

## Dietary habits and health among university students living at or away from home in southern Italy

FRANCESCO BAGORDO – TIZIANA GRASSI –  
FRANCESCA SERIO – ADELE IDOLO – ANTONELLA DE DONNO

### Summary

The aim of this study was to assess the eating habits of a group of university students, to highlight any differences between students living at and away from home and to examine aspects of their health and nutritional status. One hundred and ninety-three undergraduate students at the University of Salento (Lecce, Italy) completed a self-administered food habits questionnaire divided into three major sections: demographic, social and cultural characteristics, eating habits, health information. Students living at home got more physical exercise and consumed higher quantities of cooked vegetables, fish, meat products, chips, bread/cereals, pulses, cooked meals and sandwiches. In contrast, students living away from home were characterized by higher consumption of raw vegetables, beer and alcoholic drinks, raw/cold meals, frozen meals and ready meals. Moreover, students living alone reported a greater number of episodes of gastroenteritis and perceived that they had a larger body mass. Student lifestyles and living arrangements were associated with a shift away from the Mediterranean diet and would appear to expose students to the risk of food-borne illness. This appeared more evident among students living away from home, for whom the assumption of primary responsibility for food shopping and preparation can lead to unhealthy dietary habits.

### Keywords

dietary habits; food frequency questionnaire; Mediterranean diet; undergraduate students

The role of healthy eating in the prevention of chronic and infectious disease has been well documented [1]. A balanced diet and consumption of food prepared in accordance with good practices are factors that contribute to maintaining a healthy lifestyle. The Mediterranean diet is widely recognized as satisfying the requirements of healthy nutrition [2–4]. Originally based upon the dietary habits of the sunny regions of Crete, Greece and southern Italy, this diet may be pictured as a pyramid [5] which represents food types and frequency of consumption: (a) high intake of vegetables, pulses, fruits and cereals; (b) medium-high intake of fish; (c) low intake of meat and saturated fat; (d) olive oil as the principal fat; (e) medium-low intake of dairy products; (f) moderate consumption of wine.

Despite their nutritional background, the dietary habits of the Mediterranean population have been deteriorating over the last decades as a result of increased consumption of animal

products and reduced intake of cereals, fruits, pulses and vegetables [6]. Moreover, worldwide lifestyle changes have led consumers to adopt risky eating habits due to the consumption of food often prepared on a large scale, in advance and poorly stored.

The departure from the ideal model of the Mediterranean diet may increase the risk of obesity [7], diabetes [8] and cardiovascular disease [9], while the consumption of food away from home is often associated with food-borne disease outbreaks [10].

The different stages of life, in particular work- or study-related, can produce profound changes in eating habits. The start of University education is an important time in the life of an individual, since it often represents a period of greater responsibility for food choices and health [11]. The most common factors affecting food choices in this young population include changes in living arrangements [12], costs and financial resources [13, 14], and the

---

Francesco Bagordo, Tiziana Grassi, Francesca Serio, Adele Idolò, Antonella De Donno, Department of Biological and Environmental Sciences and Technologies (Di.S.Te.B.A.), University of Salento, via Prov. le Lecce-Monteroni, 73100 Lecce, Italy.

Correspondence author:

Antonella De Donno, tel.: 0039 0832 298687, e-mail: antonella.dedonno@unisalento.it

availability of convenience and “fast” meals [15].

The aim of the present study was to examine the eating habits of a group of undergraduate students from the University of Salento in order to highlight any differences between students living with their family or away from it. Some aspects of their health and nutritional status were also evaluated.

## MATERIALS AND METHODS

Undergraduate students ( $n = 195$ ) enrolled in the second to fifth years of the degree course in Biological Sciences at the University of Salento (Lecce, Italy) were invited to participate in the study during the period January–April 2010. Recruitment strategies included flyers and advertisements on campus notice boards.

The participants were required to be free of diet-related health problems and to be consuming their usual mixed diets. Those who met the study criteria were invited to complete a self-administered eating habits questionnaire. Once their willingness to participate was verified, participants were informed of the study's aims and how to complete the questionnaire.

