



Food choices among Portuguese teenagers: a case study

Maria de Fátima Bessa Correia GUIMARÃES, Cristina CARAPETO

Cite this article as:

Guimarães, M.F.C.B., Carapeto, C. (2023). Food choices among Portuguese teenagers: a case study. *Food and Health*, 9(1), 13-26. <https://doi.org/10.3153/FH23002>

Universida Aberta, Department of
Science and Technology Rua da Escola
Politecnica, 141-147, 1269-001 Lisboa,
Portugal

ORCID IDs of the authors:

M.F.B.C.G. 0000-0002-6791-3950
C.C. 0000-0002-3190-9669

Submitted: 04.07.2022

Revision requested: 08.08.2022

Last revision received: 23.08.2022

Accepted: 06.09.2022

Published online: 10.11.2022

ABSTRACT

The Mediterranean Dietary Pattern (MDP) is currently accepted as being protective against some of the most worrisome chronic non-communicable diseases in today's society. It is important to instil this nutritional pattern in young people as it is at this point in life that healthy eating habits are created and later maintained. Assessing the adherence of students to the Mediterranean Dietary Pattern (MDP). A case study was carried out with 463 students aged between 14 and 20 years old. Parents of the youngsters were also surveyed to find out about the accuracy of the youth's answers and to determine the type of food preparation practiced in the family. Those who participated in this study had an informed consent, previously signed by their parents and voluntarily expressed their willingness to participate, although they could drop out at any time if they so wished. The results showed a good adherence to the Mediterranean Dietary Pattern (MDP) by the respondents (46.47%) and their knowledge about the concept of the Mediterranean Diet can be classified as "good" (39.7%) and "reasonable" (36.6%). The main conclusions of the study are that the students participating in the study have a good knowledge about the Mediterranean Food Pattern and show a high level of adherence to it.

Keywords: Mediterranean diet, KIDMED, Health

Correspondence:

Cristina CARAPETO

E-mail: cristina.carapeto@uab.pt



© 2022 The Author(s)

Available online at
<http://jfhs.scientificwebjournals.com>

Introduction

A food pattern is generally understood as a system of social and cultural norms and rules, socially built in accordance with the variety of objective conditions of existence and the psycho-affective economy of individuals that guide, regulate, shape, and give meaning to the act of eating. These food patterns (or models) are the result of a long and deep interaction between biotopes, the biopsychic and the sociocultural environments. These norms and rules are imposed from the outside, throughout the primary socialization process the shaping of tastes, foods, and meals (Lopes, 2006).

Mediterranean food can be defined as being an efficient management of a set of foods and culinary techniques that allowed the survival of the various southern communities and, at the same time, being the result of a social and cultural adaptive construction to a certain type of environmental conditions (Graça 2014; Sikalidis et al, 2021).

The Mediterranean Dietary Pattern (MDP) was first studied in Crete in the 1940s. Upon arriving at the island of Crete, researchers from the Rockefeller Foundation discovered levels of health and longevity that were not expected owing to the apparent poverty and reduced access to health care by local populations. They found levels of mortality from cardiovascular diseases lower than those recorded in the United States of America, and the different eating habits of that population began to make them suspect that there was a relationship between the Mediterranean Dietary Pattern and the non-emergence and development of chronic non-communicable diseases. In the following decades, Ancel Keys and his team would confirm this. Since then, health has been linked to the intake of foods characteristic from regions with climatic similarities to those found in Mediterranean-influenced countries (Graça 2014; Ntanasi et al, 2018; Caradonna et al, 2020).

According to Serra-Majem, (2014) the Mediterranean Diet Pattern (MDP), defined in 1993 at the International Conference on Mediterranean Diets, is defined as a lifestyle marked by diversity in life style habits, combined with characteristics such as: (1) high consumption of foods of vegetable origin (poorly refined cereals, vegetables, fruit, dried and fresh pulses and nuts and oilseeds); (2) consumption of fresh, less processed and local products, respecting their seasonality; (3) use of olive oil as the main fat for cooking or seasoning food; (4) low to moderate consumption of dairy products; (5) frequent consumption of fish and low/infrequent consumption of red meat; (6) consumption of water as the beverage of choice and low to moderate consumption of wine with the main meals; (7) simple culinary procedures with ingredients in the right proportions; (8) practice of daily physical activity

and (9) the habit of having meals with family and friends, promoting coexistence among people at the table.

The teaching and dissemination of concepts associated with healthy eating requires clear pedagogical models that can be understood by the general population. Therefore, food guides have emerged, sometimes as graphic representations that allow simplified dissemination of food and nutritional recommendations. The Mediterranean Food Pattern Pyramid is a food guide, which was initially developed in 1994, and later updated in light of the tradition and culture inherent to the Mediterranean region. The most current representation, created by the Mediterranean Diet Foundation, expresses an example of a sustainable food pattern, where nutrition, local production, biodiversity, and culture are strongly linked, with a reduced impact on the environment (Pinho et al, 2016).

