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The role of parents in shaping good nutrition habits in children

Rola rodziców w kształtowaniu prawidłowych nawyków żywieniowych u dzieci

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Abstract

Introduction and aim of the study: Creating and strengthening correct eating habits in preschool and school age is a basic element of developing healthy lifestyle in children. The greatest role in this significant period for developing specific eating behaviours is played by parents who are not only responsible for providing healthy food, but also the right example to follow. The aim of the study was to analyse children's eating habits and physical activity depending on body mass index, level of education, and type of their parents' activities. **Materials and methods:** The study was conducted in a randomly selected educational institution after obtaining the consent of the school's headmaster. The participants of the study were children and their parents ($N = 80$; 52 girls and 28 boys) aged 6 to 13, residents of the Podkarpackie Voivodeship. **Results:** This study shows that mothers with a higher level of education are more likely than mothers with a lower level of education to have children with normal body weight or overweight ($p = 0.026$). More often, physical education classes were attended by children whose parents regularly take up physical activity, and the time spent by parents on physical activity during the week was a factor affecting their children's participation in additional sports activities. The children of parents regularly taking up physical activity participated in them more often. **Conclusions:** Parents, through various processes and behaviours, instil in their children certain mechanisms which are important from the health perspective and can be helpful and contribute to the proper development of nutritional practices.

Keywords: eating habits, children, parents, BMI, physical activity

Streszczenie

Wprowadzenie i cel pracy: Tworzenie i wzmacnianie prawidłowych nawyków żywieniowych u dzieci w wieku przedszkolnym i szkolnym jest podstawowym elementem wykształcenia u nich prozdrowotnego stylu życia. W tym znaczącym okresie największą rolę w wypracowaniu określonych zachowań żywieniowych odgrywiają rodzice, odpowiedzialni nie tylko za dostarczanie zdrowej żywności, ale także za przekazywanie właściwych przykładów w tym zakresie. Celem prezentowanego badania była analiza nawyków żywieniowych i aktywności fizycznej wśród dzieci w zależności od wskaźnika masy ciała, poziomu wykształcenia i sposobu aktywności ich rodziców. **Materiał i metoda:** Badanie zostało przeprowadzone w losowo wybranej placówce oświatowo-wychowawczej po uzyskaniu zgody dyrektora szkoły. Badanie obejmowało grupę dzieci ($N = 80$; 52 dziewczynki i 28 chłopców) w wieku 6–13 lat i ich rodziców, mieszkańców województwa podkarpackiego. **Wyniki:** Wykazano, że dzieci matek z wyższym poziomem wykształcenia częściej niż dzieci matek z niższym poziomem wykształcenia miały prawidłową masę ciała lub nadwagę ($p = 0,026$). W zajęciach wychowania fizycznego częściej uczestniczyły dzieci rodziców regularnie podejmujących aktywność fizyczną, a czas przeznaczony przez rodziców na aktywność fizyczną w ciągu tygodnia był czynnikiem wpływającym na uczestnictwo ich dzieci także w dodatkowych zajęciach sportowych, w których z większą częstością brały udział dzieci rodziców podejmujących regularną aktywność fizyczną. **Wnioski:** Rodzice poprzez swoje zachowania zaszczepiają w dzieciach istotne z perspektywy zdrowia nawyki, które mogą sprzyjać wykształcaniu prawidłowych praktyk żywieniowych.

