3 times in week	18,2	20,6	**19,3**
	once a week or less	50,6	57,5	**54**
How often do you eat cheese?	everyday	18,2	20,6	**19,3**
	4-6 times in week	23,4	26	**24,7**
	2-3 times in week	22,1	21,9	**22**
	once a week or less	36,3	31,5	**34**
Do you consume energy drinks?	yes	13	15,1	**14**
	no	87	84,9	**86**

The frequency of eating milk, natural yoghurt, kefir, and curd were also examined. Daily consumption of milk, natural yogurt and kefir were declared by 20.8% of girls and 35.6% of boys, while 24.7% of girls and 24.7% of boys reached for these products only once a week or less frequently. The consumption of cottage cheese at least 4 times a week was declared by 31.4% of girls and 21.9% of boys. Over half of the students (54%) - 50.6% of girls and 57.5% of boys - eat cheese curd cheese once a week or less frequently. Consumption of cheese daily gives 18.2% of girls and 20.6% of boys, while as much as 36.3% of girls and

31.5% of boys consume yellow cheese once a week or less frequently. Consumption of dairy products once a week or less often declared 24.7% of girls and the same number of boys. Only 8% of girls and 35.6% of boys drank every day. It is worth noting that a significant number of children every day reach for sweets (21.3%). Statistical significance related to the consumption of sweets was estimated at p = 0.04 (Table 2)

4. 3. Nutritional behaviors

Research indicates that among the examined children in early school age the vast majority (88%) eat meals together with their parents, and only 12% of the youngest are not accompanied by adults. Most eat 5 meals a day, breakfast before going to school, second breakfast at school. In addition, parents consciously approach the problem of healthy eating habits, encouraging their children to eat healthy snacks, largely fruit and vegetables (84,7%) and other healthy snacks (13,3%). 2% of the respondents answered that their parents encourage them to eat sweets. The results show that only 34.7% of children are rewarded by their parents with sweets, 17.3% of children are taken to a fast-food restaurant, 10.7% get other snacks as a reward. Over half of the surveyed children (50.7%) get a reward unrelated to food.

4. 4. Programs promoting healthy nutrition

The "Fruit and Vegetables at School" program, which was indicated by 72.7% of children surveyed, is the most popular. The second place with comparable popularity was the programs "Glass of milk" (54.7%) and "School promoting health" (53.3%). Subsequently, the students indicated programs such as: "I eat healthily, I know more" (24.7%), "My child goes to school" (16%) and "School on a fork" (15.3%) (Table 3).

Table 3. Dissemination of programs promoting a healthy eating mode.

Question	Answers	%
In what programs related to healthy eating do you and your class participate?	A school that promotes health	53,3
	Fruit and vegetables at school	72,7
	my child is going to school	16
	I eat healthy, I know more	24,7
	„a glass of milk”	54,7
	„with training on a fork”	15,3
Are the topics discussed during the lessons related to healthy eating?	yes	92
	no	8

5. DISCUSSION

5. 1. Regularity of meals

Regular consumption of 5 meals each day provides the human body with the right dose of energy and nutrients. Consuming food every 3-4 hours does not induce longer periods of hunger and excessive accumulation of adipose tissue. Students who are in school for up to 6 hours should eat at least one meal, eg a second breakfast, while those staying over 6 hours - two meals (14).

It has been proved that the irregularity of eating meals, and therefore too long breaks between subsequent consumption contribute to the slowdown of metabolic rate and excessive accumulation of adipose tissue. Less thermogenesis and a positive energy balance result in weight gain. Long breaks between meals induce moments of hunger, which may cause the desire to eat unhealthy and easily available snacks, such as sweets or fast-food products.

It should be emphasized that abandoning supper can cause nighttime snacking. Nighttime eating (NES) is characterized by increased late appetite, eating directly before going to bed (15). All of the above behavior results in insomnia, depressed mood and social distress. There is no doubt that such habits adversely affect a young, developing organism.

5. 2. Type of meals eaten

What is also disturbing is the fact that high-processed foods are consumed between meals, eg fast food. It is an increasingly common phenomenon observed in Poland (16, 17). Such a little-varied diet used in a developing young person can lead to a deficiency of vitamins. The increase in fat intake may contribute to overweight and obesity, and consequently to serious chronic diseases, especially cardiovascular diseases. Omnipresent advertisements, colorful packaging promoting fast-food products may be the reason for a high rate of consumption of this type of meals.