The traditional Mediterranean Diet (MD) pyramid was updated in 2010 to adapt to the modern lifestyle. It incorporates both qualitative and quantitative elements in food selection. The new pyramid follows the design of the previous one: it places foods that should support the diet at the bottom and relegates foods that should be consumed in moderation to the graphically narrower upper strata. But, in addition, there are signs of a cultural and social order, closely linked to the Mediterranean lifestyle, based on the concept of food (understood in a broad sense). It is not just a matter of prioritizing a particular type of food, but the way in which it is selected, cooked, and consumed. It also reflects the composition and number of servings of main meals (FDM, 2021).

The present work is a case study focused on a group of young people between 14 to 20 years of age from a school located at the city of Vida do Conde (Portugal). The study took the form of an observational epidemiological study, with an analytical and cross-sectional nature, whose general objective was to relate food consumption of these young people with their degree of adherence to the Mediterranean Diet. More specific objectives included (i) the characterization of eating and consumption habits; (ii) the analysis of the adherence to the Mediterranean Dietary Pattern and (iii) the analysis of food consumption habits of the household of the young people surveyed.

Materials and Methods

From a total of 587 students who attended the thirty-two classes surveyed in the present study (secondary education level), 463 students accepted to participate in the study, with 147 (31.7%) attending the 10th grade, 154 (33.3%) the 11th grade and 166 (35.9 %) the 12th grade, as shown in figure 1. The

total number of students who accepted to answer the survey corresponds to 79.0 % of the total population of secondary education level at the chosen school, which is within the expected range and is considered representative of the group determined with the OpenEpi calculator, Version 3, using the equation $n = [EDFF * Np(1-p)] / [(d2/Z21-\alpha/2*(N-1)+p*(1-p)]$

For the present study two questionnaires were developed: questionnaire A, which was applied to students, and, questionnaire B to be sent by email, addressed to the parent (co)responsible for the purchase and /or preparation of household food. The questionnaires were prepared based on the foods listed in the Mediterranean Diet Pyramid, created by the Mediterranean Diet Foundation, to which some beverages (wine and soft drinks) were added (FDM, 2021).

Data collection took place over a period of seven months, between October 1st, 2020, and April 30th, 2021.

Considering the target population, the objectives of the work, and the type of study, the two surveys were applied in stages. As shown before, the size of the sample was considered to be representative of the total population of secondary education in the school cluster.

Stage 1 - Application of questionnaire A to 463 students regarding their eating habits. This survey was answered at school.

Stage 2 - Application of questionnaire B to parents regarding the eating habits practiced at home. This survey was sent to the parents of the participating students through a link created for this purpose and sent through the institutional email of the school.

For ethical reasons, the study was preceded by an informal meeting with the Director of the School to present the project and obtain authorization for the application of the questionnaires. The young people who participated in this study had an informed consent, previously signed by their parents, and voluntarily expressed their willingness to participate, although they could drop out at any time if they so wished.

Questionnaire A

Questionnaire A was designed to be applied in the school context. It consisted of eight parts with a total of 18 questions.

Part A - Identification of the school year and sociodemographic data;

Part B - Anthropometric data;

Part C - Eating habits;

Part D - Frequency of meals;

Part E - Place of meals from Monday to Friday;

Part I - Knowledge about healthy food products;

Part J - Main sources of information for food knowledge;

Part K- Self-assessment of knowledge about the Mediterranean Diet;

This questionnaire aimed at obtaining data on food consumption habits, namely the adoption of some type of special diet, the consumption of foods associated with the Mediterranean Diet, the number of daily meals, and the place of meals.

Questionnaire B

Questionnaire B, electronically completed, was developed in the Google Forms application to complement the information obtained on the consumption and eating habits of the household of the young respondents. Addressed to the person responsible for purchasing and/or preparing the household's food, the aim was to confirm the information provided by the young people and to understand whether adherence to the Mediterranean Diet is a consequence of habits transmitted by adults at home.

This questionnaire consisted of two parts, with a total of thirty-two questions.

The first part of the questionnaire intended to collect socio-demographic data and anthropometric characterization of the respondent; the second part intended to collect information on the household's food consumption habits.

The frequency scale of the second part of this questionnaire presented the options “never or only once a month”, “twice a month”, “once a week”, “2 to 4 times a week”, “5 to 6 times a week” and “daily or twice or more times a day”.

The statistical analysis of the data was carried out using the data collected in the Google Forms application. The data collected in questionnaire A was inserted in the application after having the answers from the students, while questionnaire B was electronically completed, by one parent of the students.

The characterization of the eating habits of the students and their households in terms of food frequency and consumption habits was carried out through the analysis of the consumption frequencies of different foods associated with the Mediterranean Dietary Pattern (MDP).

Results and Discussion

Characterization of Sample A

The 467 students that responded the survey, had a good distribution among the three last years of school (secondary level of education), as shown in figure 1.

