

Research Article

Adherence to the Mediterranean Eating Pattern in the children and adolescents at a Family Health Unit in the Center of Portugal

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Abstract

Introduction

The Mediterranean Eating Pattern (MEP) is a dietary pattern with a recognized high nutritional value, and it's associated with a better quality of life. Despite being a country with Mediterranean characteristics, Portugal has been gradually shifting the dietary pattern and showing a rise in the prevalence of obesity. The objectives of this study were: assessing the adherence to MEP in the children and adolescents followed in the Infant and Juvenile Health Surveillance (IJHS) Consultation and its association with their nutritional status.

Materials and methods

Cross-sectional observational study. A convenience sample of children aged 2 to 18 years old that were followed in IJHS consultation at a model A Family Health Unit in the center of Portugal was used. A Portuguese translation of the Mediterranean Diet Quality Index in Children and Adolescents (KIDMED index) filled by the children, or the caregivers was used to evaluate MEP adherence and a calculation of the Body Mass Index (BMI) to assess nutritional status. Posterior statistical analysis was performed with SPSS®.

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Results

Total of 77 participants with a median age of 10 years and a predominance of boys (55.8%). A BMI considered malnutrition was obtained in 3.9% of the participants, healthy in 70.1%, overweight in 10.4% and obesity in 15.6%. The adherence to MEP presented a median score of 10/12 points and a high score in 79.2% of the participants, most of them with a healthy BMI. A statistically significant relationship between a high adherence to MEP and an early age (rSpearman=-0.424, p=<0.001) and a lower BMI level (rSpearman=-0.385, p<0.001) was observed.

Discussion/ Conclusion

The population that participated in the study presented a high adherence to MEP, with a predominance of healthy BMI. This suggests that the adoption of this pattern is associated with an adequate nutritional status and a better population quality of life.

Keywords: Mediterranean Diet; Obesity; Pediatrics; Primary Health Care

Introduction

The Mediterranean Eating Pattern (MEP) is considered one of the world's healthiest dietary patterns and has a recognized high nutritional value [1–9]. MEP is characterized by a high consumption of vegetable origin food such as fresh fruit and vegetables, pulses, cereals, oilseeds, and olive oil (used as the main source of fat) and a moderate consumption of poultry, fish, dairy products and eggs. A reduced intake of red meat and processed food, ingestion of wine during the main meals (except for children and pregnant woman) and the consumption of water throughout the day are also characteristic of this dietary pattern [1–4,6–8,10–16]. Fresh, traditional, local and seasonal products are also preferred in this regimen [2,4,7,10,15]. Several studies have associated MEP with a better quality of life, reduction of chronic cardiovascular and metabolic diseases and an improvement in average life expectancy [1,2,17,18,4,6–8,10–12,16].

The modernization of today's societies has led to a shift towards a more "Westernized" diet with an increase in the consumption of lower nutritional value food as soft drinks, candies, processed food and refined flours. Sedentarism with a reduction of physical exercise practice as also been rising [2,6,7,15].

Despite being a country with Mediterranean characteristics, Portugal has been gradually shifting to a more modern unhealthy dietary pattern, especially in the Pediatric age [2] with an increase obesity prevalence [1,2,19]. Obesity is a major public health issue worldwide [1,8,9,11,15,16,19]. In Portugal according to the Childhood Obesity Surveillance Initiative 2022, in children aged 6-8 years old the prevalence of overweight was 18.4% and the prevalence of obesity was 13.5% [19]. It is known that overweight and obesity in childhood will lead to overweight and obesity in adolescence and/or adulthood [2,9,15,16,19]. Obesity is related to several diseases such as hypertension, cardiovascular diseases and

diabetes, amongst others [2,5,8,9,11,12,15,19]. Even though obesity is a multifactorial disease [9,16,19], the promotion of an early adoption of positive life habits such as a healthy diet and regular physical activity has shown to improve the health of the pediatric and adult population [2,5,7,8,12,16,19].

The objectives of this study were: assessing the adherence to MEP in the children and adolescents followed in the Infant and Juvenile Health Surveillance (IJHS) Consultation and its association with their nutritional status.

