

Research paper

Eating habits and factors affecting food choice of adolescents living in rural areas

Alexandra Bargiota,¹ Maria Delizona,¹ Andreas Tsitouras,^{2,†} Georgios N. Koukoulis¹¹Department of Endocrinology and Metabolic Diseases, University Hospital of Larissa, Medical School, University of Thessaly, ²Department of Dietetics and Nutritional Science, Harokopio University, Athens, Greece

†Deceased

ABSTRACT

OBJECTIVE: To establish factors that affect food choices among adolescents living in rural areas and to identify their food choices. **DESIGN:** A random sample of adolescents living in a Greek rural area (n=382) aged 12-18 years were individually interviewed. Food consumption was assessed by a semi-quantitative food-frequency questionnaire and adherence to the Mediterranean diet was evaluated using the KIDMED questionnaire. Information was collected regarding self-perceived body size, dieting, dietary knowledge, parental control, meal and snack frequency, eating out of home, eating takeaways and precooked meals, eating from the school canteen. **RESULTS:** Body image concerns, dieting, education about food, parental control, maternal education level and eating with family and peers are factors that were found to affect food choices in this group of Greek adolescents. The adherence to the Mediterranean diet was low (KIDMED index was 4.5 ± 2.7). Regular family meals at home were frequent in this group and 99% of the adolescents ate lunch daily at home. Eating out with peers and eating from the school canteen was related with higher consumption of 'junk type of food'. Girls and younger adolescents and those whose mothers had a higher education level seem to make healthier choices. **CONCLUSIONS:** Factors such as personal issues, family and peer pressure significantly affect food choices among adolescents living in a Greek rural area and highlight the importance of implementing multilevel strategies to promote healthy eating among adolescents.

Key words: Adolescents, Eating habits, Family, Food labels, Peers, School canteen**INTRODUCTION**

Rates of overweight and obesity have increased dramatically among adolescents and lifestyle changes

seem to be the main contributor to this change.¹⁻³ Adolescent obesity is not only capable of affecting adolescents' current health but also has an impact on later life independently of weight status in adulthood. Dietary intake and nutrition behaviours at this period of life influence lifelong eating habits and contribute to the development of risk factors for disease in adulthood.⁴ Therefore, identification of the reasons behind food choices could help to reduce the burden of several diseases.

Address for correspondence:

Dr. A. Bargiota, Lecturer in Endocrinology, University Hospital of Larissa, Biopolis Larissa, 41100 Greece,
E-mail: abargio@yahoo.gr

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Food choice in general is a complex process that depends on culture and can be influenced by different factors such as personal, social, economic and emotional. Teenagers make many more choices for themselves than they did as children. Moreover, since eating is a social act, social networks and family can affect their food choices even more.⁵ In addition, globalization is eroding traditional foods and offering more food choice and availability, all of which could influence their eating patterns.^{6,7}

Recent studies in Greece have shown that food habits in adolescents have changed and low adherence rates to the traditional Mediterranean diet have been observed, particularly in Greek children and adolescents.⁸⁻¹⁰ The majority of these studies focus on the evaluation of the nutrition status of adolescents; however, there are very limited data on factors that influence food choice in this age group in Greece. There is also little information about the meal and snack frequency of Greek adolescents as well as the places where adolescents usually eat and the timing of their meals. The purpose of the present study was to examine such eating behaviours in a cohort of Greek adolescents and the factors influencing their food choices and habits.

SUBJECTS AND METHODOLOGY

Subjects

Data were collected from 382 high school students from May to June of 2008. Stratified and random sampling from three different schools of a rural Greek area (Nea Moudania, Halkidiki) was applied. Validated responses were obtained from a total of 350 adolescents (161 boys, 46% and 189 girls, 54%), aged 12-18 years. Adolescents were further divided into two age groups: younger adolescents (12-14 years) attending the Greek "gymnasium" (first three classes of high school) and older adolescents (15-18 years), attending the Greek "lyceum" (last three classes of high school).