### Ethical considerations

This study was carried out after being approved by the local Ethics Committee (Lecce). Participation was voluntary and anonymous and prior to filling in the questionnaires, all students signed an informed consent form. They were assured that their responses would be used only for research purposes and the information given would be treated with the utmost care and confidentiality.

### Questionnaire development

A self-administered questionnaire was used to obtain demographic, social and cultural data, as well as information on eating habits, health and nutritional status (Annex 1).

The demographic data included age, sex, year of study and degree course. The second section focused on social and cultural aspects such as living situation (with parents or away from the family home) and leisure time, with a focus on physical exercise, pubs, discotheques and cultural activities. The section on food habits included the Food Frequency Questionnaire (FFQ) developed by PAPADAKI and SCOTT [14], modified slightly to better reflect local eating habits and food availability in southern Italy.

The food frequency list contained fresh fruit; cooked vegetables; raw vegetables; potatoes, rice

and pasta; chips; pulses (including beans, lentils, peas); meat products (ham, sausages, burgers, etc.); fish; snacks (crisps, nuts, etc.); sauces (mayonnaise, dips, etc.); meat and poultry; bread and cereals; dairy (including cheese and yoghurt); cakes (including sweets, sugar, chocolates, biscuits, ice cream, cakes, scones and pastries); eggs; and pizza. Concerning beverages, the categories were: fresh fruit juice; milk; soft/fizzy drinks; wine; beer; spirits; and coffee/teas.

The food frequency questionnaire included a total of 23 food items.

Consumption frequency for each food item was measured as ‘never’, ‘1–3 times per month’, ‘1–2 times per week’, ‘3–4 times per week’, ‘5–6 times per week’, ‘once per day’, ‘twice per day’, ‘3 times per day’ and ‘4 times per day’.

The section on food habits also included questions about place and frequency of consumption of breakfast, lunch and dinner, as well as questions about food preparation, such as whether food was cooked (potatoes/pasta/rice, meat, fish, cooked vegetables, pulses, chips); raw/cold (dairy, salad, raw vegetables); re-heated; frozen; pre-prepared (ready meals); or homemade sandwiches. Participants were also asked whether they perceived that their eating habits had changed since starting university and were asked to provide information about weight control and physical activity levels.

The last section included questions about participants' health during the previous year, with particular reference to acute gastroenteritis, and perceived nutritional status.

### Statistical analysis

The data obtained were subjected to statistical processing with MedCalc software version 11.5.1.0 (MedCalc Software, Ostend, Belgium).

Data for individual food items in the food frequency questionnaire were transformed to servings per week (servings/week). As in the study by PAPADAKI and SCOTT [14], it was assumed that ‘times’ could be equated to ‘portions’. Therefore, the frequency of consumption of each food and beverage category was transformed as follows: The frequency value ‘never’ was transformed to ‘0 times per week’, ‘1–3 times per month’ was transformed to ‘0.5 times per week’, ‘1–2 times per week’ was transformed to ‘1.5 times per week’, ‘3–4 times per week’ became ‘3.5 times per week’, ‘5–6 times per week’ became ‘5.5 times per week’, ‘once per day’ became ‘7 times per week’ and ‘2 times per day’ became ‘14 times per week’, ‘3 times per day’ became ‘21 times per week’ and ‘4 times per day’ was transformed to ‘28 times per week’.

The per capita weekly consumption of each

# Annex 1. Questionnaire on eating habits and lifestyles of university students.

## QUESTIONNAIRE ON EATING HABITS AND LIFESTYLES OF UNIVERSITY STUDENTS

1) Age \_\_\_\_\_ Province of residence \_\_\_\_\_ 2) Sex M ☐ F ☐

3) Degree Course \_\_\_\_\_ 4) Year of course \_\_\_\_\_

5) From which source have you obtained / do you obtain most information on matters of health?

a) television ☐

b) non-specialist publications ☐

c) specialist publications ☐

d) leaflets ☐

e) university/school/training courses ☐

f) family ☐

g) doctors ☐

h) internet ☐

i) other: \_\_\_\_\_

6) During the period of lessons do you live

a) with your family ☐

b) away from your family ☐

7) How often do you do the following?

