

SHORT COMMUNICATION

Are children from Crete abandoning a Mediterranean diet?

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ABSTRACT

Introduction: Mediterranean countries such as Greece have experienced rapid social change in the last decade. These community changes affect nutritional habits and there is a tendency for the traditional healthy Mediterranean diet to be abandoned.

Methods: The parents of children from one rural Greek village on Crete (Neapolis), and one rural village in Sweden (Kisa) were invited to their primary health care centers for an interview and to fill in a validated nutrition questionnaire, KidMed.

Results: There were no differences ($p = 0.48$) in total KidMed score between the Cretan and Swedish children, adjusted for gender and age. However, there were some significant differences in scores on certain KidMed questions. Parents of the Cretan children reported significantly higher daily use of olive oil at home and more regular nut consumption, but also more commercially baked goods or pastries for breakfast. The parents of Swedish children reported significantly higher use of cereals, grains or bread for breakfast. The mean BMIs were similar for the Cretan (Neapolis mean 16.8, 95% CI 13.5-23.0) and for the Swedish children (Kisa mean 17.4, 95% CI 13.7-25.5)

Conclusion: The results suggest the possibility of changing nutritional habits, measurable among young children in rural areas. The study raises the question of whether Cretan children may have abandoned some aspects of the traditional Mediterranean diet. It



may also be that Swedish children have changed their diet in favor of a more Mediterranean food choice. The major limitation of the study is the small sample size, and further, larger studies are warranted.

Key words: children, comparative study, Crete, Mediterranean diet, Sweden.

Introduction

It has long been observed that people living in the Mediterranean countries have lower rates of diseases such as cancer and coronary artery disease compared with populations in other European countries^{1,2,3}. Furthermore, there are studies indicating that the Mediterranean diet (MD) is associated with a reduction in total mortality^{4,5}.

During the last decade, living conditions in European countries have changed considerably. Greece has experienced such changes at a rapid rate over the last 20 years and has moved towards Western ideals. This has affected nutrition and eating habits and studies indicate that people in Mediterranean areas are abandoning the healthy MD^{6,7}. Such lifestyle changes are a major factor in the rapid rise in overweight among many populations; school children in Greece, the US, Ireland and Portugal are among the most overweight internationally⁸. The increase in weight is most significant among children and adolescents who are exposed to social risk; there is also a connection between overweight parents and overweight children⁹. According to a WHO statement, one-fifth of all children in Europe are overweight and, of these, one-third is obese. These children are at increased risk of diseases such as type-2 diabetes, hypertension, psychosocial problems and reduced life expectancy¹⁰.

Consequently, there is scientific interest in the MD and its presumably preventive and salutogenetic effects on health, and also in how social changes in these societies affect public health. The MD is characterized by low saturated fat content and a high level of monounsaturated fat mainly in the form of olive oil; moderate intake of alcohol (consumed

as wine with meals); high consumption of vegetables, fruits, legumes and cereals; moderate consumption of fish, milk and dairy products, mostly in the form of cheese; and low consumption of meat products¹¹.

Most of the studies concerning MD have focused on adults, but a previous Spanish study reported a nutritional index for children, the so called KIDMED-index¹². This KidMed-index was devised in order to evaluate children's dietary habits and test adherence to MD among children and adolescents¹².

The aim of the present study was to evaluate adherence to the MD among children between one and less than 13 years of age in a village on rural Crete, Greece, and to compare their nutritional habits with children from a village in rural Sweden. Our hypothesis was that Cretan children would report a more Mediterranean food choice than their Swedish counterparts.

Methods

Children from two primary health care centers (PHC), one in the village of Neapolis with 6765 inhabitants on Crete, Greece, and one in the village Kisa with 9981 inhabitants in Sweden were compared. These PHC are both located in semi-rural areas with no other PHC located nearby. All children between one year and less than 13 years of age who had visited these two PHC between June 1999 and September 2004 for gastrointestinal problems were addressed, and 24/24 families on Crete and 23/24 families in Sweden agreed to participate. The children were identified retrospectively by scrutinizing medical records noted by the local physician at the PHC. In the village Neapolis on Crete



$n = 24$ children (13 boys and 11 girls) and in the village Kisa in Sweden $n = 23$ children (13 boys and 10 girls) met the inclusion criteria. There was no statistically significant difference ($p = 0.117$) in mean age between the participating groups of children, it being 4.6 years (± 3.7 years) for the Neapolis children and 4.6 years (± 2.6 years) for the Kisa children.