Assessment of dietary intake and eating behaviour

Usual dietary intake during the month preceding enrolment was assessed with the use of a semi-quantitative food-frequency questionnaire including foods and beverages commonly consumed in Greece

adapted to the adolescents' preferences and has been previously validated.^{11,12} The KIDMED questionnaire was used to assess whether the adolescents were keeping to the Mediterranean diet. The KIDMED questionnaire was recently developed to assess the compliance of young people (2-24 years) to the Mediterranean diet, and higher values of this index suggest greater nutritional adequacy, especially in vitamins and minerals.^{6,8} Additionally, the following factors were examined and analyzed: self-perceived body size, dieting, dietary knowledge, parental control, meal and snack frequency, eating out of home, eating takeaways and precooked meals, eating from the school canteen. Data were collected by a trained dietician with the help of the parents during a personal interview. Parents also provided information regarding their educational level which was divided into 3 groups: low [illiteracy, primary, junior middle school (9 y)]; medium [senior middle school (10-12 y)]; and high [university or higher education (13 y)].⁸ The study protocol was approved by the local educational board and parent consent was obtained in advance for each participant.

Statistical analysis

Continuous variables are presented as means \pm SD and categorical variables as absolute frequencies. Descriptive statistics were used to describe dietary practices. Multivariate linear and logistic regression analyses were used to assess the determinant role of sex, age, dietary knowledge and parents' education level and parental control on dietary practices. The results from regression models are presented as standardized β coefficients. The chi square test was used to test for differences in categorical variables. The level of significance was defined at $P < 0.05$. Data were analyzed using the Statistical Package for the Social Sciences (SPSS13) software.

RESULTS

The overall response rate to the survey was 91.6% self-perceived body size

Of the boys participating, 22.4% thought they were underweight, 13% too heavy and 64.6% 'about right'. Among the girls the corresponding proportions were not very different: 20.1% thought they were too light, 15.4% too heavy and 64.5% 'about right'. 29% of the

boys and 30% of the girls replied that they were on a slimming diet in order to lose weight.

Dietary knowledge

Of the participants, 72% reported receiving sufficient education about reading and understanding food labels with information on ingredients. Girls and older adolescents read significantly more information on food labels than boys and younger teenagers ($p < 0.001, \beta = 0.071$; $p < 0.001, \beta = 0.202$, respectively). When adolescents buy food by themselves they are interested in low total calories, low quantity of fat and the expiry date of the product. When they shop with their parents they pay attention to the type and the percentage of the additives and conservatives of the product, the country which has produced it and its expiry date (Figure 1). 75% replied that they knew what the Mediterranean diet and its main components are. Approximately 22% of the adolescents responded that their food selection was based solely on health concerns, 17% only on taste regardless of

its impact on their health and 53% on both health concern and taste.

Parental control

Of the participants, 93% replied that their parents control their food choices: 20% very much, 42% quite a lot, 21% moderately and 10% not very much. Parental control was greater among the younger adolescents ($p < 0.01, \beta = -0.144$).

Meal and snack frequency

Table 1 displays the number of meals and snacks that adolescents ate on a daily basis. Compared to boys, significantly fewer girls ate dinner (84% boys, 71% girls, $p < 0.04$) and a snack before bed ($p < 0.035$). Dinner time was fixed, between 20.00 and 21.00 pm for 35% of the adolescents.

Eating out

Figure 2 shows the places where adolescents go to eat when they go out with their parents and with

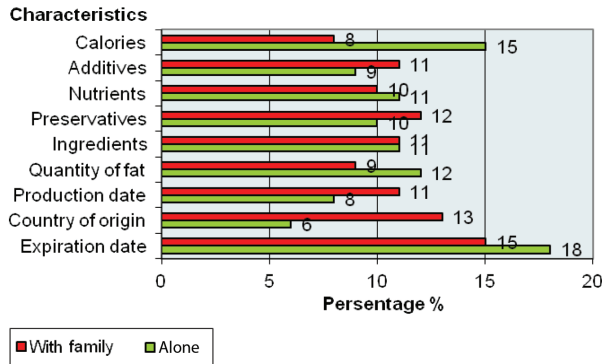


Figure 1. Food label information that the adolescents are interested in when they shop alone and with their parents.