	Never	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Every day
a) Pub/sandwich bar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Cinema/theatre/cultural activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Disco/night clubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Sport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8) On what you consider to be a typical day during the period of lessons, where do you have breakfast?

a) at home ☐

b) in a bar ☐

c) I usually don't have breakfast ☐

9) On what you consider to be a typical day during the period of lessons, where do you have lunch?

a) at home ☐

b) in a snack-bar/fast food restaurant ☐

c) canteen ☐

d) pizzeria/restaurant ☐

e) packed lunch prepared at home ☐

10) On what you consider to be a typical day during the period of lessons, where do you have supper?

a) at home ☐

b) canteen ☐

c) in a snack-bar/fast food restaurant ☐

d) pizzeria/restaurant ☐

11) How often in the last year have you consumed the following foods during the period of lessons?

	Never	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Every day	More than once a day (specify)
Fresh fruit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooked vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potatoes/rice/pasta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meat and poultry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dairy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meat products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eggs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bread/cereals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pulses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pizza	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snacks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fresh fruit juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soft/fizzy drinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spirits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coffee/tea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sauces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparation arrangements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooked meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw/cold meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Re-heated meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frozen meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ready meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home-made sandwiches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12) Have your eating habits changed since you started attending university?

a) yes, a lot ☐ b) yes, but not much ☐ c) no, not at all ☐

13) How many times in the last year have you had one or more of the following symptoms: nausea, vomiting, diarrhoea, persistent abdominal pain: \_\_\_\_\_

14) Would you say you are:

a) Underweight ☐

b) Normal weight ☐

c) Overweight ☐

food or beverage was then calculated by taking the sum of the values for all students in the population of reference and dividing the result by the total number of individuals.

The Mann-Whitney test was used to detect changes in food intake for students living at and away from home. A  $p$ -value of 0.05 was considered statistically significant. Other data are reported descriptively.

## RESULTS AND DISCUSSION

One hundred and ninety-five students completed the eating habits questionnaire. Of these, 2 questionnaires were rejected due to improbable replies, resulting in 193 usable questionnaires.

One hundred and forty students (72.5%) still lived at home with their parents during their studies, while fifty-three (27.5%) lived away from home, in student residences or flats, alone or with other students/friends.

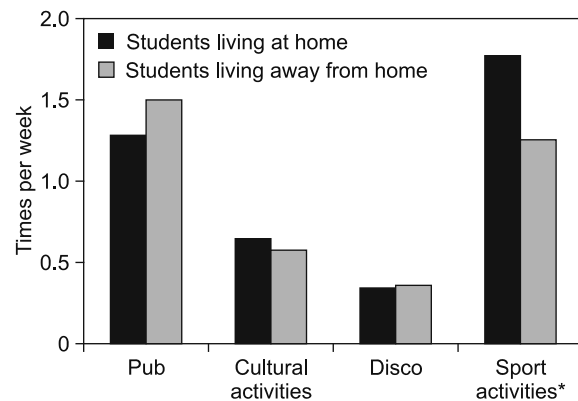
The students ranged in age from 20 to 30 years (mean age  $23.3 \pm 2.9$  years) and the majority (77.7%) were female.

Leisure activities were mainly represented by sports (1.63 times per week) and going to the pub (1.34 times/week), while cultural activities (0.63 times/week) and discos (0.35 times/week) were less frequent (Fig. 1).

The relative frequencies differed in accordance with residence. Sport was significantly higher ( $p < 0.05$  – Mann Whitney test) among students living in the family home (1.78 times/week) than among those living away from home (1.25 times/week). Smaller differences were recorded for other activities. Students living away from their families attended pubs, sandwich bars and clubs more frequently (1.50 times/week) and were less engaged in cultural activities (cinema, theatre, cultural associations) (0.58 times/week) than their colleagues who lived with their parents (1.28 times/week and 0.65 times/week respectively).

Concerning the place of consumption of daily meals, 82.0% of students consumed breakfast at home, 8.0% at a bar and 11.0% said they skip the first meal of the day. In this case, there were no significant differences between students living with their families and those living alone.

In contrast, students living with their families ate lunch at home (63.6%) or had a homemade packed lunch at the university (20.7%), while students living outside the family home ate in their flat (52.8%), in the university canteen (24.5%) or in the campus bar (17.0%).



