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ORIGINAL PAPER

The influence of maternal dietary habits on children's eating behaviours and nutritional status in Poland

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ABSTRACT

Introduction: The aim of the study was to investigate the relationship between mothers' declared dietary patterns and nutritional status and eating habits in children. It was hypothesised that children who follow a balanced diet would demonstrate better health indicators compared to those who do not adhere to any particular dietary guidelines.

Material and methods: The research was conducted in 6 public primary schools within the Pomeranian Voivodeship from September 2022 to January 2023, with the participation of 515 mothers or legal guardians. Children's eating habits were evaluated through questionnaires, specifically employing the children's eating behaviour questionnaire and the food frequency questionnaire.

Results: The findings revealed that children adhering to a Mediterranean or vegetarian diet were more likely to maintain a healthy body weight and to choose healthier snacks, such as fruits, when compared to those who did not follow any specific diet. In contrast, children without a defined dietary plan were more prone to being overweight and exhibited a higher consumption of sweets.

Conclusions: These results suggest that structured diets, particularly the Mediterranean and vegetarian options, can positively influence children's eating habits and body composition.

KEY WORDS:

children, dietary habits, obesity.

INTRODUCTION

Childhood obesity has emerged as a formidable public health challenge in the 21st century, with its prevalence escalating markedly on a global scale in recent years. This multifaceted condition is influenced by a variety of biological, environmental, and behavioural factors and is increasingly recognised as a phenotype associated with numerous pathologies [1]. Accurate estimations of obesity prevalence in children are critical for informing public health policies and guiding future research endeavours [2]. Epidemiological trends indicate that obesity can manifest early in life, with the potential for persistence into adulthood [3]. This persistence is concerning because childhood obesity is linked to a spectrum of cardiometabolic disorders and psychosocial comorbidities, which can culminate in premature mortality [4]. Obesity should be conceptualised as a chronic disease with complex pathophysiological underpinnings and significant health repercussions. However, this study focuses on early childhood and the role of dietary patterns in preventing obesity, rather than on the complexities of adolescent obesity management. Although adolescence introduces transformative physical and psychosocial changes that necessitate tailored prevention strategies, these aspects are beyond the scope of this research. Addressing obesity in childhood is critical

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because early intervention can mitigate the risk of lifelong health complications – both medical and psychological – while promoting healthier outcomes over the lifespan [5]. Dietary patterns established in early childhood play a crucial role in shaping long-term health outcomes, influencing growth, cognitive development, and future productivity [6]. Parental involvement is pivotal in promoting healthy eating behaviours among preschool-aged children [7]. Despite this, research indicates that a considerable proportion of children and adolescents do not adhere to diets that are rich in essential nutrients [8]. This dietary inadequacy has profound implications, contributing to metabolic diseases, overweight, obesity, and other diet-related conditions. Studies have shown that poor adherence to the Mediterranean diet correlates with an increased likelihood of obesity and insulin resistance [9]. Notably, current trends highlight unhealthy habits among school-aged children, particularly concerning the consumption of sweetened beverages, adherence to a Mediterranean diet, and levels of physical activity [10]. Various dietary strategies have emerged as potential interventions for weight management and metabolic improvement, including intermittent fasting, calorie restriction, vegetarian diets, and moderate exercise [11–13]. In recent years, there has been increasing emphasis on the importance of healthy eating as a fundamental aspect of preventive health care, particularly regarding children. With the rising prevalence of obesity and overweight in Poland and globally, the significance of a balanced diet in preventing lifestyle-related diseases is gaining substantial attention. Current discourse in scientific literature explores various dietary models – such as Mediterranean, vegetarian, vegan, and ketogenic diets – as strategies for enhancing children's health outcomes. These diets may exert differential effects on physical health, energy levels, and cognitive development among children. Despite the extensive research on the impact of dietary practices on children's health, few studies have systematically examined the correlations among different dietary models, body composition, fruit consumption, and other eating behaviours within the context of Polish children. Thus, the objective of this study is to investigate whether adherence to specific dietary patterns – namely, the Mediterranean, ketogenic, vegan, or vegetarian diets – correlates with improved body composition and healthier eating habits among children. The central hypothesis posits that children who engage in balanced dietary practices demonstrate superior health indicators compared to their counterparts who do not follow a defined dietary regimen.