Materials and Methods

Cross-sectional observational study conducted from January to July of 2022. A convenience sample of children aged 2-18 years old that were followed in IJHS consultation at a model A Family Health Unit in the center of Portugal was used. All children aged 2 to 18 years old who were followed in this consultation during the study period and did not have any type of vegetarianism or a diagnosed eating disorder, were invited to participate. The questionnaire was adapted from Quaresma et al [2]. It contained a written informed consent and questions about age, sex, type of consultation (first or subsequent), the Portuguese translation of the Mediterranean Diet Quality Index in Children and Adolescents (KIDMED index) [2], height and weight. The questionnaire was previously reviewed and accepted by the Family Health Unit Coordinator. It was hand-out by the doctors at the end of the IJHS consultation and it was filled by the children or the caregivers who accepted to participate. All the questionnaires' data were anonymous. The height and weight were measured by the nurses as a part of the IJHS consultation.

The adhesion to MEP was evaluated through the KIDMED index composed by 16 dichotomous questions. The answers were assigned a value of +1 or -1 according to a positive or negative relation with the MEP, respectively. The overall score can range from -4 to 12 and it is classified as poor adherence (score < 3), average adherence (score 3-7) and good/ high adherence (score ≥ 8) [2,10].

The children's nutritional status was assessed by a calculation of the Body Mass Index (BMI) as the ratio between weight (kilograms) and squared height (m²) and further classified according to the World Health Organization criteria in underweight, normal weight, overweight and obesity [20].

Posterior statistical analysis of the data was performed with IBM SPSS® Statistics for Macintosh version 26.0. The relative and absolute frequencies, minimum and maximum values were calculated. Continuous data was expressed as mean and standard deviation (SD). A 95% confidence interval was applied. The Kolmogorov-Smirnov test was used to test the normality of the variable's distribution. As none of the quantitative variable followed a normal distribution, the Spearman coefficient was applied to evaluate the association between quantitative variables. The Qui-square test and exact Fisher test were applied to evaluate the association between qualitative variables. The level of statistical significance for this analysis was set at $p < 0.05$.

Results

Characteristics of the population

The study was carried out in a total of 77 participants with a median age of 10 years old (IQR 5-15) and a predominance of boys (55.8%). A BMI considered overweight was obtained in 10.4% of

the participants and obesity in 15.6%. Most of the participants filled the questionnaire on a subsequent consult (81.8%) (Table 1).

		n (%)
Age (years)	[2-5[16 (20.8%)
	[5-10[22 (28.6%)
	[10-15[19 (24.7%)
	[15-18[20 (25.9%)
	Median (IQR)	10.0 (5.0-15.0)
Sex	Male	43 (55.8%)
	Female	34 (44.2%)
Type of consultation	First consultation	14 (18.2%)
	Subsequent consultation	63 (81.8%)
Nutritional status	Underweight	3 (3.9%)
	Normal weight	54 (70.1%)
	Overweight	8 (10.4%)
	Obesity	12 (15.6%)
Mediterranean Eating Pattern adherence	Low (≤ 3)	1 (1.3%)
	Average (4-7)	15 (19.5%)
	High (≥ 8)	61 (79.2%)

Table 1: Population characterization (n=77).

Adherence of the Mediterranean Eating Pattern

Through the analysis of the KIDMED final score we observed a median score of 10/ 12 points (IQR 8-10) and a high adherence to the MEP (score ≥ 8) in most of the children (n= 61, 79.2%) (Table 1). The only participant in the sample that scored a low adherence to MEP was a 17-year-old boy.

The item with the highest score on KIDMED was item 11 related to the consumption of olive oil at home, with all the participants answering positively. The item with the lower score was item 10, related to the consumption of nuts regularly (at least 2-3 times per week) with only 22.1% participants answering positively (Table 2).