Słowa kluczowe: nawyki żywieniowe, dzieci, rodzice, BMI, aktywność fizyczna

INTRODUCTION

Creating and strengthening correct eating habits at preschool and school age is the basic element of educating children on how to live a healthy lifestyle. The greatest and the most responsible role in this important period for the development of specific eating behaviours is played by parents, not only in terms of providing healthy foods, but also a proper example to follow⁽¹⁾. The skills and tips that a child acquires in their early years will determine their future food choices as well as their health status. Parents are the authority whose behaviour and reactions are imitated and recreated by children. Irregular eating, skipping meals, missing breakfast or eating sweets affect children and their future food choices. Parents, by teaching their children healthy rules of nutrition and not changing their bad eating habits, can cause inappropriate behaviour in a child who will not get used to eating a given product or meal, seeing that his/her authority – mum or dad – contradicts words with her or his behaviour. Improper eating habits, established in childhood, result in the shaping of an inadequate model of nutrition which will be continued into adulthood⁽²⁾. The recommended solution would be to prepare meals together, initiate situations for trying new flavours, select various vegetables and fruit, and ensure a varied diet with limited sugar and salt intake and an adequate amount of physical activity, which together can minimize the risk of developing cardiovascular diseases in adulthood, such as type 2 diabetes or obesity⁽³⁾. There is little research in the literature on the role of parents in shaping proper eating habits of their children. The psychological aspects of children's nutritional behaviour are analysed, as well as their physical activity, which is influenced by the family environment, and thus primarily parents, as well as their level of education, dietary preferences, and knowledge. Making such observations highlights the role of parents and the impact of their behaviour on the child's health and prevention of lifestyle diseases. The rationale for the present study is a significant increase in the prevalence of overweight and obesity not only in adults, but also in children. Measurements taken by scientific entities allow to detect irregularities in this area, and provide a good opportunity to draw parents' attention to the important role they play in shaping the correct lifestyle of their children.

AIM OF THE STUDY

The aim of the study was to analyse the eating habits and physical activity among children depending on the body mass index (BMI), education level, and the physical activity of their parents.

MATERIALS AND METHODS

The study was conducted in the 2018/2019 school year in a randomly selected educational institution after obtaining

the headmaster's consent to conduct the study. The study group consisted of ($N = 80$; 52 girls and 28 boys) aged 6 to 13 and their parents (aged 27 to 57) living in the Podkarpackie Voivodeship. The patients gave their written consent to participate in the study. The study was carried out by the method of a diagnostic survey with the use of the questionnaire technique. The questionnaire was addressed to the parents and included questions about the child's nutritional preferences and diet, as well as general questions about the child's age and sex, as well as the age, weight, height, and education level of the parents. The purpose and details of the study (date, need to come to school without meals) were communicated to the parents by the organisers during a school interview, following which they had an opportunity to fill in the questionnaire and the attached consent form. Measurements were carried out on previously scheduled days, in the morning, on an empty stomach, in a properly prepared room with suitable conditions for taking off outerwear and taking measurements only in underwear, while ensuring a sense of intimacy for the subjects. The body composition analysis of the children was performed using the Tanita BC-428 MA analyser, and the height was measured using the SECA 213 height meter. The children's waist circumference was measured using a centimetre – the smallest circumference of the torso between the lower edge of the costal arches and the hip plates, at the end of free exhalation. Ultimately, a total of 80 children and their parents were selected to participate in the measurements. The participation in the study was voluntary, and the participants were informed about the possibility of withdrawing from the study at any stage. Information on the course of the measurements was provided, and the personal data of the respondents was secured by issuing a digital code. The criteria for study selection were as follows: voluntary consent of the child's parent and consent of the respondent to participate in the study, the child's age from 6 to 13 years, health status allowing the child to have his/her body weight and height measurements taken. The statistical analysis of the collected material was performed in the Statistica 13.1 package by StatSoft.

Characteristics of the research group

The study involved a total of 80 schoolchildren aged from 6 to 13 (52 girls and 28 boys) and 80 parents (aged from 27 to 57) living in the Podkarpackie Voivodeship. Most of the children were girls (65% of the group). Moreover, 8- and 11-year-olds predominated among the subjects, accounting for almost 50% of the study group. The mean age of the examined children was 9.2 ± 1.6 years. The mean body weight of boys was determined to be 33.19 ± 9.28 kg, and it was slightly higher (by 0.66 kg) than the average body weight of girls (32.53 ± 11.06 kg). In order to classify the body weight of children, updated percentile grids developed during the nationwide OLA/OLAF research project for children from 3 to 18 years of age were used. Overweight and obesity were