MATERIAL AND METHODS

The survey was conducted in 6 public primary schools located in the Pomeranian Voivodeship of Poland between September 2022 and January 2023. The participants in the survey were pupils aged 6–15 years. Participants were informed at the outset that the study was entirely anonymous and that the findings would solely be utilised for research purposes. Participation was voluntary, and all respondents provided consent by accepting the patient information form along with a presentation of the study. The initial section of the questionnaire emphasised informed consent. Informed consent was obtained electronically through an online form. Participants were informed about the study's purpose, procedures, and their rights, including the voluntary nature of their participation and the anonymity of their responses. No personal identifying information was requested or collected during the consent process, ensuring participant privacy and compliance with data protection regulations. Respondents indicated their consent by submitting the form, without the need to provide any personal data. The study adhered to ethical standards, including anonymity and voluntary participation. Informed consent was provided on the survey's first page, in line with the Declaration of Helsinki (2000) and the European General Date Protection Regulations (679/2016). For the overall project analysing behaviours, habits, and attitudes of children in the Pomeranian Voivodeship, approval was obtained from the Bioethics Committee (NKBBN/177/2021). The survey comprised 15 questions, organised into 2 distinct sections. The questionnaires were completed exclusively by mothers or legal guardians of the children. No direct surveys or interviews were conducted with the children. The first section aimed to acquire basic demographic information regarding the respondents, while the second section concentrated on the dietary habits and behaviours of the participating mothers. The questionnaire was developed utilising established instruments, notably the children's eating behaviour questionnaire (CEBQ) and the food frequency questionnaire (FFQ), to assess eating habits effectively [14]. Dietary patterns were determined based on maternal responses to FFQ and CEBQ, validated tools for dietary assessment. Mothers were asked about their typical food choices, meal frequency, and adherence to specific dietary models, such as Mediterranean, vegetarian, ketogenic, or unspecified diets. Adherence to each dietary pattern was categorised based on the frequency of consumption of the key food group characteristic of these diets. The Mediterranean diet was characterised by high consumption of fruits, vegetables, whole grains, olive oil, and fish, with limited intake of red meat. The vegetarian diet excluded meat and fish but allowed plant-based foods and, in some cases, dairy and eggs. The vegan diet excluded all animal products, focusing on plant-based proteins, grains, and vegetables. The ketogenic diet emphasised high fat, moderate protein, and very low carbohydrate intake. Medical diets included those tailored for health conditions, such as gluten-free or low-sodium regimens. Mothers not adhering to a specific dietary model were classified as following an unspecified diet. Although the study did not directly assess children's

physical development or health outcomes, dietary habits and behaviours analysed (e.g. frequency of meals, snacking, and fluid intake) are recognised as important determinants of overall health. The present study involved a comprehensive questionnaire administered to 540 mothers or legal guardians, aged 20 to over 45 years (M = 35.3). Mothers were selected as respondents due to their primary role in shaping children's eating behaviours, making meal choices, and providing information about dietary patterns. Inclusion criteria referred to mothers or legal guardians of children enrolled in the selected primary schools, who agreed to participate voluntarily after providing informed consent. The drop-out rate was included 7 incomplete responses and 18 refusals to participate. Responses were verified for correctness and completeness after submission to ensure validity. After data verification, a total of 515 completed questionnaires were included in the analysis. Only fully completed questionnaires with informed consent were considered valid for inclusion in the study. To facilitate participation, invitations were disseminated through school administrators, who shared the survey link across various platforms, including student websites, social media channels, and the Librus electronic diary system. The survey, designed in Google Forms, specifically targeted mothers of children enrolled in the schools. Participants voluntarily engaged in the study, assured of the anonymity and confidentiality of their responses. No personal identifiers or contact information were collected, with responses finalised contingent upon the submission *via* a designated 'send' button. Importantly, no financial incentives were provided for participation. For the analytical portion of the study, statistical software, including Statistica 12 Advanced Pack with Plus Kit, PQStat 1.8.0.438, and Excel 2007, was employed. The analysis focused on qualitative variables, utilising the χ^2 test to evaluate the relationships between nominal variables and to ascertain the alignment of observed frequencies with theoretical distributions. Additionally, a correspondence analysis was conducted to elucidate potential associations and patterns among the nominal variables, thereby identifying both correlated relationships and independent factors within the dataset.

RESULTS

CHARACTERISTICS OF CHILDREN'S SILHOUETTES

This study analysed the responses of 515 mothers whose children attend public primary schools in Poland. In the study, the women described the profiles of their children based on the knowledge available to them. They rated weight status body types in one of four categories: slim, normal, overweight, and obese (Figure 1). Respondents assessed their figure as overweight – 43.30%, the least as obese – 7.38%, 16.12% of respondents rated their children's body shape as slim, and 33.20% considered it normal.