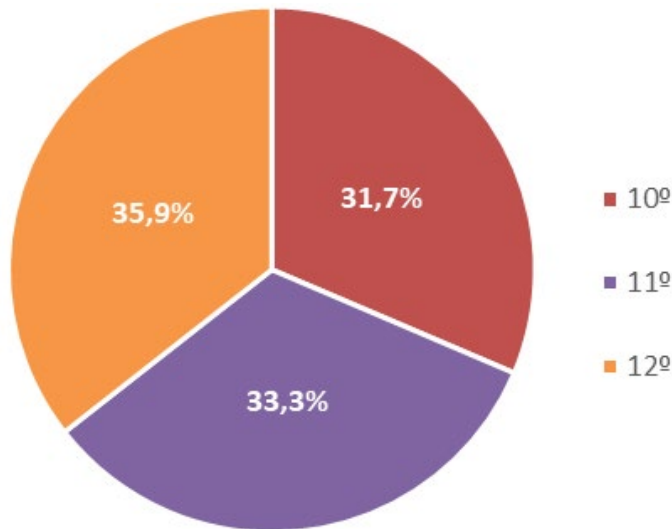


Figure 1. Year of schooling of students in the present study

From the total number of questionnaires, it was found that 248 students were male and 215 were female, corresponding, respectively, to 53.6% and 46.4%, with the vast majority (95.7%) being Portuguese (Fig.2).

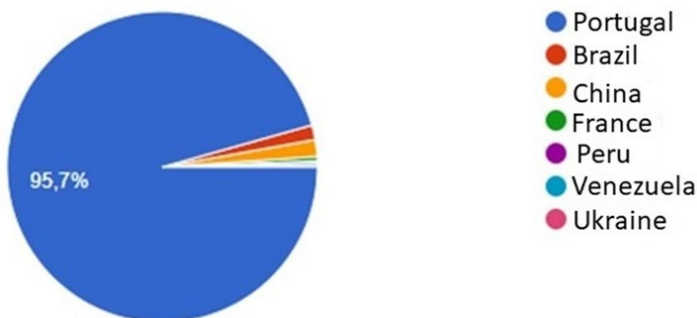


Figure 2. Nationality of students

Regarding the fact of following any special types of diet, 84.1% of the participants reported not to practice any special type of diet. The remaining 15.9% of students reported following specific diets as follows:

- 13 students (2.8%) reported being vegetarian,
- 8 students (1.7%) followed a gluten-free diet,
- 17 students (3.7%) followed a lactose-free diet,

- 28 students (6.0%) followed a weight loss diet and
- 8 students (1.7%) indicated that they practiced another type of diet.

Once this 15.9% of students reported to following specific diets they were not included in the statistical analysis although they were allowed to participate in the study. Our sample was then reduced to 431 students but remained representative of the group (OpenEpi calculator, Version 3).

Before presenting our results regarding the eating habits of the study population, it is important to stress that the Mediterranean Food Pattern refers to not only the type of food that is consumed but also to the way it is cooked, the number of daily meals as well as the conviviality with family or friends. That is why it is important to analyse the daily eating habits of the study population to assess their adherence to the Mediterranean Dietary Pattern (MDP) (FDM, 2021).

Regarding daily meals, 9% of students reported the habit of not eating breakfast; 20.5% said they did not consume food in the middle of the morning; 7% reported not having a mid-afternoon snack and 51.8% reported not having supper.

While an average of 84% of students only consume breakfast from Monday to Friday and an average of 72.4% consume the morning snack only from Monday to Friday, practically all students (98.5%) consume the meal “lunch” every day of the week. Figure 3 summarizes these eating habits by meal and by day of the week with regard to Breakfast, Morning Snack, and Lunch, and Figure 4 summarizes the same eating habits, but in relation to Afternoon Snack, Dinner, and Supper.

It was found that:

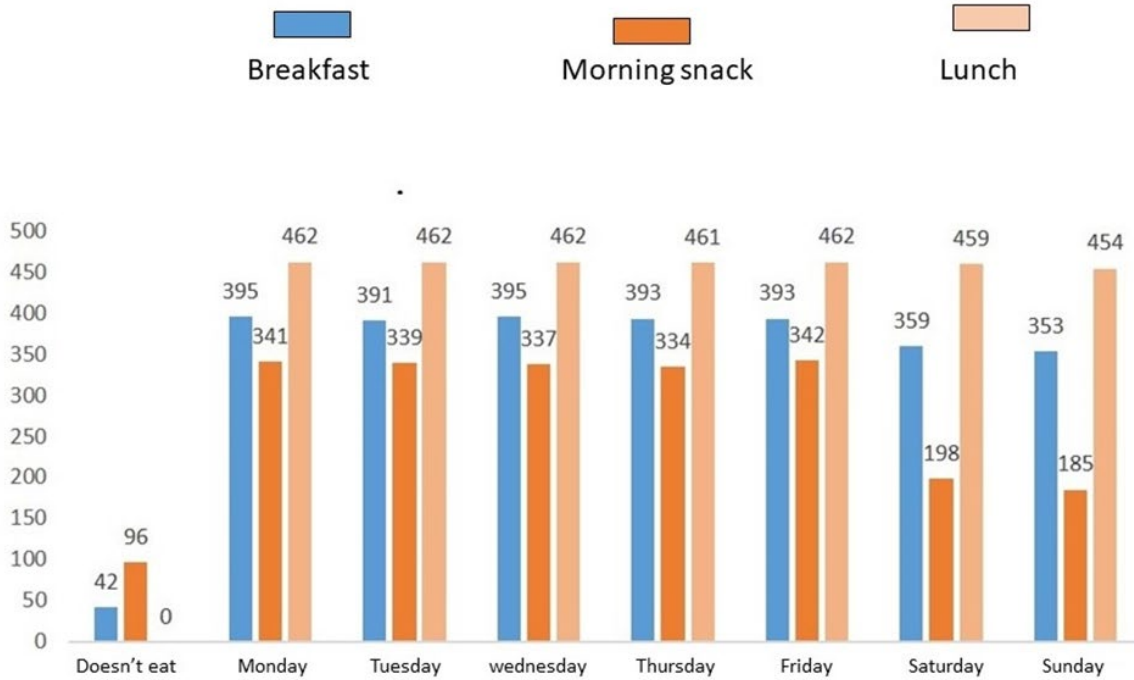
- the afternoon snack is consumed daily by an average of 84.6% of students,
- dinner is consumed daily by an average of 97%
- supper is consumed daily by an average of only 30.6% of students, with an increase to 38.1% during weekends (Figure 4).