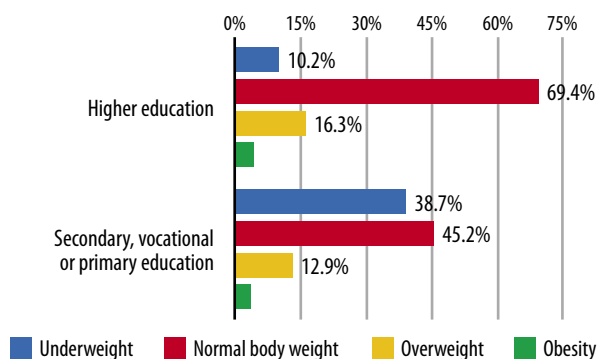


Fig. 1. Mother's education and child's BMI

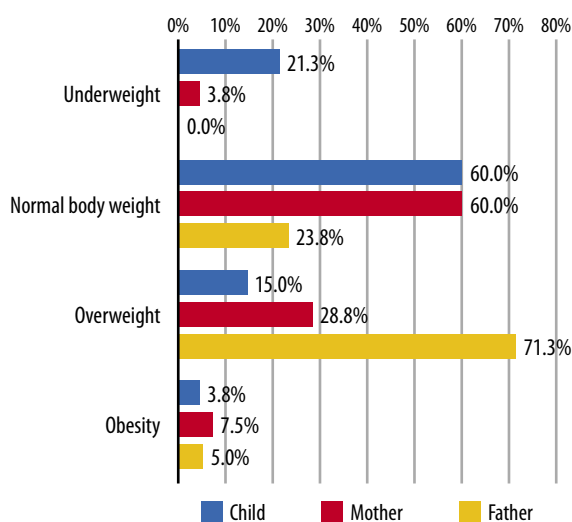


Fig. 2. Comparison of the BMI of fathers and mothers with the BMI of the child

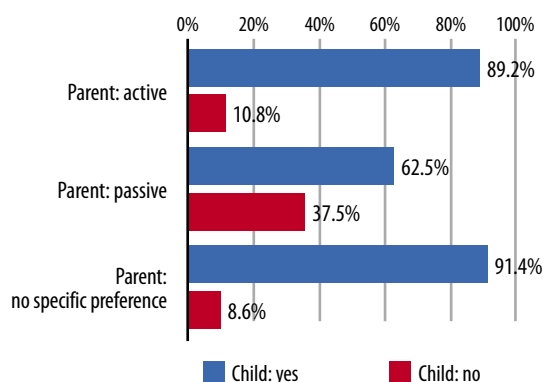


Fig. 3. Forms of spending free time preferred by parents and the child's participation in additional sports activities

defined based on the BMI percentile grids for a specific gender and age, assuming that a BMI value between the 85th and 95th percentile corresponded to overweight, BMI \geq 95th percentile to obesity, and $<$ 5th percentile to underweight. Any value between the 5th and 85th percentiles was classified as normal body weight.

The children with body weight deficiency were 21.25% in total, which accounted for over 1/4 of the entire group studied. 15% of the examined children were overweight.

The smallest number of children were obese (3.75%), and the highest had normal body weight (60.00%). In the group of girls, body weight deficiency was more frequent, while in boys it was overweight. Analysing the prevalence of abdominal obesity among the children according to the criterion of waist circumference to body height (waist to height ratio, WHtR) higher than or equal to 0.5, it was found that it was more common among boys. Among the children of both sexes, it was determined between 7 and 11 years of age, with the mean index being 0.53 ± 0.05 . Abdominal obesity among boys was found in 14.28% of the respondents and was insignificantly higher ($p > 0.001$) compared to the group of girls (9.62%) of the same age.