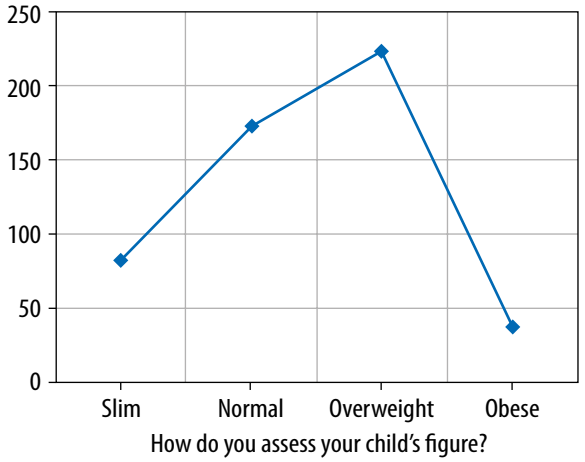

FIGURE 1. Assessment of the child's silhouette from the perspective of mothers

** χ^2 Pearson: 49,2012, df = 3, p = 0.000000, statistically significant differences p < 0.005*

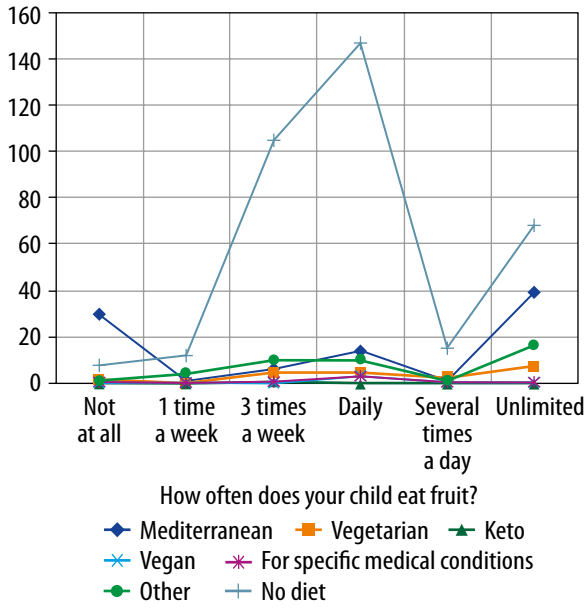

FIGURE 2. Influence of the dietary model used on children's fruit consumption habit

THE INFLUENCE OF DIETARY MODELS ON THE FRUIT CONSUMPTION HABITS OF CHILDREN

Analysis of the data presented in Figure 2 and Table 1 shows that the parents' diet can influence the frequency with which their children eat fruit. Parents following a Mediterranean diet declared that their children most often ate fruit without restriction, although there was also a noticeable group of children who did not eat fruit at all. Children in families following a vegetarian diet also tended to eat fruit without restrictions, while the group of parents following other diets was dominated by children who ate fruit regularly. In families that did not follow a specific diet, children who ate fruit daily or several times a week predominated, but only a small percentage ate fruit without restriction. These results suggest that

TABLE 1. Influence of the dietary model used on children's fruit consumption habits

Diet	Not at all	How often does your child eat fruits?					
		1 times a week	3 times a week	Daily	Several times a day	Unlimited	All
Mediterranean	30	1	6	14	1	39	91
Vegetarian	1	0	4	4	2	7	18
Keto	0	0	1	0	0	0	1
Vegan	0	0	0	3	0	0	3
For specific medical conditions	0	0	1	3	0	1	5
Other	1	4	10	10	1	16	42
No diet	8	12	105	147	15	68	355
General	40	17	127	181	19	131	515

χ^2 Pearson – 164.30

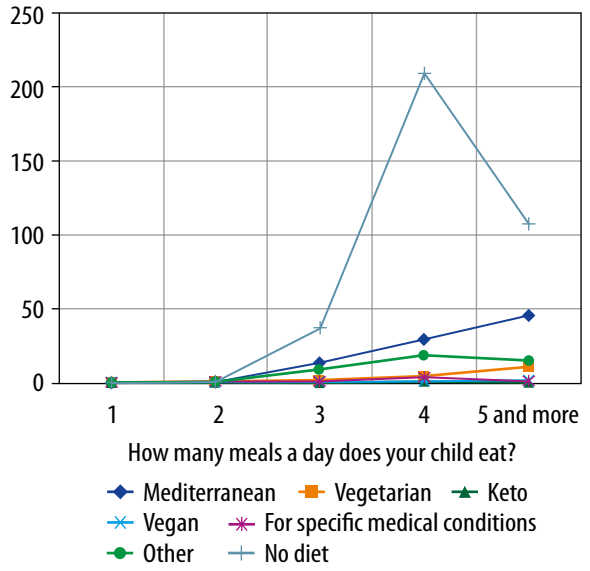

FIGURE 3. Frequency of children's meal intake according to dietary model

adherence to a specific diet, such as a Mediterranean or vegetarian diet, may be associated with a higher frequency of fruit consumption among children ($p < 0.0001$).

FREQUENCY OF CHILDREN'S MEALS BASED ON FEEDING PATTERNS

Among children whose parents followed a Mediterranean diet, the majority ate 5 or more meals a day, while a smaller percentage were limited to 4 or 3 meals a day (Figure 3, Table 2). In contrast, among children whose parents did not follow a specific diet, those eating four meals a day predominated, while a slightly smaller number ate 5 or more meals. In both cases, only a minority of children ate 2 meals a day, and no child in the group of parents following the Mediterranean diet was limited to one meal. These results indicate that parental adherence to the Mediterranean diet may be associated with more frequent meal consumption by children ($p = 0.0232$).