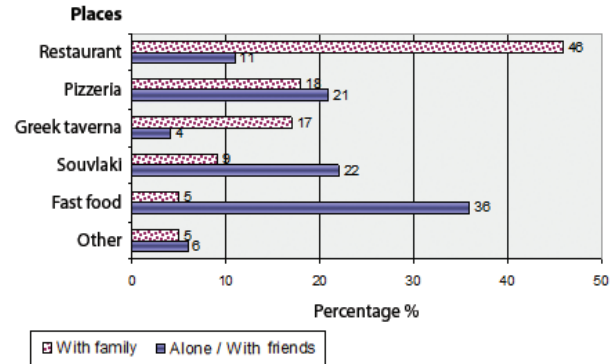


Figure 2. Places where adolescents ate when they went out with parents and friends.

Table 1. Frequency of daily meals and snacks of Greek adolescents. Results are given as absolute numbers (n) and percentages (%)

	Boys				Girls				Total			
	Eat		Don't eat		Eat		Don't eat		Eat		Don't eat	
Meals	n	%	n	%	n	%	n	%	n	%	n	%
Breakfast	124	77	37	23	134	71	55	29	258	74	92	26
Midmorning snack	70	44	90	56	82	43	107	57	152	43	198	57
Lunch	159	99	2	1	188	99	1	1	347	99	3	1
Afternoon snack	92	57	69	43	101	53	88	47	193	55	157	45
Dinner	136	84	25	16	135	71	54	29	271	77	79	23
Before bed snack	24	15	137	85	12	6	177	94	36	10	314	90

their peers. 53% of the adolescents answered that they ate out once a week and 21% ate out twice a week. When they ate out with the family they went to restaurants (46%), a pizzeria (18%) or to a traditional Greek tavern (17%) and consumed significantly more pasta ($p < 0.005$ $\beta = 0.015$) and dairy products ($p < 0.01$, $\beta = 0.084$) but less vegetables ($p < 0.005$ $\beta = -0.092$). However, when they ate out with peers or alone they went to fast food places (36%) or ate traditional Greek fast-food [souvlaki, gyros (22%)] and pizza (21%). Boys ate out significantly more frequently than girls ($p < 0.005$ $\beta = 0.219$). Eating out was inversely related to the mother's age: the younger the mother, the higher the frequency of eating out ($p < 0.005$ $\beta = -0.19$).

Takeaways and precooked meals

Of our adolescents, 77% replied that they ate takeaways at home, 45% of them once a week and 21% of them twice a week. For takeaways, pizza was their first preference, followed by kebabs and burgers. Very rarely the takeaway was a cooked meal and salad. Eating takeaways was positively related to the mother's educational level ($p = 0.044$, $r = 0.108$).

Consumption of precooked meals at home in the present group was low, with only 12% of the participants eating a precooked meal at home once a week.

School canteen

In this survey 83% of the adolescents replied that they bought food from the school canteen: 42% did so daily, 13% three times a week and 12% twice a week. Foods the most frequently consumed from the canteen were toast with cheese and ham (36%), soft drinks and beverages (32%) and sweets (20%). 40% of the adolescents replied that they were very satisfied with the quality of the food of the school canteen and 30% moderately so. Eating from the school canteen was negatively related to the number of details that adolescents read on food labels ($p = 0.027$ $\beta = -0.092$).