The mean age of the mothers of the examined children was 38.09 ± 4.86 , and of the fathers 40.03 ± 4.88 . The average body weight of the mothers was 65.04 ± 9.69 , and of the fathers: 82.48 ± 8.18 kg. In the studied group of parents, based on the BMI classification, overweight was the most common observation (50.64% of the respondents). Among women, 60% had a normal body weight, moreover, there was a weight deficiency and second-degree obesity, which was absent in men. The fathers were overweight (72.5%). The compiled data show that more than half of the parents had higher education (61.25% among women) and secondary education (25% of the fathers and 31.25% of the mothers). Among the women, 6 mothers had vocational education (16 fathers among men), and none had only primary education, while in men it was 2.5%.

RESULTS

The relationship between the maternal education level and the child's body weight category was statistically significant ($p = 0.026$) and had a moderate force (Cramer $V = 0.34$). It was shown that the mothers with higher education had children with normal body weight (69.4% vs. 45.2%) or overweight (16.3% vs. 12.9%) more often than the mothers with a lower level of education. On the other hand, the mothers with secondary, vocational or primary education had children with body weight deficiency more often than the mothers with higher education (38.7% vs. 10.2%). There was no statistically significant correlation between the fathers' education and their children's BMI ($p = 0.090$), although this relationship was close to the threshold of statistical significance (Fig. 1).

The conclusions that arose in relation to the described link between the BMI and the education of the children's fathers were similar to the conclusions drawn on the basis of the relationship between the BMI and the education of the mothers. The fathers and mothers' BMI were compared with their children's BMI. It was shown that the frequency of a given BMI in the mother or in the father was not the same as the frequency of the same body mass category in their children ($p < 0.001$). However, it was confirmed, in the case of the mothers, that the BMI of their children increased as their body weight increased ($p = 0.046$). A similar relationship was not found for the fathers, though ($p = 0.539$) (Fig. 2).

Parents' education	Frequency of consumption of selected products	R	p
Mother	Vegetables	-0.19	0.084
	Fruit	-0.11	0.312
	Sweets	-0.22	0.052
	Sweetened beverages	-0.06	0.604
	Fast foods	-0.13	0.269
Father	Vegetables	-0.13	0.256
	Fruit	0.10	0.387
	Sweets	-0.11	0.334
	Sweetened beverages	-0.06	0.617
	Fast foods	-0.04	0.698

R – Spearman's rank correlation value; p – significance level of differences.

Tab. 1. Parents' education and frequency of consumption of selected products by children

The study's results revealed that the time spent by the parents on physical activity during the week was not a factor influencing the participation of their children in physical education classes at school ($p = 0.083$). It was noted that the children of parents who regularly undertook various forms of physical activity regularly participated in their physical education classes more often than other children. The children's participation in physical education classes at school was significantly influenced by the forms of spending free time preferred by their parents ($p = 0.001$). This relationship was found to be of moderate strength (Cramer $V = 0.43$). The children of parents who spend their free time actively, or both actively and passively, regularly participated in PE classes than the children of parents who spent their free time only passively. The time spent by the parents on physical activity during the week was a factor that significantly affected their children's participation in additional sports activities ($p = 0.005$). The children of parents regularly taking up physical activity participated in additional sports activities more often. This relationship was of moderate strength (Cramer $V = 0.36$). The children's participation in additional sports activities was not significantly influenced by the forms of spending free time preferred by their parents ($p = 0.075$). However, it was observed that the children of parents who spent their free time actively, or both actively and passively, participated in additional activities more often than the children of parents who spent their free time only passively (Fig. 3).

The snacks chosen by the studied parents and their children were similar. In this respect, though, the presence of statistically significant differences was not confirmed ($p = 0.300$). Fruit was eaten most often (45 children – 56.3% and 38 parents – 47.5%), while sweets were ranked second (19 children – 23.8% and 23 parents – 28.8%). There was no statistically significant correlation between the parents' level of education and the frequency of consumption of selected food products by their children ($p > 0.05$). However, we can observe a greater influence of the mothers on the type of selected food products, such as vegetables and sweets (Tab. 1).