Regarding the place where meals are consumed from Monday to Friday, it was observed that:

- Breakfast at home — 395 (84.5%) students;
- Breakfast at the school bar — 13 (2.8%);
- Breakfast brought from home — 12 (2.6%).

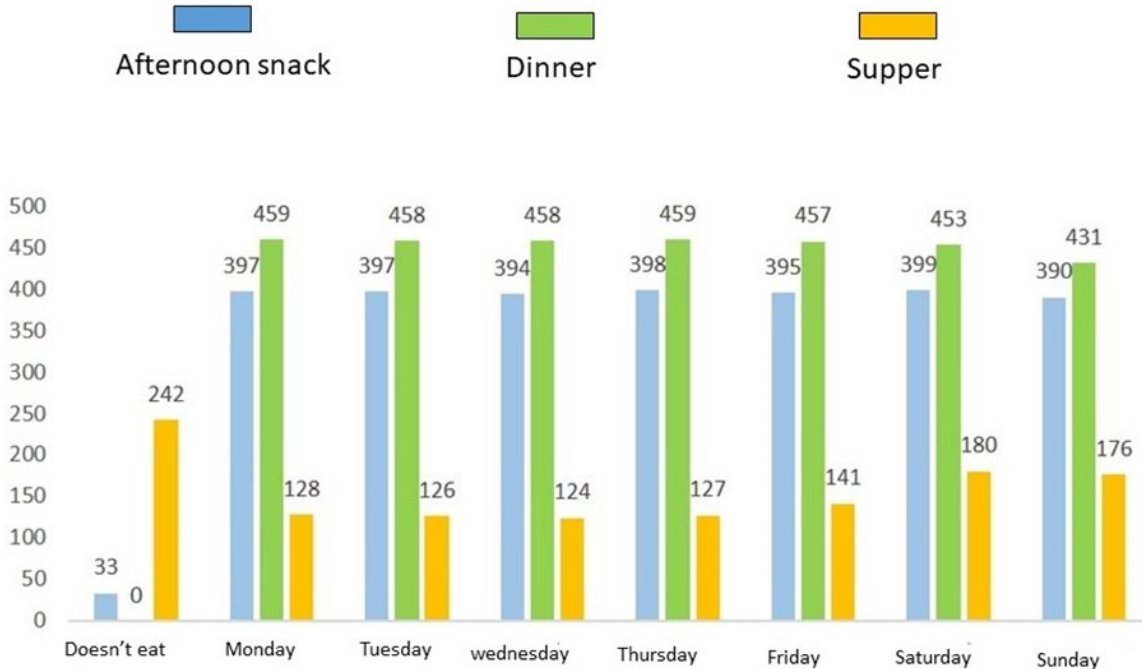
Of the students who consume the morning snack we found that:

- 276 (69.8%) bring it from home;
- 98 (24.8%) purchase products from the school bar and
- 18 (4.5%) eat at home



Numbers in bars show the actual number of students in the study have has the habit of consuming the referred meal in each day of the week.

Figure 3. Eating habits by meal and by day of the week (Breakfast, Morning Snack and Lunch)



Numbers in bars show the actual number of students in the study that have the habit of consuming the referred meal in each day of the week.

Figure 4. Eating habits by meal and by day of the week (Snack, Dinner and Supper)

Lunch is mostly taken in the school canteen together with school friends (286 students - 61.2%), however, 170 (36.4%) students eat this meal at home, 98 (20.9%) students have lunch at a coffee shop or restaurant and 46 (68.6%) bring it from home. In all cases, this meal is never eaten without the company of friends or family.

Regarding the afternoon snack, most students (245 students – 52.5%) reported that they brought it from home, although 113 (24.1%) made this meal at home and 110 (23.5%) purchased products at the school bar. Dinner is also mostly made at home (97.2%) but 13 (2.8%) students reported having dinner at a coffee shop or restaurant. 175 students (37.5%) made supper at home.

In answer to the question “do you know what healthy food products are?”, 458 students (99.3%) said “yes” and only 3 (0.7%) said they did not know.

Regarding the main sources of information about food knowledge, it was found that parents were pointed as the main source of information (71%), followed by health professionals (doctors, nutritionists, dieticians (53%)), the Internet (47.2%), teachers (24.7%) and finally television (19.1%).