**Fig. 1.** Social and leisure activities of students living at and away from home.

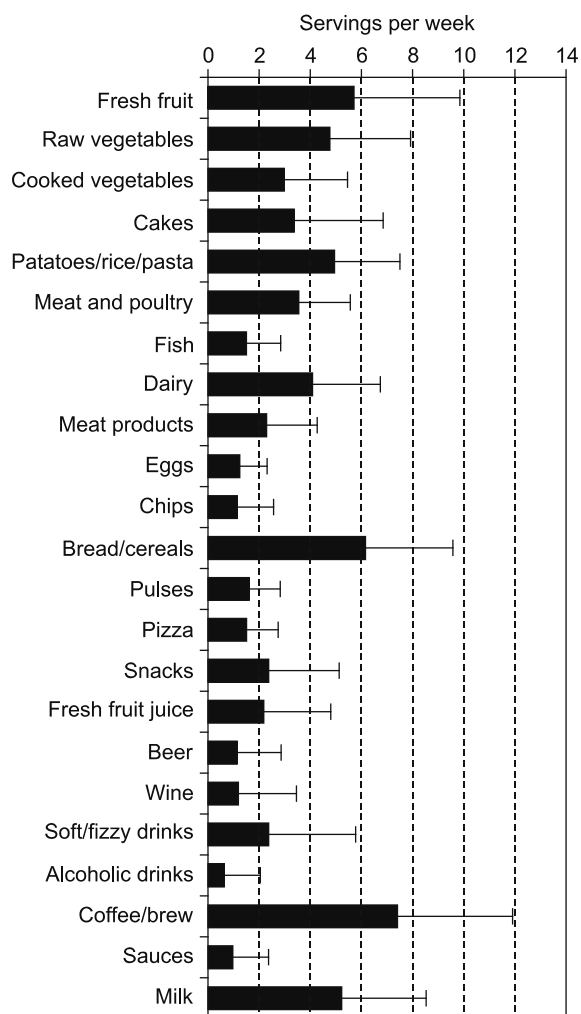
\* – levels of significance  $p < 0.05$  assessed by the Mann-Whitney test.

Supper was mainly consumed at home by both groups of students: 97.0% of those who live with their parents and 87.0% of those living outside the family home. However, among the latter, 7.0% of the participants had supper in the university canteen and 6.0% at a restaurant.

The analysis revealed that the most frequently consumed foods were bread/cereals (6.2 servings per week) and fresh fruit (5.7 servings/week). The consumption of potatoes/pasta rice was also high (4.9 servings/week), as was that of raw vegetables (4.8 servings/week), dairy (4.1 servings/week) and meat/poultry (3.5 servings/week). The most frequently consumed drinks were coffee/teas (7.4 servings/week) and milk (5.2 servings/week) (Fig. 2).

These frequencies for certain foods depended on the kind of residence. In particular, students living outside the family home had a consumption of cooked vegetables (2.18 servings per week), fish (1.11 servings/week), meat products (1.49 servings/week), chips (0.75 servings/week), bread/cereals (5.01 servings/week) and pulses (1.10 servings/week) significantly lower ( $p < 0.05$ ) than the students living with their families, and the consumption of raw vegetables (5.74 servings/week), beer (1.57 servings/week) and spirits (0.87 servings/week) significantly higher ( $p < 0.05$ ). Non-significant differences ( $p > 0.05$ ) were observed for the consumption of the other foods.

Regarding food preparation methods, students living outside the family home reported higher consumption ( $p < 0.05$ ) of raw/cold meals (10.10 servings/week), frozen meals (0.76 servings/week) and ready meals (1.30 servings/week), and lower consumption ( $p < 0.05$ ) of cooked food



**Fig. 2.** Frequency of consumption of foods and beverages by undergraduate students.

(12.22 servings/week) and homemade sandwiches (1.09 servings/week) (Tab. 1).

Analysis of responses concerning changes in eating habits since starting the university studies showed that 26.4% of the students had not changed their eating habits, 23.3% had changed their habits significantly, while the remaining 50.3% had made only minor changes. Specifically, the changes affected 72.0% of students living with their families and 79.0% of those living away from their families.