TABLE 2. Frequency of children's meal intake according to dietary model

Diet	How many meals a day does your child eat?					
	1	2	3	4	5 and more	All
Mediterranean	0	1	14	30	46	91
Vegetarian	0	1	2	4	11	18
Keto	0	0	0	1	0	1
Vegan	0	0	0	1	2	3
For specific medical conditions	0	0	0	4	1	5
Other	0	1	8	18	15	42
No diet	1	1	37	209	107	355
General	1	4	61	267	182	515

χ^2 Pearson – 41.25

TYPES OF FOOD CONSUMED BETWEEN MEALS BY CHILDREN AND THE FEEDING PATTERNS OF PARENTS

Among children whose parents followed a Mediterranean diet, more than half did not snack between meals, and among snacks, sweets were the most common choice, while healthier options such as nuts and dried fruit were less popular (Figure 4, Table 3). Children from families following a vegetarian diet were most likely to reach for fruit and nuts and seeds, with a small proportion not snacking at all between meals. The group of children whose parents followed other diets showed a varied choice of snacks, with a marked proportion of sweets, fruit, and no snacking between meals. The largest group, the children of parents not following a specific diet, mostly chose sweets, with a smaller proportion reaching for fruit or not snacking at all. The results indicate a significant influence of parents' dietary pattern on children's snacking choices, with diets such as Mediterranean or vegetarian favouring avoidance of snacking or choosing healthier options ($p < 0.0001$).

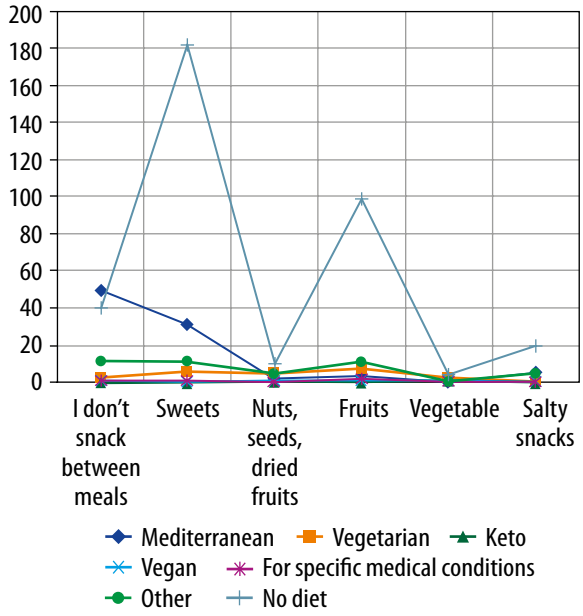

FIGURE 4. Type of food consumed between meal by children and parent's eating pattern

RELATIONSHIP BETWEEN DIETARY PATTERNS AND THE AMOUNT OF FLUIDS CONSUMED BY CHILDREN

In the group of children whose parents followed a Mediterranean diet, the majority consume around 1 litre of fluids *per* day, while a significant percentage drink less than 0.5 litres (Figure 5, Table 4). Children of parents following a vegetarian diet had lower fluid intake, with the highest percentage reaching 0.5 litres *per* day. In the group of parents who did not follow a specific diet, the largest proportion of children consumed around 0.5 litres of fluids, with a slightly smaller proportion drinking 1 litre. The results indicate a relationship between parents' dietary pattern and their children's hydration levels, suggesting that different diets may shape different fluid intake habits ($p < 0.0001$).

THE ASSOCIATION BETWEEN CHILDREN'S DIETARY HABITS AND THEIR INTAKE OF MEALS, SNACKS, AND FLUIDS: A CORRESPONDENCE ANALYSIS. THE SECTION BETWEEN CHILDREN'S EATING HABITS AND THEIR CONSUMPTION OF MEALS, SNACKS, AND FLUIDS – A CORRESPONDENCE ANALYSIS

Figure 6 presents a correspondence analysis that elucidates the relationships among various factors pertinent to children's eating habits, including fruit consumption, the number of meals consumed *per* day, fluid intake, and snacking behaviours. Children's body silhouettes were assessed through a maternal perception questionnaire. This

TABLE 3. Type of food consumed between meals by children and parent's eating pattern

Diet	What food does your child usually eat between meals?					
	I don't snack between meals	Sweets	Nuts, seeds, dried, fruits	Vegetables	Salty snack	All
Mediterranean	50	31	1	0	5	91
Vegetarian	1	5	4	1	0	18
Keto	0	0	0	1	0	1
Vegan	2	0	0	1	0	3
For specific medical conditions	1	1	0	1	0	5
Other	11	11	4	1	4	42
No diet	40	182	10	4	20	355
General	105	230	19	9	29	515