Evaluating their own knowledge about the Mediterranean Diet, given the options “Very good”, “Good”, “Fair” and “Poor” it was found that 11% of the students consider that they have a “very good” knowledge; 39.7% consider having “good” knowledge on the subject; 36.6% classify their knowledge as “reasonable” and 12.7% recognize having a “poor” knowledge of the topic.

The adherence of these young people to the Mediterranean dietary pattern was also analysed using the Mediterranean Diet Quality Index for children and adolescents (KIDMED Index as shown in Table 1) (Serra-Majem et al, 2004; Altavilla and Caballero-Pérez, 2019). This questionnaire was also answered at school. The results obtained are shown in Table 1.

From the analysis of the answers obtained, the consumption of a fruit or fruit juice every day (73.2%) stands out positively; 71.7% consumed fresh or cooked vegetables at least once a day; 70.8% consumed fish at least 2 to 3 times a week; consumption of legumes more than once a week represented 74.5%; consumption of pasta or rice 5 or more times a week represented 86.9%; 81.5% consumed cereals or products derived from cereals (bread, etc.) for breakfast; the use of olive oil at home is a habit for 94.4%; 83.5% have the habit of having breakfast; and the consumption of dairy products (milk, yogurt, etc.) for breakfast represented 82%.

As negative aspects, we found that the low consumption of a second fruit daily (29%) stands out as well as the consumption of fresh or cooked vegetables more than once a day (37.4%). The consumption of nuts at least 2 to 3 times a week (18.6%) and the consumption of yogurt and cheese other than at breakfast (36.6%) is also poor.

From the previous analysis, it is possible to assess the levels of adherence to the Mediterranean Dietary Pattern (MDP) (Table 2).

It stands out that the students participating in this study have good adherence to the Mediterranean Diet.

Characterization of Sample B

89 parents answered questionnaire B. The answers obtained were mostly given by female participants (86.5%) and they were mostly in the age group between 42 to 45 years of age.

Regarding the level of schooling, it was found that all parents had more than basic school, as shown in Figure 5.

With regard to employability, 74.1% of the respondents reported being active, and 12.9% were unemployed.

To the question about the habit of cooking meals at home, a percentage of 90.9% were affirmative answers; 8% of the respondents answered that they cooked sometimes and only 1 participant (1.1%) said that did not cook.

Food consumption habits of the households of the young people surveyed showed that the reasons that most influenced the choice/purchase of food on a daily basis were

- Freshness of the food (89.8%)
- Family preference (68.2%)
- The price (65.9%)
- The fact that food was produced locally (23.9%)
- The easiness/speed in food preparation and confec-tion (19.3%)
- The availability of points of purchase (18.2%)
- The fact that foods were typical from the region (10.2%)
- Packaging or presentation (8%)
- The fact of food being related to cultural or ethnic roots and finally (4.5%)
- Easiness of food transporting (3.4%) (fig.6).

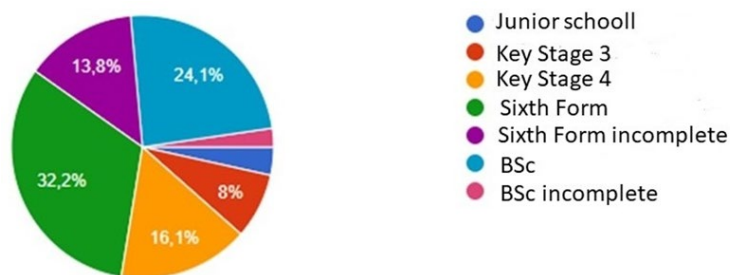
As for the use of aromatic herbs such as celery, rosemary, chives, coriander, mint, bay leaf, basil, oregano, parsley, sage, and thyme to season their cooking, the majority of participants (82%) reported having this habit while 10.1% mentioned their sporadic use and 7.9% said they did not have the habit of using aromatic herbs.

Table 1. KIDMED survey result

	Number	Yes	No
Do you consume a fruit or fruit juice every day	467	42	125
Do you consume a second fruit every day	467	138	329
Do you eat fresh or cooked vegetables regularly, at least once a day	467	336	131
Do you eat fresh or cooked vegetables regularly, more than once a day	467	177	290
Do you consume fish regularly (at least 2-3 times a week)	467	331	135
Do you go, more than once a week, to “fast-food” (hamburger) restaurants	467	58	409
Do you eat pulses more than once a week	467	349	118
Do you eat pasta or rice almost every day (5 or more times a week)	467	409	58
Do you eat cereal or cereal products (bread, etc.) for breakfast	467	382	85
Do you eat nuts (walnuts, almonds, etc.) regularly (at least 2 to 3 times a week)	467	88	379
Do you use olive oil at home	467	443	24
Do you usually have breakfast	467	392	75
Do you have dairy products (milk, yogurt, etc.) for breakfast	467	384	83
Do you eat prepared food or pastries for breakfast	467	117	350
Do you eat 2 yogurts and/or cheese (40g) daily	467	171	296
Do you eat sweets or treats several times a day	467	73	394

Table 2. Levels of adherence to Mediterranean Dietary Pattern (MDP) by KIDMED

Level of adherence	Frequency	Relative frequency (%)
High adherence (>8)	244	52,25%
Intermediate adherence (4/7)	217	46,47%
Low adherence (<=3)	6	1,28%
Total	467	100%

**Figure 5.** Level of education of parents

It should be noted that 93.3% of participants consider that the preparation of meals at home, with family and friends, provides them pleasure and well-being.