DISCUSSION

A paramount issue is the awareness of parents of the influence they exert on shaping their children's eating habits, but also their lifestyle. Scientific research shows a clear correlation between the nutritional behaviour of parents – especially mothers – and obesity in the child, which seems justified in view of the fact that usually the mother is the person who creates eating patterns among her relatives at home⁽⁴⁾. On the basis of the obtained results, it was found that the children who were overweight or obese had both parents, or one parent, with a BMI above 24.99. This relationship was more common among the mothers of the children under study. Similar results were reported by El Ashmawi et al. in their study, demonstrating that the children of obese parents are much more likely to be obese⁽⁵⁾. Many studies indicate the described dependencies and the fact that the BMI, education level and other indicators of the parents' socio-economic status are associated with an increased risk of obesity in children^(6,7). The conducted analyses also reveal a relationship between the parents' level of education and the child's body weight and the eating behaviour they adopt^(8,9). Nepal's study shows the same results as those reported in the present study⁽¹⁰⁾. It also confirms that the mother's level of education affects the body weight and specific behaviour of the child. Higher education of mothers correlates with normal body weight of their children, and less frequent irregularities in their nutrition, while primary, secondary or vocational education more often predisposes children to being underweight. Different observations were reported by Hudson et al., who in their study did not find any significant correlations between the level of parents' education and body weight abnormalities in children⁽¹¹⁾. Other observations show that the parents' education level also affects the type and number of meals and snacks consumed by the child during the day. Mothers with higher education more commonly reach for healthy snacks for their children than mothers with a lower level of education⁽¹²⁾. Even though, as Khandpur et al. and Fielding-Singh point out, the role of fathers in providing snacks to their children has become more important in recent years, still the influence of mothers seems to be instrumental in the choice of nutritional products, including snacks for children^(13,14). Hardcastle and Blake recognise mothers as a key target group for family attitudes towards eating, buying, and preparing food⁽¹⁵⁾. In the study by Koziol-Kozakowska et al., it was observed that the mother's higher education correlates positively with the amount of milk consumed, and negatively with the amount of crisps consumed⁽¹⁶⁾. The observations reported by Vereecken and Maes prove that the children of mothers who had a higher level of education, consumed more fruit and vegetables and had a lower intake of sweetened beverages in their diet⁽¹⁷⁾. Gevers et al. showed that 7–12-year-old children of mothers with lower education levels consumed more high-energy snacks compared to the children of mothers with higher education levels⁽¹⁸⁾. In addition, Bargiota et al., van Ansem et al., Vilela et al., Emmett and