Items	Yes	No
	n (%)	n (%)
1. Consumption of a fruit or a fruit juice every day	65 (84.4%)	12 (15.6%)
2. Consumption of a second fruit every day	50 (64.9%)	27 (35.1%)
3. Consumption of raw or cooked vegetables 1 time a day	64 (83.1%)	13 (16.9%)
4. Consumption of raw or cooked vegetables >1 time a day	41 (53.2%)	36 (46.8%)
5. Consumption of fish regularly (at least 2-3 times a week)	61 (79.2%)	16 (20.8%)
6. Eating >1 time per week to a fast-food (hamburger) restaurant	5 (6.5%)	72 (93.5%)
7. Consumption of beans >1 time per week	59 (76.6%)	18 (23.4%)
8. Consumption of pasta or rice almost every day (5 times a week)	71 (92.2%)	6 (7.8%)
9. Consumption of cereals or grains (bread, etc.) for breakfast	69 (89.6%)	8 (10.4%)
10. Consumption of nuts regularly (at least 2-3 times per week)	17 (22.1%)	60 (77.9%)

11. Consumption of olive oil at home	77 (100%)	0 (0%)
12. Skipping breakfast	12 (15.6%)	65 (84.4%)
13. Consumption of a dairy product for breakfast (yoghurts, milk, etc.)	74 (96.1%)	3 (3.9%)
14. Consumption of commercially baked goods or pastries for breakfast	5 (6.5%)	72 (93.5%)
15. Consumption of 2 yoghurts and/or cheese (40 g) daily	62 (80.5%)	15 (19.5%)
16. Consumption of sweets or candy several times every day	7 (9.1%)	70 (91.0%)
Median total score (IQR)	10 (8-10)	
Minimum score	2	
Maximum score	12	

Table 2: KIDMED score items, absolute and relative frequencies.

The prevalence of a high adherence to MEP declines as the age by category increases (Table 3). Analyzing the relation between age and a high adherence to MEP, a statistically significant value was found ($r_{\text{Spearman}} = -0.424$, $p < 0.001$).

Age (years)		[2-5]	[5-10]	[10-15]	[15-18]
Nutritional status	Underweight	1 (6.3%)	2 (9.1%)	0 (0%)	0 (0%)
	Normal weight	12 (75%)	15 (68.2%)	13 (68.4%)	14 (70%)
	Overweight	2 (12.4%)	0 (0%)	2 (10.5%)	4 (20%)
	Obesity	1 (6.3%)	5 (22.7%)	4 (20%)	2 (10%)
	Total	16 (100%)	22 (100%)	19 (100%)	20 (100%)
Mediterranean Eating Pattern adherence	Low (≤ 3)	0 (0%)	0 (0%)	0 (0%)	1 (5%)
	Average (4-7)	0 (0%)	2 (9.1%)	5 (26.3%)	8 (40%)
	High (≥ 8)	16 (100%)	20 (90.9%)	14 (73.7%)	11 (55%)
	Total	16 (100%)	22 (100%)	19 (100%)	20 (100%)

Table 3: Nutritional status and KIDMED score by age groups, absolute and relative frequencies.

Regarding the sex of the participants, a high adherence was more prevalent in the female sex 82.4% versus the male sex 76.7% but not in a statistically significant manner (Qui-square test, $p = 0.547$).

Subsequent consultations presented with a more prevalent high adherence (82.5%) than first consultations (64.3%) but also not in a statistically significant manner (exact Fisher test, $p = 0.128$).

Analyzing, the relation between the BMI (as a number) and the high adherence to MEP, a statistically significant relationship between a lower value of BMI and the adherence to MEP was observed ($r_{\text{Spearman}} = -0.385$, $p < 0.001$).

The relation between each KIDMED question and a healthy BMI was analyzed, and we found a positive correlation between a healthy BMI and questions 1 (exact Fisher test $p < 0.001$), 2 (exact Fisher test $p = 0.005$), 3 (exact Fisher test $p = 0.036$), 4 (exact Fisher test $p = 0.024$), 5 (exact Fisher test $p = 0.005$) and 15 (exact Fisher test $p = 0.002$).

Discussion

The modernization of today's societies has driven to the alteration of the dietary habits with a progressive deviation from the more traditional eating pattern like MEP [2,7,11,18]. This may be partially justified by globalization present in the modern societies, the alteration of behaviors and markets, different family organization and the new trends [2,7].

The application of the KIDMED score to a group of children aged 2 to 18 years old followed in a IJHS Consultation in a Health Family Unit in the center of Portugal showed a high adherence to MEP in 79.2% of the children in our sample.