χ^2 Pearson – 218.37

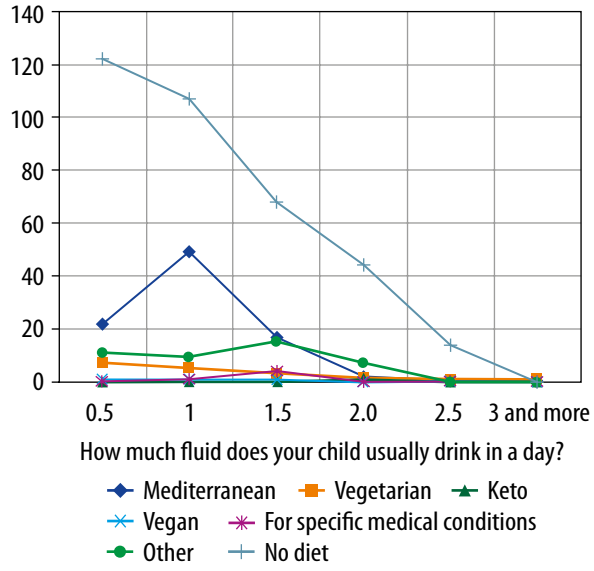

FIGURE 5. Relationship between dietary pattern and amount of fluids consumed by children

subjective method was used to gather maternal perspectives on their children's body types. The graph effectively delineates the associations between these variables for distinct groups of children, categorised based on parental diet (e.g. Mediterranean diet, vegetarian diet, vegan diet, and diets for specific medical conditions) and body types (slim, normal, overweight, and obese).

The results of the analysis show that children whose parents followed a Mediterranean diet had stronger associations with fruit consumption. Similar relationships were found for children who regularly drank larger amounts of fluids (more than 2 litres *per* day) and those who preferred vegetable snacks. In contrast, children who consumed 3 meals a day were more likely to reach for sugary snacks and usually did not follow any special dietary restrictions.

In the analysis, there also appears to be a relationship between the frequency of meals consumed and snack choice. Children who ate 5 or more meals *per* day (5+) tended to consume vegetable snacks and drank more than 3 litres of liquids daily (3L+), while those who eat only 2 meals *per* day tended to drink liquids less often and tended to snack less. Children whose parents followed more restrictive diets (e.g. ketogenic, vegan, vegetarian) showed different eating patterns compared to children whose parents did not follow special dietary rules.

DISCUSSION

While this study did not evaluate direct health outcomes or physical development, the examined dietary habits such as meal frequency, fruit consumption, and snack choices were closely linked to broader health indicators, as supported by existing literature. The results of our study indicated that children whose mothers adhered to the Mediterranean diet demonstrated significantly improved body composition. These findings are consistent with the conclusions of D'Innocenzo *et al.*, who emphasised the Mediterranean diet's effectiveness in preventing obesity and various metabolic disorders. This dietary model, characterised by high consumption of vegetables, fruits, nuts, whole grains, and olive oil, along with moderate intake of fish and poultry, is associated with a decreased risk of obesity and associated health complications, thereby confirming its health benefits. The World Health Organisation has also highlighted that deviation from the Mediterranean diet contributes to increased weight and overall diminished health among children [15]. Additionally, Papadaki *et al.* asserted that the Mediterranean diet yields positive outcomes in terms of metabolic health [16]. A dietary pattern emphasising minimally processed plant-based foods and high levels of monounsaturated fats, while restricting saturated fats, meat, and dairy, serves as a benchmark for supporting overall health [17, 18]. The study also highlighted that nearly half (48.17%) of the children whose mothers lacked adherence to any structured dietary plan were classified as overweight, constituting the most substantial subgroup

TABLE 4. Relationship between dietary pattern and amount of fluids consumed by children

Diet	How much fluid does your child usually drink in a day?						
	0.5 l	1 l	1.5 l	2.0 l	2.5 l	3 l and more	All
Mediterranean	22	49	17	2	1	0	91
Vegetarian	7	5	3	1	1	1	18
Keto	0	0	0	1	0	0	1
Vegan	1	1	1	0	0	0	3
For specific medical conditions	0	1	4	0	0	0	5
Other	11	9	15	7	0	0	42
No diet	122	107	68	44	14	0	355
General	163	172	108	55	16	1	515