In addition, 47% of the participants replied that they ate at school a snack prepared at home, 24% of them on a daily basis and 50% a few times a week. Girls and younger adolescents ate a home prepared snack at school more often than boys and the older adolescents ($p < 0.05$ $\beta = 0.053$ and $p < 0.001$ $\beta = 0.265$, respectively). Bringing a home prepared

snack to school was inversely related to parental control ($p < 0.001$ $\beta = -0.207$) and was a significant positive determinant for the number of elements that adolescents read on food labels ($p < 0.001$ $\beta = 0.123$).

Table 2 shows the KIDMED test and index in our sample. The KIDMED index score was 4.5 ± 2.7 . Optimal KIDMED score (> 8) was found in 16% of the adolescents, average (4-7) in 45% of the adolescents and poor (< 3) in 39% of them. The score was higher in females than in males ($p = 0.007$ $\beta = 0.078$) and younger adolescents than the older ones ($p = 0.028$ $\beta = -0.186$). Additionally, higher maternal education level was associated with significantly higher KIDMED score ($p = 0.037$ $\beta = 0.027$).

Table 3 indicates the weekly consumption of the different food groups. Girls consumed significantly more fruits ($p = 0.033$ $\beta = 0.234$) and vegetables ($p = 0.004$ $\beta = 0.232$) compared to boys. Twenty-nine percent (29%) of the teenagers consumed alcohol once a week and 16% twice to three times a week.

DISCUSSION

In this study, we have examined the factors that affect food selections of a cohort of Greek adolescents and their eating behaviours and habits. Our data showed that many of the adolescents felt they were too heavy, this suggesting an awareness of their shape or image. About one third of them reported trying to lose weight by following a low fat diet, further indicating a concern about their body image. Previous studies indicated that approximately one out of five to six female adolescents face a risk for disordered attitudes regarding body image and food.^{10,13} Our data indicated an increased level of adolescents on a slimming diet, identical for boys and girls, which might be associated with the increasing levels of childhood obesity in Greece. In addition, in our study boys and girls up to the age of 18 years were included, among whom an increasing prevalence of dieting with age has previously been observed.¹⁰ Other possible explanations that can be offered are increasing family and media influences, peer pressure and personal issues during the critical time of puberty^{5,14-16} in a transition from traditional Greek to a more Westernized environment.⁸ It will be interesting to observe from future data collections whether this concern with body image will alter with age.

Table 2. KIDMED test and KIDMED index in Greek adolescents (n=350) aged 12-18 years, by gender

KIDMED index		Male (%)	Female (%)	Total (%)
Fruit or fruit juice daily		45	58	51.7
Second serving of fruit daily		36	48	42
Fresh or cooked vegetables daily		22	40	32
Fresh or cooked vegetables >1/day		16	34	25
Regular fish consumption (at least 2-3/week)		55	60	57.4
>1/week fast-food (hamburger)restaurant		34	50	42.9
Pulses >1/week		55	63	59.7
Pasta or rice almost daily (≥5/week)		34	39	36.3
Cereal or cereal product for breakfast		63	45	53.4
Regular nut consumption (at least 2-3/week)		13	17	15.4
Use of olive oil at home		96	97	96.6
No breakfast		23	29	26.3
Dairy product for breakfast		42	46	44
Commercially baked goods or pasties for breakfast		76	79	77.7
Two yoghurts and/or 40 gr cheese daily		50	47	48
Sweets and candy several times a day		85	80	82.6
KIDMED INDEX		Poor (≤3)	Average (4-7)	Good (≥8)
Sex	Male	52	41	7
	Female	39	50	11
Mother's education Level (%)	Low	7	3	10
	Medium	61	57	58
	High	32	40	32
Father's education Level (%)	Low	11	6	10
	Medium	51	62	45
	High	38	32	45

Table 3. Weekly consumption of the different food groups and alcohol by the Greek adolescents (n=350) aged 12-18 years. Results are given by gender as percentages (%) and times per week (t/w)