With regard to the dietary habits of the adults surveyed, and regarding the use of olive oil as the main cooking fat, it was found that this fat is used daily by all the adults that cook at home with a minimum consumption of 2 tablespoons per day which can easily rise up to 6 or 7 tablespoons daily.

Regarding the frequency of consumption of pre-prepared meals, the majority (65.5%) answered that they consume these products once a week while 21.8% said they did not consume them. In addition, 11.5% said that they consumed pre-prepared meals twice a week and 1.1% admitted to consuming them 4 times a week.

As for the consumption of certain products of animal origin and cereals and their frequency of its consumption in the last 30 days, the results are shown in Table 3.

From the analysis of the table 3, it can be concluded that white meat, pork, fish, and eggs are structuring foods in the participants' diet, as are yogurts and bread. Soups, vegetables, and fruit are also present with a high frequency and with regard to the consumption of beverages, tea and/or coffee stand out as being consumed every day or even more than once a day.

We also asked about cooking methods, namely boiled, grilled, fried, roasted, stewed, and stir-fried, as well as the frequency of the consumption of each type of cuisine (table 4). From the analysis of the table, one may conclude that there is a good variety of cooking methods that are used regularly.

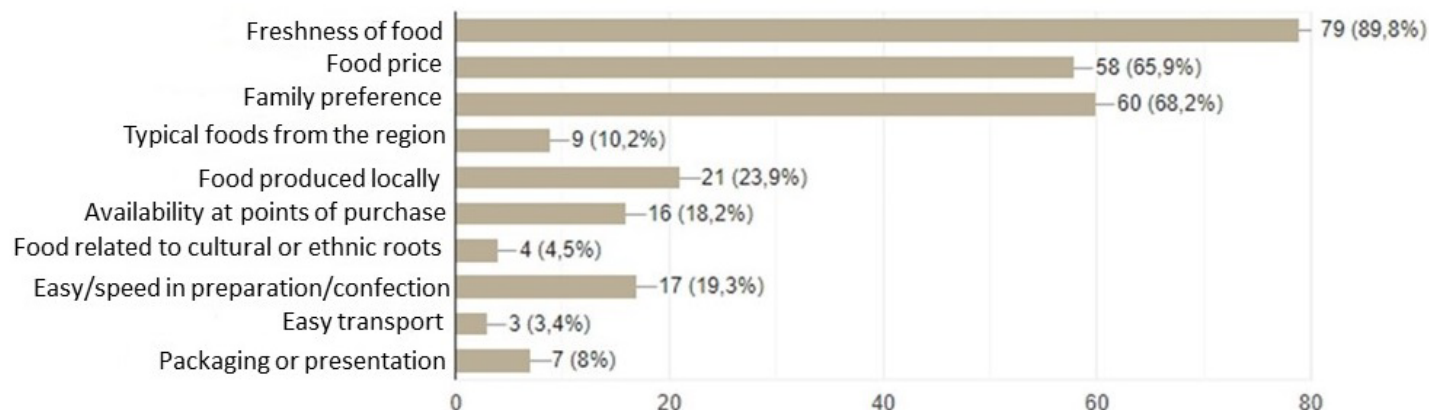


Figure 6. Reasons that influence food purchase

Table 3. Frequency of consumption of food products

Products	Frequency	Never or less than once a month	Twice a month	Once a week	2 to 4 times a week	5 to 6 times a week	Once a day	2 or more times a day
Processed meats		32	21	34	2	-----	-----	-----
Red meat		29	19	76	49	3	2	-----
white meats		2	4	19	46	11	4	3
Fish		2	12	32	33	8	2	-----
Eggs		1	15	29	35	8	1	-----
Milk		13	1	19	12	15	24	5
Yogurts		11	4	16	24	11	16	7
Cheese		8	7	23	15	20	13	3
Breakfast cereals		32	6	20	11	7	10	3
Bread		4	5	19	16	15	21	9
Soup		11	4	20	18	14	17	5
Potatos		6	4	26	37	14	2	-----
Various raw or cooked vegetables		3	2	21	18	16	16	13
Pulses		5	4	32	27	12	5	4
Rice, spaghetti or pasta		1	4	19	33	14	10	8
Fresh fruit		1	1	18	14	13	16	26
Natural fruit juices		29	13	24	12	6	2	3
Bottled fruit juices		77	26	47	16	-----	3	6
Coffee and/ot tea		6	-----	21	6	5	15	36
Herbal teas		55	6	8	5	5	6	4
Wine		53	7	17	2	-----	9	1
Other alcoholic beverages		70	6	5	2	2	4	-----

Table 4. Cooking methods and frequency of consumption

Frequency Cooking method	Never or less than once a month	Twice a month	Once a week	2 to 4 times a week	5 to 6 times a week	Once a day	2 or more times a day
Boiled (includes fish stews)	15	14	31	21	4	4	-----
Grilled	4	8	26	35	11	4	1
Fried	14	19	35	20	-----	1	-----
Oven baked	5	8	42	26	6	1	1
Stews	5	8	38	29	7	2	-----
Stir-fried	8	11	42	24	1	1	2

Regarding the eating habits of the young people surveyed, it was found that most of them do not practice any special type of diet with those who report doing so, the most representative being the slimming diet (6%). An identical result was presented in the results of the National Food and Physical Activity Survey (IAN-AF) 2015-2016, in which only 6.8% of the individuals reported following a special diet (INE, 2017).