Finally, the health status of participants was analysed, with particular attention to food-borne illness. The analysis showed that during the previous year, 73.6% of students reported at least one episode of gastroenteritis (70.7% of students living with their families and 81.1% of those living away from their families). On average, 4.35 cases per year of gastroenteritis were recorded, with

a significantly higher frequency among students living outside the family home (5.35 cases/year) than those living at home (3.98 cases/year) (Tab. 2).

Further investigation was carried out to assess students' perception of their nutritional status. A portion of 65.0% of all students considered themselves to be of normal weight, 24.0% overweight, and 11.0% underweight. The perception of own nutritional status could be related to the consumption of some key food. In fact, the students who considered themselves as "normal weight" consumed 3.16 servings/week of cooked vegetables, 1.58 servings/week of pulses, 3.29 servings/week of meat and poultry, 2.05 servings/week of meat products and 3.02 of cakes whereas the students who considered themselves as "overweight" consumed 2.60 servings/week of cooked vegetables, 1.52 servings/week of pulses, 3.91 servings/week of meat and poultry, 2.73 servings/week of meat products and 3.76 servings/week of cakes. It is interesting to note that a higher percentage of students living away from their families (26.3%) considered themselves to be overweight, while 13.0% of students living with their families considered themselves to be underweight, compared to 5.7% of those living outside the family home (Tab. 3).

These results suggests some considerations.

A healthy lifestyle, proper nutrition and adequate physical exercise are key factors in preventing many diseases including obesity, and are therefore crucial to human health [16–18].

The start of university studies is an important stage in the life of an individual because it often coincides with assumption of greater responsibility concerning both the maintenance of a healthy lifestyle and food choices [11, 19].

The results of this study, obtained by analysing answers to a questionnaire administered to 193 students attending the University of Salento (Lecce, Italy), showed different eating habits in relation to different lifestyles.

During the academic term, the students are forced to spend many hours away from home and inevitably to change their eating habits. This entails more frequent consumption of foods in restaurants and canteens, as well as an increased reliance on quick- or easy-to-prepare meals. All this probably causes a shift away from the typical patterns associated with the Mediterranean diet and would appear to expose students to the risk of food-borne illness.

In this study the most unhealthy eating habits concerned meat consumption, which was generally much higher than is recommended in the Mediter-

**Tab. 1.** Mean weekly consumption (servings/week) of selected foods and preparation/consumption arrangements of students living at and away from home.

Food item	Students living at home ( <i>n</i> = 140)		Students living away from home ( <i>n</i> = 53)		Difference [%]	<i>p</i>
	Mean	SD	Mean	SD		
Fresh fruit	5.76	4.05	5.58	4.41	-3.2	0.697
Raw vegetables	4.40	3.00	5.74	3.52	30.5	0.028
Cooked vegetables	3.29	2.56	2.18	2.05	-33.7	0.005
Cakes	3.45	3.65	3.17	2.99	-8.0	0.876
Potatoes/rice/pasta	4.90	2.50	5.06	2.74	3.1	0.882
Meat and poultry	3.69	2.09	3.19	1.78	-13.5	0.146
Fish	1.65	1.45	1.11	0.90	-32.5	0.015
Dairy	4.14	2.79	3.96	2.25	-4.2	0.954
Meat products	2.60	2.07	1.49	1.42	-42.6	< 0.001
Eggs	1.31	1.15	1.08	0.82	-17.7	0.296
Chips	1.29	1.58	0.75	0.74	-41.6	0.005
Bread/cereals	6.60	3.31	5.01	3.46	-24.1	< 0.001
Pulses	1.80	1.34	1.10	0.57	-38.8	0.002
Pizza	1.58	1.27	1.32	1.13	-16.3	0.057
Snacks	2.38	2.78	2.36	2.73	-0.7	0.972
Fresh fruit juice	2.25	2.79	1.99	2.10	-11.7	0.844
Beer	0.97	1.74	1.57	1.61	61.2	< 0.001
Wine	1.33	2.48	0.83	1.53	-37.3	0.639
Soft/fizzy drinks	2.47	3.48	2.11	3.20	-14.4	0.699
Spirits	0.55	1.41	0.87	1.38	57.8	0.009
Coffee/teas	7.17	4.50	8.03	4.47	12.0	0.241
Sauces	1.10	1.51	0.62	0.97	-43.2	0.148
Milk	4.97	3.07	6.02	3.79	21.2	0.178
<b>Preparation arrangements</b>						
Cooked meals	15.51	4.76	12.22	3.98	-21.3	< 0.001
Raw/cold meals	7.58	3.88	10.10	4.56	33.3	0.002
Re-heated meals	1.76	1.21	1.42	1.04	-19.8	0.070
Frozen meals	0.48	0.28	0.76	0.53	60.9	< 0.001
Ready meals	1.00	1.83	1.30	1.77	29.7	0.036
Homemade sandwiches	1.90	2.00	1.09	1.34	-42.4	0.014