This results were parallel to Quaresma et al. (81.0%), with a similar methodology in the North of Portugal [2]. The prevalence of a high adherence to MEP declines as age increases, ranging from 100% in children aged [2-5] years old to 55% in children [15-18] years old. Previous studies in Portugal, by Vaquinhos et al in children aged 10-11 years old in the same city as our study [17] and by Marques et al [1] in children 9-11 years old in a Northern city presented a higher prevalence of high adherence to MEP in their sample. Contrary to that, Cardoso et al studied children 10-19 years old in the North of Portugal [3] and Mateus et al studied children aged 11 to 16 in public schools in the South of the country [4] and found worse prevalence of high adherence to MEP that in our sample. We hypothesized these differences are due to that fact that the studies were performed with different context characteristics. International studies in Italy [6,7,15], Iceland [5], Estonia [16], Spain [18], Turkey [9,11] and Greece [8] have also showed lower prevalence of good adherence to MEP. Regarding the interaction between age and a high adherence to MEP, high adherence to MEP declines as children get older in a statistically significant manner ($r_{\text{Spearman}} = -0.424$, $p < 0.001$) as in the study by Quaresma et al [2]. This result could be explained by the growing autonomy in the eating choices as children get older. This greater autonomy is sometimes also associated with dietary habits worsening. We can say that the implementation of healthy life styles is important in childhood and also in adolescence in order to guarantee healthy eating habits and regular physical exercise practice throughout pediatric age [2,15]. Italian studies also did not find a relation between higher adherence and age [6,7].

A high adherence to MEP has been extensively associated with a better nutritional state, a reduction of the prevalence of obesity and cardiovascular disease risk factors [2,5,11,16]. The population in our study presented a 10.39% prevalence of overweight and 15.58% of obesity, identical to Quaresma et al. [2]. The prevalence of overweight was lower in Cardoso et al [3] and higher in the COSI 2022 [19] and Marques et al [1]. A Turkish study had a similar prevalence of overweight [11] and several Italian [6,7,15] and Spanish [13] studies had higher prevalence of overweight but lower prevalence of obesity. A Greek study also had lower obesity rates [8].

Regarding other previous studies in Portugal, the role of the COVID-19 pandemic could also be a justification for the worsening of the children nutritional status. COSI 2022 reported an increase in the children's intake of sweet and savory snacks during pandemic, but a decrease consumption of soft drinks, take out and pre-cooked meals [19]. Other previous studies, associated confinement measures and disruption of the in person school activities with the rising consumption of high caloric density foods [19].

Analyzing, the relation between the BMI (as a number) and the high adhesion to MEP, a correlation between a lower value of BMI and the adhesion to MEP was observed ($r_{\text{Spearman}} = -0.385$, $p < 0.001$). Opposing to our findings, there was no correlation between the children's nutritional status and a high adherence to MEP in Quaresma et al [2] and Cardoso et al [3]. Italian [15] and a Greek [8] studies associated lower adhesion to MEP with obesity. Turkish [9] and Spanish [13] studies associated poor adherence to MEP with a higher BMI. Other studies in Estonia [16], in Spain [18], Turkey [11] and Italy [6,7] found no association between BMI and MEP adherence.

The sex of the participants was not statistically related to high adherence to MEP, similarly to Quaresma et al [2], Cardoso et al [3] and other international studies [5-8,15,16,18]. Contrary to this findings, a Turkish study showed higher MEP adherence in girls [9].

Regarding the type of consultation, there was no statistical correlation between first or subsequent consultations and a high adherence to MEP. Quaresma et al had similar findings [2]. This could mean that after a first consultation with a health care provider, children begin to change their habits and behavior progressively.

The item with the highest score was item 11 related to the consumption of olive oil at home with all the participants answering positively, equally to the results of previous Portuguese [2-4,17] and Italian [7] studies.