The parents of the children were invited to the PHC for an interview and to fill in a validated 16-item questionnaire, KidMed¹². The total score ranged from 0 to 12 points, and ≤ 3 points were considered poor, 4–7 medium and ≥ 8 high compliance with the MD. The KidMed questionnaire was bilingually back-translated into the Greek and Swedish language. The child's present length and weight were also included in the data collection so as to be able to calculate their body mass index (BMI)². All p -values were calculated by the χ^2 test and adjusted in multivariate analysis for age and gender differences between the two sites.

The Ethics Committee at the Faculty of Health Sciences, Linköping University, Sweden approved this study (DNS 03-640, 2003). An approval was also given from the local ethics committee of the PHC in Neapolis, Greece.

Results

The results of the KidMed questions are presented (Table 1). The p -values were adjusted for age and gender differences between the sites. There was no difference ($p = 0.48$) in the total KidMed score between Cretan (Neapolis mean = 5.71, 95% CI 4.60-6.82) and Swedish children (Kisa mean = 5.91, 95% CI 5.26-6.56). However, there were some significant differences for certain questions in the KidMed score. The Cretan families reported significantly higher daily use of olive oil at home, commercially baked goods or pastries for breakfast and regular nut consumption, while the Swedish families reported significantly higher use of cereals, grains or bread for breakfast. The mean BMIs were similar for the Cretan (Neapolis mean 16.8, 95% CI 13.5-23.0) and Swedish children (Kisa mean 17.4, 95% CI 13.7-25.5).

Discussion

Our results indicate that the use of a diet characterized as Mediterranean for children less than 13 years of age was quite similar between children from a rural village in Sweden and a rural village on Crete, as judged by the KidMed index. However, two typically Mediterranean diet features, daily use of olive oil at home and regular nut consumption, were significantly more common among the Cretan children. We also found that more children eat sweets and pastries for breakfast on a daily basis in Neapolis village compared with Kisa village. In Sweden, many families have embraced the rule of so-called 'Saturday sweets' with sweets only being allowed on Saturdays. According to these results, this does not seem to be the case on Crete. The nutritional habits revealed in this study among children must be seen against a background of ongoing social changes, even apparent in rural areas, in both countries. In Sweden, there is generally a high level of dietary awareness, and parents tend to adopt parts of the MD, for example an increase in fruit consumption and the use of olive oil, which previously was sold only as a laxative in Swedish pharmacies. Further, in Sweden there are common dining restaurants in schools, available free of charge for all children, where food is prepared in accordance with a balanced diet chart. The Cretan children bring packaged lunches to school. Some Cretan children eat traditional foods, while others have more or less abandoned the traditional diet for a Western diet that includes junk food, which contains a large amount of 'empty calories' (eg pastries). Recent studies have been conducted on Crete with the aim of emphasizing the importance of the MD and other health factors by including such information in the education of Greek children^{12,13}. The results of these intervention studies showed that knowledge of health, nutrient intake and physical activity had increased among participating children, with the potential to reverse negative acquired nutritional habits^{14,15}.



Table 1: Comparison of the KidMed (Mediterranean Diet Quality Index in children and adolescents¹²) questions between children from Crete (village of Neapolis $n = 24$) and Sweden (village of Kisa $n = 23$), and the points assigned to each question (data adjusted for age and gender).

KidMed questions and answers 16 items (score)	Neapolis Crete n (%)	Kisa Sweden n (%)	P-value
Takes a fruit or juice every day (+1)	20 (83.3)	21 (91.3)	0.18
Has a second fruit every day (+1)	12 (50)	11 (47.8)	0.28
Have fresh or cooked vegetables regularly once a day (+1)	9 (37.5)	14 (60.9)	0.10
Have fresh or cooked vegetables more than once a day (+1)	5 (20.8)	4 (17.4)	0.70
Consumes fish regularly (at least 2–3 times per week) (+1)	9 (37.5)	10 (43.5)	0.22
Goes more than once a week to a fast-food (hamburger) restaurant (-1)	2 (8.3)	0	0.11
Likes pulses, like beans, peas and lenses and eats them more than once a week (+1)	14 (58.3)	8 (34.8)	0.08
Consumes pasta or rice almost every day (5 or more times per week) (+1)	17 (70.87)	10 (43.5)	0.23
Have cereals or grains (bread etc) for breakfast (+1)	17 (70.8)	23 (100)	0.01
Consumes nuts regularly (at least 2–3 times per week) (+1)	4 (16.7)	0	0.04
Uses olive oil at home (+1)	23 (95.8)	13 (56.5)	<0.001
Skips breakfast (-1)	9 (37.5)	5 (21.7)	0.32
Has a dairy product for breakfast (yoghurt, milk etc) (+1)	19 (79.2)	19 (82.6)	0.94
Has commercially baked goods or pastries for breakfast (-1)	11 (45.8)	1 (4.3)	0.002
Takes two yoghurts and/or some cheese (40 g) daily (+1)	13 (54.2)	11 (47.8)	0.64
Takes sweets and candy several times every day (-1)	5 (20.8)	2 (8.7)	0.40