SD – standard deviation.

Levels of significance were assessed by the Mann-Whitney test.

**Tab. 2.** Incidence of gastroenteritis among participants of the study.

	Students with at least one episode of gastroenteritis in the previous year		Average number of episodes/year
	<i>n</i>	[%]	
Students living at home	99	70.7	3.29
Students living away from home	43	81.1	4.22
Total	142	73.6	3.55

**Tab. 3.** Students' perception of their nutritional status.

	Total ( <i>n</i> = 193)		Students living at home ( <i>n</i> = 140)		Students living away from home ( <i>n</i> = 53)	
	<i>n</i>	[%]	<i>n</i>	[%]	<i>n</i>	[%]
Underweight	21	10.9	18	12.9	3	5.7
Normal weight	125	64.8	89	63.6	36	67.9
Overweight	47	24.4	33	23.6	14	26.4

anean diet, i.e. a few times per month [5]. In addition, the study revealed low consumption of fruits, vegetables, fish and pulses (traditionally frequent in Mediterranean cuisine and important factors in the prevention of chronic diseases). However, the study found that both groups of students maintained a balanced consumption of potatoes/rice/pasta, bread/cereals and dairy products.

The departure from the ideal model of the Mediterranean diet appeared more pronounced among students who left their family home to relocate to the University town. Although some positive changes were recorded (i.e. higher consumption of raw vegetables), the diet of these students was characterized by a lower intake of fish, pulses and cooked vegetables than students living with their families. Students living away from their families also showed a trend towards lower consumption of home-cooked meals and more frequent use of quick- and easy-to-prepare meals such as ready meals, raw/cold meals and frozen meals. This finding supports the thesis that assumption of primary responsibility for food shopping and preparation can lead to unhealthy dietary habits among university students living away from home [20]. In contrast, the choice, purchase and preparation of food for students living at home is performed by other family members, who provide support for healthier food habits [21].

This study also showed that students living outside the family home had higher consumption of coffee/teas and alcoholic beverages, probably as a result of spending more time in bars, pubs and discotheques.

In contrast, students living in the family home had a higher intake of sandwiches and meat products due to consumption of homemade lunches at university (in class or outside).

The dietary habits of university students reported in this study are similar to those reported by earlier studies, in which unfavourable dietary habits and unhealthy lifestyle choices among University students were reported [11, 20, 22–26].

Different eating habits among students also seem to influence the epidemiology of food-borne diseases, as indicated by the incidence of episodes attributable to gastroenteritis. Students living outside the family home reported a higher frequency of abdominal pain, vomiting, diarrhoea, etc. than students who live with their families, probably because of higher consumption of cold and handled food, frequently in restaurants or canteens, which has often been associated with food-borne gastroenteritis outbreaks [27–29].

This study also revealed that the nutritional status perceived from the students is effectively

related to food intake. In fact, the students who considered themselves as “normal weight” showed the consumption of food more similar to the Mediterranean diet with a higher intake of cooked vegetables and pulses, and lower intake of meat and poultry, meat products and cakes than students who reported nutritional status tending to “overweight”.

It was interesting to note that the students living away from their families perceived more abundant body mass than the students living in the family home. In addition to the nutritional intake, other factors might have contributed to the different constitution of the body mass, such as frequency of physical exercise that was significantly higher among students who lived in the household.