Analyzing some specific positive eating habits, 84.4% of the children in our sample reported daily consumption of fruit or fruit juice, 83.1% daily consumption of raw or cooked vegetables, 92.2% consumption of pasta or rice ≥ 5 times per week, 89.6% consumption cereals or grains for breakfast, 96.1% dairy products for breakfast and 80.5% 2 yoghurts and/ or cheese daily, similarly to Quaresma et al. results [2]. Comparing to other Portuguese and international studies, our sample showed a similar or better prevalence of this positive eating habits [1,3,4,6,7,11,17-19].

Considering some negative eating habits, in our study 6.5% ate at a fast-food restaurant at least once a week, 15.6% skipped breakfast, 6.5% consumed commercially baked goods or pastries for breakfast and 9.1% consumed sweets or candies several times every day. Paralleling to Quaresma et al., a comparable part of the children ate at a fast-food restaurant at least once a week, less children skipped breakfast and consumed commercially baked goods or pastries for breakfast, but more of them consumed sweets or candies several times every day [2]. Other Portuguese studies presented a similar or higher prevalence in the majority of this negative eating habits [1,3,4,17]. In international studies there was an overall higher prevalence of negative eating habits [6,7,11,18].

We consider that this study presents strengths associated with the fact that our sample included Portuguese children evaluated in a different setting, the Infant and Juvenile Health Surveillance Consult. The use of the KIDMED test, which is a scientifically validated tool adopted in several previous international studies, also allows for a comparison with other countries. This study was also conducted in a post-COVID-19 pandemic setting, showing more recent nutritional status of the Portuguese children.

The authors also want to state that even though the questionnaires were anonymous, all the children who were identified as overweight or obese during the IJHS Consultation were adequately treated.

However, we point that the interpretation of this study results should consider some limitations. The limitations we consider are the lower sample size, being a unicentric and retrospective study and the use of a self-reported eating habits questionnaire. In the future it would also be interesting to consider the participants physical activity, urban/ rural area dichotomy, family socioeconomic status and the length of breastfeeding.

Conclusion

This study provides important information regarding a specific population in the center of Portugal. The population that participated in the study presented a high adhesion to MEP and a predominance of healthy BMI, suggesting that the adoption of this pattern is associated to an adequate nutritional status and a better quality of life.

We stress the importance of assuring the healthy eating habits in every IJHS consultation. Children and adolescents represent a priority age group for the correction of dietary habits as it is harder to promote lifestyle changes in older ages. An action plan with educational purposes should be elaborated to promote adherence to MEP. In doing so, we would be aiming to decrease overweight and obesity in pediatric age and to prevent the onset of non-communicable diseases in pediatric and adult populations.

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Author's contribution

All authors stated contributed to this article according to the International Committee of Medical Journal Editors guidelines.

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Availability of data and materials

The data set used during the study is available to the authors.

Ethics approval and informed consent

Ethics approval from the Health Family Unit Coordinator was obtained for the development of this study. The researcher informed all the participants and their parents/ guardian about the course of study, being free to participate or withdraw from the study. Written consent form was obtained from all participants and/ or parents/ guardians.

Consent for publication

The authors agree to submit this article to the journal and, if accepted, to its publication in this journal. The authors warrant that this article is original, does not contravene on any copyright and any other proprietary right of any third party, is not under consideration by another journal, and has not been previously published.

Competing interest declaration

The authors express that they have no competing interests.