Our study raises the question of whether Cretan children have abandoned some aspects of the traditional MD, even in rural areas. The results indicate a possibility of changing nutritional habits that is measurable among small children in rural areas, because the dietary differences of Swedish children are small in comparison. However, the results must be interpreted with caution due to the small number of participating children, and the fact that there were no base-line measurements for the children. Another limitation is that the parents rather than the children filled in the questionnaire. The study does warrant further studies with larger samples, preferably with children at various ages.

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References

1. La Vecchia C. Mediterranean diet and cancer. *Public Health and Nutrition* 2004; **7**: 965-968.
2. Keys A. Coronary heart disease in seven countries. IX. The Greek islands of Crete and Corfu. *Circulation* 1970; **41(4 Suppl)**: 188-100.
3. Kannel WB, Dawber TR, Kagan A, Revotskie N, Stokes 3rd J. Factors of risk in the development of coronary heart disease-six year follow-up experience. The Framingham Study. *Annals of Internal Medicine* 1961; **55**: 33-37.



4. Trichopoulou A, Costacou T, Bamia C, Trichopoulos D. Adherence to a Mediterranean diet and survival in a Greek population. *New England Journal of Medicine* 2003; **348**: 2599-2608.
 5. Knuops KT, de Groot LC, Kromhout D, Perrin AE, Moreiras-Varela O, Menotti A et al. Mediterranean diet, lifestyle factors, and 10-year mortality in elderly European men and women: the HALE project. *JAMA* 2004; **292**(12): 1433-1439.
 6. Yannakoulia M, Karayiannis D, Terzidou M, Kokkevi A, Sidossis LS. Nutrition-related habits of Greek adolescents. *European Journal of Clinical Nutrition* 2004; **58**: 580-586.
 1. Kafatos A, Diacatou A, Voukiklaris G, Nikolakakis N, Vlachonikolis J, Kounali D et al. Heart disease risk-factor status and dietary changes in The Cretan population over the past 30 years: the Seven Countries Study. *American Journal of Clinical Nutrition* 1997; **65**: 1882-1886.
 8. Laron Z. Increasing incidence of childhood obesity. *Pediatric Endocrinology Review* 2006; **1**(Suppl 3): 443-447.
 9. WHO. Young people's health in context. Health behavior in school-aged children (HBSC-study). International report from the 2001/2002 survey. Copenhagen: WHO Europe, 2004.
 10. WHO. The challenge of obesity in the WHO European Region and the strategies for response. Copenhagen: WHO Europe, 2007.
 11. Trichopoulou A, Lagiou P. Healthy traditional Mediterranean diet; an expression of culture, history and lifestyle. *Nutrition Review* 1997; **55**: 383-389.
 12. Serra-Majem L, Ribas L, Ngo J, Ortega R, Alicia García A, Pérez-Rodrigo C et al. Food, youth and the Mediterranean diet in Spain. Development of KIDMED - Mediterranean Diet Quality Index in children and adolescents. *Public Health and Nutrition* 2004; **7**: 931-935.
 13. Kafatos I, Peponaras A, Linardakis M, Kafatos A. Nutrition education and Mediterranean diet: exploring the teaching process of a school-based nutrition and media education project in Cretan primary schools. *Public Health and Nutrition* 2004; **7**(7): 969-975.
 14. Lionis C, Kafatos A, Vlachonikolis J, Vakaki M, Tzortzi M, Petraki A. The effects of a health education intervention program among Cretan adolescents. *Preventive Medicine* 1991; **20**: 685-699.
 15. Manios Y, Kafatos A. Health and nutrition education in elementary schools: changes in health knowledge, nutrient intakes and physical activity over a six year period. *Public Health and Nutrition* 1999; **2**(3a): 445-448.
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