Jones and Durão et al. identified a relationship between the higher education of mothers and healthier eating patterns of their children^(19–23). In a study by Damen et al., fruit was the type of snack most mothers gave to their children, followed by cookies and candies⁽¹²⁾. In the present study, the mothers also usually offered their children fruit as a snack, both to school for lunch, and similarly, sweets ranked second as the most popular snack. Despite the lack of statistical significance, there was a correlation in which the mothers with higher education levels more frequently provided their children with snacks in the form of vegetables, while the mothers with lower education levels more often gave their offspring sweets. An effect of this tendency was a link between the consumption of sweets as snacks and the occurrence of overweight or obesity in children. Similar observations show (apart from the mother's level of education), an important issue which is the mother's working time and its impact on the child's nutrition. It turns out that children whose mothers work longer during the day eat more unhealthy foods (e.g. carbonated drinks, fast foods) and less healthy foods (fruit, vegetables, milk), and spend more time in front of the TV/computer⁽²⁴⁾. Similar conclusions were drawn by Fertig et al., who noted that the working time of mothers was associated with fewer meals consumed by children during the day (presumably due to skipping meals) and more time spent watching TV⁽²⁵⁾. According to the researchers, there is a link between the mother's work and childhood obesity, believing it to be rooted in a given country's cultural, social and institutional context. This account, however, does not apply to European citizens⁽²⁶⁾. Datar et al. confirm that maternal work correlates positively with childhood obesity, especially among families with a high socioeconomic status⁽²⁴⁾. These results are comparable with the findings obtained by Ziol-Guest et al. and show that the socioeconomic status of the family has an influence on the increase in the child's weight⁽²⁷⁾. The level of income determines pro-health eating behaviours as well because it positively correlates with the level of education, and this in turn correlates with the conscious choice of a healthy lifestyle. According to the available research, physical activity decreases with the age of the child⁽²⁸⁾. Physical effort is much more often undertaken by children from primary schools compared to adolescents attending secondary schools. Among junior high school students, the vast majority of teenagers do not spend enough time being physically active with their parents. This seems to be natural, considering the fact that among teenagers the amount of time spent with their mothers and fathers is significantly reduced. However, according to Zadarko-Domaradzka et al., the most important problem associated with low levels of physical activity is the lack of favourable models drawn from the behaviour of parents, which, if reflected by children, could become long-lasting positive habits⁽²⁹⁾. The most favourable period of introducing the habits of regular physical activity to children is the early school period, when the child has a congenital need for physical activity. Parents – often unconsciously – create a prototype of how to spend free time through their

own behaviour. The described dependencies show the absolute influence of parents on the shaping of their children's habits – in addition to eating and movement habits. Physical activities actually undertaken by children's parents have a much greater impact on children's behaviours than the verbal motivation to engage in physical activities⁽³⁰⁾. Many cross-sectional studies have shown a correlation between the physical activity of children and their parents. It is clearly visible among children aged 5–9 and in older children, aged 11, 13 and 15⁽³¹⁾. Other publications reveal no association between the physical activity of children and their parents⁽³²⁾. The authors argue that the family environment does not play a highly important role in shaping a healthy lifestyle of children. Another factor that determines the level of children's physical activity is the level of their parents' education. Higher education is associated with a greater awareness of the impact of physical activity on human health, and consequently with taking actions supporting its effectiveness and improvement^(33,34). In the present study, the children whose parents regularly undertook physical activity more often participated in physical education classes at school. The relationship between the mothers and fathers devoting their time to physical activity turned out to be absolute – an increased frequency of the children's participation also in additional, extracurricular sports activities. The conclusions of the analysis clearly suggest that the parents, through their own unconscious behaviour, instil in their children certain mechanisms which are important from the health perspective which can be helpful and support proper development of eating practices. Further studies of children's behaviour, including an investigation of correlations with various environmental factors, should be undertaken as a starting point for targeted and effective nutritional education programmes, while suggesting further research strategies to elucidate interactions between these factors influencing children's behaviour.

CONCLUSIONS

1. In the study, the mothers with a higher level of education had children with normal body weight or overweight more often than the mothers with a lower level of education. Conversely, the mothers with primary, secondary, or vocational education had children with body weight deficiency more often than the mothers with higher education.
2. It was confirmed that in the group of the mothers examined, the abnormalities in their body weight were accompanied by abnormalities in the body weight of their children (weight deficiency, overweight or obesity).
3. The frequency of snacking and snacks selected by the parents and their children were similar. The most common foods included fruit and sweets.
4. The time spent by the parents to engage in physical activity during the week was not a factor influencing the participation of their children in physical education classes

at school, however, the children whose parents regularly engaged in physical activity regularly participated in PE classes more often.

5. The children's participation in physical education classes at school was influenced by the forms of spending free time preferred by their parents. The children whose parents spent their free time actively, or both actively and passively, regularly participated in PE classes more often than the children whose parents spent their free time only passively.
6. The time spent by the parents for practising physical activities during the week was a factor influencing the participation of their children in additional sports activities. The children of parents regularly taking up physical activity participated in additional sports activities more frequently.

Conflict of interest

The authors do not report any financial or personal connections with other persons or organisations which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

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