Food item or Food group	Boys					Girls					Total				
	Never (%)	1 t/w (%)	2-3 t/w (%)	4-5 t/w (%)	6-7 t/w (%)	Never (%)	1 t/w (%)	2-3 t/w (%)	4-5 t/w (%)	6-7 t/w (%)	Never (%)	1 t/w (%)	2-3 t/w (%)	4-5 t/w (%)	6-7 t/w (%)
Olive oil	4	4	14	19	59	3	6	17	26	48	3	5	16	23	53
Fruits	1	10	13	26	44	0	7	15	20	58	0	9	17	23	51
Vegetables	3	12	28	35	22	3	3	15	32	41	3	10	21	34	32
Pasta / rice	1	21	44	30	4	1	12	43	31	7	1	16	46	31	6
Cheese	7	4	14	26	49	2	6	22	24	46	4	5	18	25	48
Pulse	11	34	37	9	9	5	31	41	19	4	8	33	39	14	6
Bread	4	8	11	14	63	7	11	19	17	46	6	10	15	16	53
Red meat	7	31	32	17	13	4	32	40	19	5	5	31	37	18	9
Chicken	10	35	30	14	11	12	33	33	17	5	11	35	32	15	7
Potatoes	2	11	35	31	21	2	20	36	23	19	2	16	35	27	20
Dairy products	4	5	20	29	42	0	9	17	28	46	2	7	19	29	43
Fishes	10	35	37	11	7	5	35	32	20	8	7	35	34	16	8
Sweets	3	22	34	20	15	6	28	32	14	20	7	25	34	17	17
Eggs	3	40	36	10	5	12	41	32	11	4	11	41	34	10	4
Alcoholic drinks	34	34	17	4	11	48	25	15	8	4	41	29	16	7	7

t/w: time/week

Furthermore, our data indicate that adolescents' concerns about their body image are an important contributing factor in choosing food. Interestingly in this study, although the majority of the adolescents replied that both taste and health were important in choosing food, when it came to food selection, their food choices were based on its content. When adolescents bought food by themselves, they focused mainly on information about low calories and low fat percentage on food labels. Perhaps adolescents desire to be healthy but seem not necessarily to be concerned with their health outcomes at this point in their lives. Previous studies that evaluated food habits in adolescents also discovered low health concerns in adolescents' food choices.^{17,18}

Knowledge about food is considered to be beneficial not only for food choice and healthy weight reduction but also as concerns its long-term implications for general health. Food label reading has previously been used as a tool for nutritional education.¹⁹ In the present study, girls and older adolescents seem to be better educated as they are interested in having more information on food labels when they buy food and are thus more aware of its implication for weight and health. In addition, although the majority of our sample replied that they had been educated and knew what the Mediterranean diet is, they did not seem to follow it. Our data indicated a low to moderate adherence to the Mediterranean diet, a finding that is in line with previous data from Greece and other Mediterranean countries.^{6-8,20,21} It follows that teenagers, despite being generally well informed about healthy eating, do not often translate this knowledge into their daily lives. Other studies have also shown that nutrition label reading and food education do not translate into healthier diet in adolescents.^{22,23} Therefore, it might be necessary for intervention programmes designed for adolescents to focus not only on education on healthy food eating but also on behaviour changes. These programmes should also take into account the adolescents' lifestyle and social environment. Eating is a social event and thus the presence of family and friends inevitably can affect food choices.²⁴

Our adolescents ate with their families frequently, which is in agreement with other data.^{5,25} Lunch has traditionally been the main family meal in Greece and almost all of the participants (99%) ate lunch daily with their families. Approximately two thirds