The fact the majority of students that participated in the study consume regularly the main meals (breakfast, lunch and dinner) as well as the morning and afternoon snack, as shown before in the analysis of results, is well in accordance with the Mediterranean Dietary Pattern (MDP) which advises the consumption of several meals during the day, dividing the amount of energy between them instead of concentrating all the energy necessary for body function in just one or two main meals (D'Innocenzo et al, 2019). Our results about the study of food consumption habits and adherence to the Mediterranean Dietary Pattern are reinforced by the results obtained with the KIDMED survey. We feel confident with the results shown in relation to the KIDMED questionnaire since it has already been proven the reproducibility and validity of this index with Portuguese adolescents (Rei et al, 2021). In addition, the results of the present study are in accordance with those found in another study regarding Portuguese children (Rito et al, 2018). We observed that some students have their meals at home even during weekdays. This means that either they live within walking distance of school or their parents are able to fetch them from school at mealtime. Whichever the case, this is important since it reinforces family bonds but even the students who eat at school facilities or at local restaurants mentioned the company of friends during meals. This is also an important and strong characteristic of the Mediterranean Dietary Pattern (MDP). In addition, the fact that these students' parents have a good level of education (as shown in figure 5) also influences the food choices made by families and taught to youngsters (Almeida et al, 2021; Hanemaayer et al, 2022).

In this study, participants showed to have a good habit of eating breakfast, which is in accordance with the Mediterranean traditions, although we found a slight drop between consumption on weekdays *versus* weekends. The 2018 HBSC (Health Behaviour in School-aged Children), a collaborative study of the World Health Organization (WHO) that aimed at studying the lifestyles of adolescents and their behavior in various scenarios of their lives, pointed in the same direction (Inchley et al, 2020). In that study participated 6997 young students and it was reported a difference of 5.5 pp lower in the consumption of breakfast on weekends than on weekdays (Inchley et al, 2020). However, an inverse result was found in an earlier study carried out in 2012 in which a sample of 276 young people, between eleven and sixteen years old, showed that between 63.8% and 64.5% ate breakfast during the weekdays, increasing that frequency during the weekends to 81% on Saturday and 84.4% on Sunday (Matos, 2018). When analysing, breakfast consumption among adolescents, the IAN-AF 2015-2016 results indicate that the prevalence is 91.6% (INE, 2017).

As for the mid-morning meal, our results show inverse values from those observed in the study by Mateus (2012) in which during the weekdays only 2.0% to 2.9% ate this meal with the frequency increases during the weekend to 37.1% on Saturday and 38.4% on Sunday. This may be due to a geographical difference being the study by Mateus (2012) done in the south of the country (Algarve) while our study relates to students in the northern rural part of Portugal. In the 2015-2016 IAN-AF (national inquiry to families) results, the prevalence was found to be 53.2% (INE, 2017) leveling the results of both studies.

These two meals (breakfast and mid-morning meal) are particularly important in the diet of young people since they represent the first source in the day of water and infusions, dairy products, fruit and fruit juices, as well as bread and other poorly refined cereals in accordance with the principles and

recommendations of the MD Pyramid (FDM, 2021). Compared to other studies, the present one shows results more in line with the MD indications regarding these meals, although it may be concluded that a considerable number of young people deviate from these guidelines, especially during weekends, which indicates that they spend too many hours without eating. Although without certainties, we may think of small changes in the habits of the young Portuguese students in the sense of skipping breakfast during the weekends. This may be due to the atypical year in which the present study was developed (during the COVID-19 pandemic period) in which most students spent more time at home than usual. This factor may have led to this change in eating habits owing to the changes in the school schedules.

Regarding the remaining daily meals, we found that lunch was eaten by all the students every day of the week, with no significant difference in its frequency during weekends. This is well in accordance with the new Mediterranean Diet Foundation Expert Group's pyramid (Lacatusu et al, 2019) although different values were found by Mateus (2012) that reported differences for this meal for weekdays (between 29.0% and 34.5%) and weekends (92.5% on Saturday and 94.4% on Sunday). A similar result to the present study was reported in the 2015-2016 IAN-AF results (INE, 2017), where the prevalence is 97.9%.

As for the afternoon snack, it seems that the majority of the surveyed young people consume it daily, although with a value relatively lower than that found in the 2015-2016 IAN-AF results (INE, 2017) with a prevalence of 91.9%, but much higher than that found by Mateus (2012) in which there was a consumption between 19.9% and 22.1% from Monday to Friday and 68.7% on Saturday and 71.2% on Sunday.

Dinner is one of the most frequently eaten meals in this study, with an average of 97% of students having it every day of the week, similar to what Mateus and the IAN-AF 2015-2016 found (Mateus, 2012; INE, 2017).