In conclusion, this study provides interesting insights into the field of nutrition in young adults and problems related to the acquisition of healthy lifestyles in this age range. The results suggest that lifestyle affects dietary habits and could have important consequences for the health of university students. It would be desirable, therefore, for the media to make greater efforts to promote good eating habits, and for nutritional education programs to be activated within the university, taking the Mediterranean diet as a model. The aim of these educational initiatives, which have been already implemented with success [30, 31], should be to help young people improve their diets and encourage them to pursue a more careful and healthier lifestyle.

All these considerations refer to a group of students of southern Italy that could have food habits and lifestyles different from those of students from other parts of Italy. Some possible developments of this research could be to compare the data obtained in this study with those found in other Italian universities, for example in northern Italy, in order to detect any significant differences.

## REFERENCES

1. Willett, W. C.: Diet and health: What should we eat. *Science*, 264, 1994, pp. 532–537.
2. Kastorini, C. M. – Milionis, H. J. – Goudevenos, J. A. – Panagiotakos, D. B.: Mediterranean diet and coronary heart disease: Is obesity a link? – A systematic review. *Nutrition, Metabolism and Cardiovascular Diseases*, 20, 2010, pp. 536–551.
3. Bonaccio, M. – Iacoviello, L. – de Gaetano, G. – on behalf of the Moli-sani Investigators: The Mediterranean diet: The reasons for a success. *Thrombosis Research*, 129, 2012, pp. 401–404.
4. de Groot, C. P. G. M. – van Staveren, W. A.: Nutritional concerns, health and survival in old age.