χ^2 Pearson – 82.97

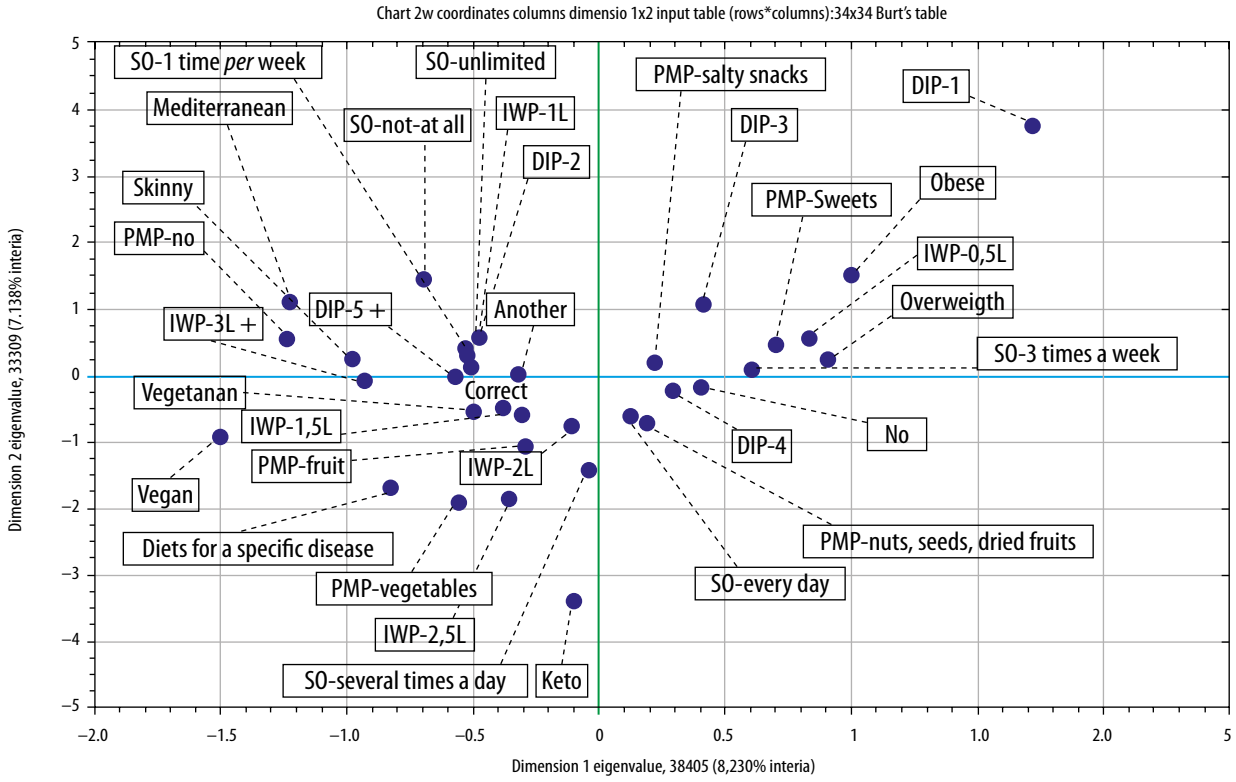

FIGURE 6. Relationship between eating habits and the amount of meals, snacks and fluids consumed in children

DIP – daily number of meals, IWP – amount of liquids drunk, PMP – snacks between meals, SO – consumption of fruit

in this category. This observation aligns with the study conducted by Mahfouz *et al*., which confirms that a significant number of individuals with obesity do not adhere to structured dietary plans. These studies collectively suggest that the absence of a targeted dietary approach may contribute to an elevated risk of overweight and obesity [19]. Research conducted by Xu *et al*., which analysed a sample of 2338 children and adolescents, revealed a significant correlation between low nutritional knowledge and an increased prevalence of overweight and obesity, as measured by body mass index. The rising rates of overweight and obesity among children and adolescents represent one of the most pressing public health challenges of the 21st century, with a notable global increase [20]. In our study, it was observed that children whose parents adhered to the Mediterranean diet tended to consume fruit without restrictions, accounting for 42.86% of this group. A low adherence to the Mediterranean dietary pattern is linked to a higher prevalence of overweight and obesity in children. Evidence from several countries confirms that frequent consumption of fruits and vegetables occurs even amidst high rates of overweight and obesity in young populations. For instance, a study by Pereira-da-Silva *et al*. found that in Portugal, where the Mediterranean diet is prevalent, 93% of children reported consuming fresh fruit regularly [21]. While the Mediterranean diet, traditionally followed in Mediterranean regions, is defined by substantial intake of plant-based foods such as vegetables, legumes, cereals, nuts, and fresh seasonal fruits, our study does not permit a direct assessment of its adoption among the children studied. Consequently, references to this diet in the study context should be viewed as a broader framework rather than a direct outcome of analysing specific dietary behaviours. [22]. In our research, among a cohort of children whose mothers did not follow any specific dietary regimen, nearly half (48.17%) were classified as overweight, marking the largest category in the study. Gross *et al*. noted that adherence to the Mediterranean diet was suboptimal in approximately half of the surveyed population [23]. Additionally, our study found that among 355 children whose parents do not follow any particular dietary model, 30.14% consume 5 or more meals a day, while 58.87% consume 4 meals. Family meals are associated with numerous benefits, promoting healthy eating habits and reducing the risk of overweight. Do Amaral *et al*. identified positive outcomes in food intake among children who participated in family meals (3 or more times *per* week), including decreased consumption of sugary beverages and increased intake of fruits and vegetables [24]. Eating 3 meals a day is generally considered a healthier dietary practice [25]. Paoli *et al*. assert that consuming more than 4 meals a day correlates with a lower risk of obesity compared to consuming fewer than 3 meals a day, even when controlling for age, gender, physical activity, and total energy intake [26]. In our study, among children who consumed snacks, sweets were the most prevalent option. According to Żwirska *et al*., 73.5% of girls and 65.7% of boys with malnutrition,