References

1. Marques GFS, Pinto SMO, Reis ACRS, Martins TDB, Conceição AP, *et al.* (2021) Adherence To the Mediterranean Diet in Elementary School Children (1St Cycle). *Revista Paulista de Pediatria : Orgao Oficial Da Sociedade de Pediatria de Sao Paulo* 39: e2019259.
2. Quaresma F, Tomada I, Silva R, Carreiro E, Rêgo C (2020) Adesão ao padrão alimentar mediterrânico em crianças e adolescentes em contexto de consulta de vigilância de saúde. *Acta Portuguesa de Nutrição* 22: 6-9.
3. Cardoso C, Pereira D, Carneiro F, Almeida M, Fernandes A, *et al.* (2017) Adesão à dieta mediterrânica em adolescentes do norte de Portugal. IV Encontro de Jovens Investigadores Do Instituto Politécnico de Bragança.
4. Mateus MP (2012) Adesão ao Padrão Alimentar Mediterrânico em adolescentes no Algarve .
5. Galan-Lopez P, Ries F, Gísladottir T, Domínguez R, Sánchez-Oliver AJ (2018) Healthy lifestyle: Relationship between mediterranean diet, body composition and physical fitness in 13 to 16-years old icelandic students. *International Journal of Environmental Research and Public Health* 15.
6. Archero F, Ricotti R, Solito A, Carrera D, Civello F, *et al.* (2018) Adherence to the mediterranean diet among school children and adolescents living in northern Italy and unhealthy food behaviors associated to overweight. *Nutrients* 10: 1-13.
7. Bonaccorsi G, Furlan F, Scocuzza M, Lorini C (2020) Adherence to mediterranean diet among students from primary and middle school in the Province of Taranto, 2016-2018. *International Journal of Environmental Research and Public Health* 17: 1-10.
8. George ES, Gavrilis S, Itsiopoulos C, Manios Y, Moschonis G (2021) Poor adherence to the Mediterranean diet is associated with increased likelihood of metabolic syndrome components in children: The Healthy Growth Study. *Public Health Nutrition* 24: 2823-2833.
9. Korkmaz GÖ, Kabaran S (2020) Protective effects of a Mediterranean-like dietary pattern on obesity, abdominal obesity and large neck circumference in a cohort of Turkish children aged 6-9 years. *Asia Pacific Journal of Clinical Nutrition* 29: 363-371.
10. Bach A, Serra-Majem L, Carrasco JL, Roman B, Ngo J, *et al.* (2006) The use of indexes evaluating the adherence to the Mediterranean diet in epidemiological studies: a review. *Public Health Nutrition* 9: 132-146.
11. Yilmaz FÇ, Çağiran D, Özçelik AÖ (2019) Adolescent Obesity and Its Association with Diet Quality and Cardiovascular Risk Factors. *Ecology of Food and Nutrition* 58: 207-218.
12. Muros JJ, Salvador F, Zurita F, Gámez VM, Knox E (2017) Associação entre comportamentos de estilo de vida saudável e a qualidade de vida relacionada à saúde entre adolescentes. *Jornal de Pediatria* 93: 406-412.
13. Marcos-Pasero H, Aguilar-Aguilar E, Colmenarejo G, Ramírez de Molina A, Reglero G, *et al.* (2023) Dietary and Physical Activity Habits as Conditioning Factors of Nutritional Status among Children of GENYAL Study. *International Journal of Environmental Research and Public Health* 20: 1-12.
14. Programa Nacional de Promoção da Alimentação Saudável (2022) A Roda ajuda a escolher e a combinar os Roda dos alimentos : o q ue é ? As porções Grupo de alimentos Uma alimentação completa , e q uilibrada e A nova Roda dos Alimentos Mediterrânica é agora apresentada numa versão.
15. Grosso G, Marventano S, Buscemi S, Scuderi A, Matalone M, *et al.* (2013) Factors associated with adherence to the Mediterranean diet among adolescents living in Sicily, southern Italy. *Nutrients* 5: 4908-4923.
16. Galan-Lopez P, Domínguez R, Pihu M, Gísladóttir T, Sánchez-Oliver AJ, *et al.* (2019) Evaluation of physical fitness, body composition, and adherence to mediterranean diet in adolescents from Estonia: The adoleshealth study. *International Journal of Environmental Research and Public Health* 16: 1-13.
17. Vaquinhas M, Carlos F, Martins I, Oliveira R, Cancela V, *et al.* (2015) Padrão alimentar mediterrânico numa população escolar. *Escola Superior de Enfermagem de Coimbra*.
18. Arriscado D, Muros JJ, Zabala M, Dalmau JM (2014) Factors associated with low adherence to a Mediterranean diet in healthy children in northern Spain. *Appetite* 80: 28-34.
19. Rito A, Mendes S, Figueira I, Faria MC, Carvalho R, *et al.* (2023) Childhood Obesity Surveillance Initiative COSI Portugal 2022. In Instituto Nacional de Saúde Doutor Ricardo Jorge IP.
20. WHO child growth standards: length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: methods and development. In World Health Organisation (2006).



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