- Biogerontology, 11, 2010, pp. 597–602.
5. Willett, W. C. – Sacks, F. – Trichopoulou, A. – Drescher, G. – Ferro-Luzzi, A. – Helsing, E. – Trichopoulos, D.: Mediterranean diet pyramid: a cultural model for healthy eating. *American Journal of Clinical Nutrition*, 61, 1995, pp. 1402S–1406S.
  6. Kafatos, A. – Kouroumalis, I. – Vlachonikolis, I. – Theodorou, C. – Labadarios, D.: Coronary-heart disease risk factor status of the Cretan urban population in the 1980s. *American Journal of Clinical Nutrition*, 54, 1991, pp. 591–598.
  7. Panagiotakos, D. B. – Chrysohou, C. – Pitsavos, C. – Stefanadis, C.: Association between the prevalence of obesity and adherence to the Mediterranean diet: the ATTICA study. *Nutrition*, 22, 2006, pp. 449–456.
  8. Esposito, K. – Maiorino, M. I. – Ceriello, A. – Giugliano, D.: Prevention and control of type 2 diabetes by Mediterranean diet: a systematic review. *Diabetes Research and Clinical Practice*, 89, 2010, pp. 97–102.
  9. Martínez-González, M. A. – García-López, M. – Bes-Rastrollo, M. – Toledo, E. – Martínez-Lapiscina, E. H. – Delgado-Rodríguez, M. – Vazquez, Z. – Benito, S. – Beunza, J. J.: Mediterranean diet and the incidence of cardiovascular disease: A Spanish cohort. *Nutrition, Metabolism and Cardiovascular Diseases*, 21, 2011, pp. 237–244.
  10. Lynch, M. – Painter, J. – Woodruff, R. – Braden, C.: Centers for disease control and prevention. Surveillance for foodborne-disease outbreaks – United States, 1998–2002. *MMWR Surveillance Summary*, 55, 2006, pp. 1–42.
  11. Colić Barić, I. – Šatalić, Z. – Lukesić, Z.: Nutritive value of meals, dietary habits and nutritive status in Croatian university students according to gender. *International Journal of Food Science and Nutrition*, 36, 2003, pp. 819–833.
  12. Brevard, P. B. – Ricketts, C. D.: Residence of college students affects dietary intake, physical activity, and serum lipid levels. *Journal of the American Dietetic Association*, 96, 1996, pp. 35–38.
  13. Pan, Y. – Dixon, Z. – Humburg, S. – Huffman, F.: Asian students change their eating patterns after living in the United States. *Journal of the American Dietetic Association*, 99, 1999, pp. 54–57.
  14. Papadaki, A. – Scott, J. A.: The impact of eating habits of temporary translocation from a Mediterranean to a Northern European environment. *European Journal of Clinical Nutrition*, 56, 2002, pp. 455–461.
  15. Nicklas, T. A. – Baranowski, T. – Cullen, K. W. – Berenson, G.: Eating patterns, dietary quality and obesity. *Journal of the American College of Nutrition*, 20, 2001, pp. 599–608.
  16. Vuori, I. M.: Health benefits of physical activity with special reference to interaction with diet. *Public Health Nutrition*, 4, 2001, pp. 517–528.
  17. Trichopoulou, A. – Costacou, T. – Bamia, C. – Trichopoulos, D.: Adherence to a Mediterranean diet and survival in a Greek population. *New England Journal of Medicine*, 348, 2003, pp. 2599–2608.
  18. King, D. E. – Mainous, A. G. – Carnemolla, M. – Everett, C. J.: Adherence to healthy lifestyle habits in US adults, 1988–2006. *American Journal of Medicine*, 122, 2009, pp. 528–534.
  19. Pei-Lin, H.: Factors influencing students' decisions to choose healthy or unhealthy snacks at the University of Newcastle, Australia. *Journal of Nursing Research*, 12, 2004, pp. 83–91.
  20. Papadaki, A. – Hondros, G. – Scott, J. A. – Kapsokefalou, M.: Eating habits of University students living at, or away from home in Greece. *Appetite*, 49, 2007, pp. 169–176.
  21. Freedman, M. – Grivetti, L.: Diet patterns of first, second and third generation Greek-American women. *Ecology of Food and Nutrition*, 14, 1984, pp. 185–204.
  22. Soriano, J. M. – Moltò, J. C. – Manes, J.: Dietary intake and food pattern among university students. *Nutrition Research*, 20, 2000, pp. 1249–1258.
  23. Steptoe, A. – Wardle, J. – Cui, W. – Bellisle, F. – Zotti, A. M. – Baranyai, R. – Sanderman, R.: Trends in smoking, diet, physical exercise and attitudes toward health in European university students from 13 countries 1990–2000. *Preventive Medicine*, 35, 2002, pp. 97–104.
  24. Huang, T. – Harris, K. J. – Lee, R. E. – Nazir, N. – Born, W. – Kaur, H.: Assessing overweight, obesity, diet and physical activity in college students. *Journal of American College Health*, 52, 2003, pp. 83–86.
  25. Mammas, I. – Bertsiyas, G. – Linardakis, M. – Moschandreas, J. – Kafatos, A.: Nutrients intake and food consumption among medical students in Greece assessed during a clinical nutrition course. *International Journal of Food Science and Nutrition*, 55, 2004, pp. 17–26.
  26. Racette, S. B. – Deusinger, S. S. – Strube, M. J. – Highstein, G. R. – Deusinger, R. H.: Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health*, 53, 2005, pp. 245–251.
  27. Appleton, H.: Control of food-borne viruses. *British Medical Bulletin*, 56, 2000, pp. 172–183.
  28. Kasowski, E. J. – Gackstetter, G. D. – Sharp, T. W.: Foodborne illness: new developments concerning an old problem. *Current Gastroenterology Reports*, 4, 2002, pp. 308–318.
  29. Schmid, D. – Kuo, H. W. – Hell, M. – Kasper, S. – Lederer, I. – Mikula, C. – Springer, B. – Allerberger, F.: Foodborne gastroenteritis outbreak in an Austrian healthcare facility caused by asymptomatic, norovirus-excreting kitchen staff. *Journal of Hospital Infection*, 77, 2011, pp. 237–241.
  30. Frenn, M. – Malin, S. – Bansal, N. K.: Stage-based interventions for low-fat diet with middle school students. *Journal of Pediatric Nursing*, 18, 2003, pp. 36–45.
  31. Chew, F. – Palmer, S.: Television health promotion in four countries. *Nutrition*, 21, 2005, pp. 634–638.

Received 22 March 2013; revised 7 May 2013; accepted 14 May 2013.