along with 42.6% of girls and 46.0% of boys who are overweight or obese, reported consuming sweets. Furthermore, overweight and obese boys consumed fruit significantly less frequently (46.0%) compared to their normal-weight or malnourished counterparts (65.7%), with a *p*-value of 0.0156. Overall, sweets emerged as the primary snack choice among children [27]. Dunford *et al*. confirm that sweets and desserts persist as prevalent snack choices among children [28]. Within the cohort of children whose parents adhere to a Mediterranean diet, the largest proportion (53.85%) consumed approximately 1 litre of fluids daily, while 24.18% consumed less than 0.5 litres. In contrast, in the population of children whose parents did not follow a specific dietary regimen, 34.37% consumed around 0.5 litres of fluids *per* day. A study by Piórecka *et al*. revealed that two-thirds of participants reported drinking water several times daily, with the most cited frequency being 3 times *per* day [29]. According to Bielaszka *et al*., parents predominantly noted that their children consumed fruit juices (39%). Simultaneously, children reported a diverse range of beverage consumption, including sodas (24%), compotes (24%), fruit juices (24%), and still mineral water (17%) [30]. Notably, flavoured waters have gained considerable popularity in Poland. These beverages typically comprise mineral water supplemented with sucrose or glucose-fructose syrup, flavourings, preservatives, and antioxidants [31]. Our research establishes a significant correlation between adherence to specific dietary patterns and improvements in children's body composition and health. Children of mothers following a Mediterranean diet, characterised by an abundance of unprocessed plant foods, regularly consumed fruit, maintained adequate fluid intake, and exhibited a lower prevalence of overweight status. Conversely, children of parents who did not adhere to specific dietary guidelines demonstrated a greater propensity for sugary snack consumption and a heightened risk of overweight. Furthermore, insufficient fluid intake and the frequent consumption of sweets may act as critical factors contributing to abnormal weight status among children. Additionally, the absence of structured meal patterns, particularly among children whose parents do not follow a defined dietary model, exacerbates the risk of overweight and obesity. Our study underscores the importance of meal regularity and adherence to a healthful dietary model, such as the Mediterranean diet, as vital components in the prevention of excess body weight. In summary, our findings lend support to the hypothesis that children who engage in balanced dietary practices exhibit superior health indicators compared to those who do not adhere to specific dietary guidelines. Nutrition education, the promotion of healthy dietary habits, and the limitation of processed snack consumption should be integral elements of strategies aimed at mitigating childhood obesity. While the dietary patterns were self-reported by the mothers, the FFQ/CEBQ provides a robust framework for identifying adherence to specific dietary models. However, the potential for reporting bias or misclassification cannot be excluded. Future research should emphasise the exploration of long-term dietary effects and the monitoring of the impact of various dietary patterns on children's metabolic health over time.

CONCLUSIONS

The results of the study lend support to the hypothesis that children whose mothers adhere to balanced diets – such as Mediterranean, keto, vegan, or vegetarian – demonstrate superior health indicators compared to those whose mothers do not follow a specific dietary framework. Children from families that implement these diets are more likely to choose healthier snacks, maintain proper hydration, and have consistent meal times. Conversely, children whose mothers do not follow a defined diet are more prone to being overweight and tend to opt for unhealthy snacks, particularly sweets. These findings emphasise the significance of structured dietary models in fostering healthy habits and preventing obesity among children. Public health strategies should prioritise meal regularity, sufficient fluid intake, and the reduction of processed snacks. Future research should explore the long-term impacts of various dietary patterns on children's metabolic health and aim to develop effective nutrition education programs both in schools and at home.

DISCLOSURES

1. Institutional review board statement: Not applicable.
2. Assistance with the article: None.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

REFERENCES

1. Gungor N. Overweight and obesity in children and adolescents. J Clin Res Pediatr Endocrinol 2014; 6: 129-143.
2. Skinner A, Skelton J. Prevalence and trends in obesity and severe obesity among children in the United States, 1999–2012. JAMA Pediatr 2014; 168: 561-566.
3. Lo J. Prevalence of obesity and extreme obesity in children aged 3–5 years. Pediatric Obesity 2014; 9: 167-175.
4. Horesh A, Tsur AM, Bardugo A, Twig G. Adolescent and childhood obesity and excess morbidity and mortality in young adulthood-a systematic review. Curr Obes Rep 2021; 10: 301-310.
5. Jebeile H, Cardel M, Kyle T. Addressing psychosocial health in the treatment and care of adolescents with obesity. Obesity 2021; 29: 1413-1422.
6. Saltaouras G, Kyrkili A, Bathrellou E, et al. Associations between meal patterns and risk of overweight/obesity in children and adolescents in western countries: a systematic review of longitudinal studies and randomised controlled trials. Children 2024; 11: 1100.
7. Jimeno-Martínez A, Maneschy I, Rupérez A, Moreno L. Factores determinantes del comportamiento alimentario y su impacto sobre la ingesta y la obesidad en ninos. JBF 2024; 1: 60-71.