Not without significance is the fact that in large cities the pace of parents' lives, and what is connected with their children, results in reaching for the simplest, most easily available form of food.

Proper nutrition for children of early school age is based on a balanced diet, increased milk consumption, fermented milk beverages, as well as vegetables and fruits. Children in this period of development should eat vegetables and fruits up to 4 times a day as an addition to meals. They allow supplementing potential deficits of vitamins, minerals, essential amino acids and fiber. Intensive growth of the young body requires daily consumption of milk or dairy products due to the high nutritional value at a relatively low energy value, which results from the relatively low-fat content and because they contain easily digestible nutrients (18). Dairy products are a source of easily digestible calcium, which is necessary for the bone mineralization process. Attention should also be paid to the phosphorus content in the diet of the examined children. It is an important building block of bones on a par with calcium. In milk, kefirs, natural yoghurts, and rennet cheese, the calcium content is higher than that of phosphorus, i.e. from 1: 0.6 to 1: 0.8. In chocolate, bars, and milk, the calcium content is similar, and the ratio of calcium to phosphorus in chocolate and bars is 1: 1.5 (14). In practice, it is permissible to have twice the content of phosphorus in comparison to calcium, however, it should be borne in mind that the calcium content in meals should be high enough. This condition can only be met by children who consume enough milk and milk products. Most children from the Lubelskie Voivodeship consume milk, natural yoghurt and/or kefir with less

frequency than recommended by recommendations (19). Resignation from consumption of dairy products in favor of, for example, sweets may in the future lead to such diseases as osteoporosis, hypertension or coronary heart disease (18).

5. 3. Nutritional behaviors

The family is the most important environment in a child's life. It shapes its nutritional behaviors, which include taste preferences, eating habits of small meals and celebrating them with the family at one table or habits related to coercion to eat whole portions, large meals or binge on a comfortable couch in front of the TV. Nutritional practices applied to children and nutritional behavior of parents affect the child's nutritional behavior based on the imitation of adults with whom they reside. The analysis of the conducted study confirms the hypothesis put forward for years by many foreign scientists, talking about the importance of shared meals for shaping eating habits among children and adolescents. A shared meal is an opportunity for caregivers to show the child their own dietary choices and the consumption of a wholesome meal. Parents' nutrition choices, approaches to food products, consumption patterns, table behavior will be followed by children.

A frequent mistake of parents in feeding their children is rewarding them with sweets (eg in exchange for a dinner they eat: "You will eat dinner well, as a reward you will get your favorite wafer"). In comparison with the results of a study conducted in 2009 among students of Warsaw schools, in which 56% of children replied that they were rewarded with sweets, the results obtained in the Lublin province seem to be more favorable. In this context, parents' knowledge, education, and awareness that food (especially sweets) cannot be a form of reward for a child are important. Such behaviors can have negative, far-reaching consequences and significantly affect the quality of their children's health in the future. Remembering that children are insightful observers, both parents and teachers should consciously reach for healthy food and set an appropriate example with their attitude.

5. 4. Programs promoting healthy nutrition

Nutritional education provides information on the principles of proper nutrition and shaping eating habits. Thanks to the growing social awareness, changes in the concept of health education are noticeable. Knowledge about proper nutrition is provided by institutions such as kindergartens and schools, as well as through mass media. Programs introduced to schools promote the consumption of dairy products, fruit, and vegetables among the youngest. Children get knowledge about the origin and cultivation of fruits and vegetables, which in the future will allow them to choose the right path of nutrition. The increase in the availability of healthy snacks adds to the attractiveness of the actions carried out. Children have the opportunity to independently choose and enjoy healthy food, which not only results in the possibility of consolidating the skills of the right choice but also contributes positively to the overall psychosomatic development of the young person.

6. CONCLUSIONS

Caring for the proper habits of the young generation can have a beneficial effect on nutritional decisions in adulthood. Systematic and long-term actions can contribute to

improving the social, economic and epidemiological situation. Thanks to the holistic approach to the important nutrition problem among children and adolescents, we can expect positive trends in the near future.

The authors of the above paper would like to draw attention to the still binding need for further research on eating habits among all social groups, which has been shown several times in this work. In the opinion of the authors, these studies should be conducted by appropriate centers in smaller and larger populations of Poland and Europe. Consistent data collection and in-depth analysis will undoubtedly lead to appropriate steps taken by healthcare professionals, educators and authorities, which will certainly contribute to improving the epidemiological situation of obesity and social health in the population in the short and long term.

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