of them had daily breakfast and dinner at home. These regular family meals may contribute to the formation of healthful eating habits and could serve as role models for healthy food choices.²⁶⁻²⁸ Moreover, in the current study, the majority of adolescents acknowledged that their parents controlled their food choices. Parental control was greater in younger adolescents than the older ones who probably at this age are starting to be more independent and to make their own choices. Younger adolescents had a significantly higher KIDMED score than the older ones and possibly the higher level of parental control in younger adolescents has contributed to that, although overall no relation was found between parental control and KIDMED score. Parental education has also been shown in large epidemiological studies to have a positive independent effect on the quality of children's diet.^{8,29-31} Our data have also shown that the higher the maternal education level, the better the KIDMED score. It has been speculated that higher parental education level may be related to higher income and thus greater availability of healthy foods, increased nutrition knowledge or increased motivation to follow a healthy lifestyle. In contrast with previous studies conducted in Greece,⁸ our data have shown no significant association between the father's educational level and the KIDMED score. The data in the present study were collected from a mainly rural area in Greece and hence it seems that, following the tradition, in rural Greece the mother remains the core person in the family who chooses and prepares the food and thus has a major influence on adolescents' nutrition.

Eating out of home has also been identified as making an important contribution to adolescents' food choices.³² Our adolescents ate out of home either with family or with peers, with more healthful food being eaten with family and more 'junk type of food' with peers. It is possible that in this way, adolescents are able to achieve some kind of balance in their meals in terms of taste and healthfulness, but also some emotional balance by being accepted by their peers as well as being part of the family. Snacks purchased out of home generally have low nutrient value and are usually full of fat and sugar.³³ This is evident in the findings of the current study, where foods such as burgers and fast-food type of food, sweets and soft drinks were consumed when adolescents ate a snack.

About half of the adolescents purchased a snack daily from the school canteen and half of them had an afternoon snack out with peers: the latter foods are mostly available in school canteens and places where adolescents regularly meet. This dietary pattern may partly be the explanation for the low compliance with the Mediterranean diet as observed in the present and other studies from the area. Modification of foods at school canteens and in places where adolescents usually go can be instrumental in enhancing their nutritional quality.

Overall, in the present study girls were more likely than boys to make healthier food choices. In our study, girls consumed significantly more vegetables and fruits, took a home prepared snack to school more frequently, read significantly more details on food labels and had overall a better KIDMED score than boys did. These data indicate better nutrition knowledge in adolescent girls, a finding that has also been described elsewhere.³⁴ In our study, for the observed gender differences other possible attributing factors might be the fact that girls skipped meals more frequently than boys and had more concerns about body weight and image, while boys by eating out with peers more frequently consumed more fast-food type of food. Boys are generally more active than girls, a factor that can also affect the amount of food consumed and the food choices.⁸ However, in our study we collected no data regarding the physical activity of adolescents.

It is noteworthy that a significant proportion of adolescents in our study consumed alcohol, although it is prohibited by law for people under the age of 18. Previous researchers elsewhere³⁵ have reached the same worrying conclusion, thus parents should be more careful and pay better attention to this point.

Some potential limitations in our study should be noted. First, no anthropometric measurements were obtained and thus it is not clear if adoption of weight concerns and dieting practices are based on actual weight or are part of the normal maturation process of adolescents. Second, the region studied is a mainly rural area and thus does not accurately represent the whole country, so that extrapolation of our data for all of Greece may not be appropriate. We believe, however, that the area shares the same sociodemographic and cultural characteristics as the

majority of rural areas of mainland Greece and thus the results of this study may be considered as representative of rural Greece. Third, the food frequency questionnaires that have been used, although including foods more frequently consumed in Greece, should probably incorporate more detailed lists of foods that are more popular among adolescents. On the other hand, in adolescents, as well as in adults, there is no perfect method of assessing dietary intake. Finally, data on the physical activity of adolescents were not collected. These data might have been useful to explain further gender and age differences as well as certain eating behaviours.

CONCLUSIONS

Body weight concerns, dieting, food knowledge, parental control, maternal education, family meals, eating with peers, age and gender are factors that affect food choices among Greek adolescents. Despite the fact that certain traditions remain strong in rural Greece, globalization seems to be eroding them and to be leading to food modifications that are not compatible with the traditional Mediterranean diet and healthy eating. Understanding adolescents' perceptions towards food and nutrition along with factors that influence adolescent food behaviour might help to promote health among adolescents and improve quality of life.

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