8. Simmonds M, Llewellyn A, Owen C, Woolacott N. Predicting adult obesity from childhood obesity: a systematic review and meta-analysis. Obes Rev 2016; 17: 95-107.
9. Ródenas-Munar M, García S, Cepeda V, Martín-Calvo N, Tur JA, Bouzas C. Preschool children's dietary patterns are associated with food shopping establishments: the SENDO project. Foods 2024; 13: 2930.
10. Chatelan A, Lebacq T, Rouche M, et al. Long-term trends in the consumption of sugary and diet soft drinks among adolescents: a cross-national survey in 21 European countries. Eur J Nutr 2022; 61: 2799-2813.
11. Liu X, Wu Y, Bennett S, Zou J, Xu J, Zhang L. The effects of different dietary patterns on bone health. Nutrients 2024; 16: 2289.
12. Bengin E, Kırtepe A, Çınar V, et al. Leptin, ghrelin, irisin, asprosin and subfatin changes in obese women: effect of exercise and different nutrition types. Medicina 2024; 60: 1118.
13. Dyńka D, Rodzeń Ł, Rodzeń M, et al. Beneficial effects of the ketogenic diet on nonalcoholic fatty liver disease (NAFLD/MAFLD). J Clin Med 2024; 13: 4857.
14. Marcos-Pasero H, Aguilar-Aguilar E, Colmenarejo G, De Molina AR, Reglero G, Loria-Kohen V. Dietary and physical activity habits as conditioning factors of nutritional status among children of GENYAL study. Int J Env Research and Public Health 2023; 20: 866.
15. D'Innocenzo S, Biagi C, Lanari M. Obesity and the mediterranean diet: a review of evidence of the role and sustainability of the mediterranean diet. Nutrients 2019; 11: 1306.
16. Papadaki A, Nolen-Doerr E, Mantzoros CS. The effect of the mediterranean diet on metabolic health: a systematic review and meta-analysis of controlled trials in adults. Nutrients 2020; 12: 3342.
17. Martínez-González M, Gea A, Ruiz-Canela M. The mediterranean diet and cardiovascular health. Circ Res 2019; 124: 779-798.
18. Salas-Salvadó J, Becerra-Tomás N, García-Gavilán JF, Bulló M, Barrubés L. Mediterranean diet and cardiovascular disease prevention: what do we know? Prog Cardiovasc Dis 2018; 61: 62-67.
19. Mahfouz A, Alsaleem S, Alsaleem M, Ghazy R. Prevalence of obesity and associated dietary habits among medical students at King Khalid University, Southwestern Saudi Arabia. Medicina 2024; 60: 347.
20. Xu Z, Zhao Y, Sun J, Luo L, Ling Y. Association between dietary knowledge and overweight and obesity in Chinese children and adolescents: evidence from the China health and nutrition survey in 2004 –2015. PLoS One 2022; 17: 1313.
21. Pereira-da-Silva L, Rego C, Pietrobelli A. The diet of preschool children in the mediterranean countries of the European Union: a systematic review. Int J Env Res Public Health 2016; 13: 572.
22. FAO. Mediterranean food consumption patterns – diet, environment, society, economy and health. FAO, Italy, Rome 2015.
23. Grosso G, Galvano F. Mediterranean diet adherence in children and adolescents in southern European countries. NFS J 2016; 3: 13-19.
24. Do Amaral E, Melo G, Silva P, Nakabayashi J, Bandeira M, Toral N, Monteiro R. Family meal frequency and its association with food consumption and nutritional status in adolescents: a systematic review. PLoS One 2020; 15: e0239274.
25. Mattson MP, Allison DB, Fontana L, et al. Częstotliwość i czas posiłków w zdrowiu i chorobie. Proc USA 2014; 111: 16647-16653.
26. Paoli A, Tinsley G, Bianco A, Moro T. The influence of meal frequency and timing on health in humans: the role of fasting. Nutrients 2019; 11: 719.
27. Żwirska J, Błaszczyk-Bębenek E, Jagielski P. Frequency of consumption of fast-food products and good food and the nutritional state of junior school students in the Myślenice Powiat in the years 2016–2017. Proceedings 2023; 91: 433.
28. Dunford E, Popkin B. 37 year snacking trends for US children 1977–2014. Pediatric Obesity 2018; 13: 247-255.
29. Piórecka B, Kozioł-Kozakowska A, Jagielski P, Schlegel-Zawadzka M. Częstotliwość oraz wybory dotyczące spożycia płynów w grupie dzieci i młodzieży szkolnej z Niepołomic i Krakowa. Bromat Chem Toksykol 2019; 2: 168-174.
30. Bielaszka A, Grochowska-Niedworok E, Kiciak A, et al. Nutrition preferences of children ages 7–10. Ann Acad Med Siles 2014; 4: 187-191.
31. Jessa J, Hozyasz K. Ocena spożycia wód smakowych przez dzieci kierowane do oddziału pediatrycznego. Pediatr Pol 2017; 4: 401-405.