Supper is the least frequent meal among the young people surveyed in this study, being eaten daily on average by only 30.6%, with an increase to 38.1% during weekends. An identical trend was found in other studies (Mateus, 2012; INE, 2017). This is not surprising since supper isn't strongly associated with Portuguese food habits (Graça, 2020; Ferreira et al, 2021).

From the analysis of the data obtained in this work, it can be concluded that the main meals (lunch and dinner) are the ones that are consumed more regularly, especially during weekdays and, compared with data from other studies mentioned before, the students surveyed have habits of more frequent

consumption, namely in relation to the intermediate meals. Bibliography points out as beneficial the daily consumption of meals at regular times and eaten in a quiet environment, as they favor the digestion of food and the regulation of the amount ingested (Esaulenko et al, 2016, Kanjilal et al, 2021; Agathão et al, 2021). The importance of breakfast, which should never be missed, is highlighted, as its omission can cause metabolic changes, resulting from prolonged fastings, such as a decrease in the ability to be attentive, concentrate, and logical reasoning, that is, causes difficulties in thinking, understanding, and learning, reasons that are often enough to affect school results (Sousa, 2013). It is also mentioned that in addition to food, there are other important factors that also influence health status and longevity, such as naps, the number of meals per day, and the presence or absence of snacks (Pinho et al, 2016; Bellisle, 2021).

Regarding the place where meals are taken from Monday to Friday, it was found that the majority of the surveyed students have lunch in the school canteen. This habit is confirmed by other studies (Mateus, 2012; Matos, 2021). As for the knowledge about healthy food products, it was found that practically all students claim to have this knowledge and mention parents as being the main source of information. Teachers appear in the fourth position of the five possible response options as a source of transmission of this type of knowledge as also happens in other studies (Mateus, 2012).

Analysing the Portuguese school curricula, published by the General Directorate for Education (DGE), it was found that although the theme of food and nutrition is present in several study cycles, only in the 9th grade the topic "Mediterranean Diet" is introduced (DGS, 2012).

For educators, it is fundamental to have food models they can rely on, whether they are health professionals, education professionals, or parents. The promotion and defense of the Mediterranean Diet can (and should) be used as a resource for more comprehensive education, aiming at preparing future citizens who are more aware of their roots and able to make healthy food choices.

The integration of the Mediterranean dietary pattern concept in the curricular goals of basic education allows the dissemination of concepts and behaviors associated with a healthy lifestyle, not only because it is important but also because levels of interest and satisfaction with school worsen with age and with the pressure of schoolwork (Pinho, et. al, 2016; Graça, 2016; Lima, 2018; Inchley, et. al, 2020; Matos, 2021).

Thus, the fact that students consider that their nutritional learning is provided by teachers in less than 25% of the participants may be seen as positive because, as the present study

shows, students follow a diet that we may consider healthy which may be due to their parents' knowledge and also because the way teachers approach food topics (integrated and planned in other subjects) allowing students to learn new concepts without being imposed on them.

Still regarding questionnaire A, 52.25% of respondents showed a high adherence to the Mediterranean Dietary Pattern (MDP), 46.47% were at the intermediate level of adherence, and only 1.28% had a low level of adherence. Compared with other studies carried out at national level, the same situation was found with only a difference of 4.12pp compared to the present study (Mateus, 2012). More recently, in the study published by Bôto et al (2021) with the objective of characterizing the eating habits, health, and adherence to the Mediterranean Dietary Pattern of young people at the secondary education level, with a sample of 325 young people aged between 15 and 19 years, the results indicated a low adherence to the Mediterranean Dietary Pattern in 9.0% of the participants, an intermediate adherence in 45.5% and a high adherence in 45.5%. In this case, there is a deviation of 7.72 pp, in the low adherence to the Mediterranean Dietary Pattern (MDP) compared with the present study. These three studies have in common the fact that they have used a similar methodology regarding the way for assessing eating habits, since they were all carried out using the same questionnaire to measure the adherence to the Mediterranean Dietary Pattern (MDP).

In relation to questionnaire B, which aimed at assessing the eating and consumption habits of the families of young students, we found that the participants have the habit of cooking at home and that they consider that the preparation of meals with family and friends provides them with pleasure and well-being, as mentioned before. Participants were, in general, female which seems to show that these activities are still carried out mostly by women. By analysing the 89 valid responses, a considerable number of participants (always over 25 years old) were found to have their own food production, namely vegetables, fruits, eggs or herbs, which is presumed to be due to the rural environment where the study was conducted, and which reveals consumption habits of local, fresh, seasonal and sustainable foods. In the MD Pyramid, these foods are located in the group of foods that should be consumed daily (Abreu, 2014; Ferreira, 2014; Pinho et al, 2016).

Comparing the consumption observed in this study with the recommendations of the MD pyramid, the daily/weekly consumption of olive oil, dairy products, aromatic herbs, white meats, eggs, legumes, processed meats, red meats, and sweets stands out positively. Negatively, we found a low daily/weekly consumption of water or infusions, fresh fruit,

vegetables, rice, pasta, bread, nuts, and fish (fresh or frozen). Potato consumption stands out for its excessive consumption.

The Mediterranean Diet is essentially characterized by the predominance of vegetable products, including fruit, vegetables, cereals, oilseeds, and legumes, and by the consumption of olive oil as the main source of fat. Olive oil is recognized for its cardioprotective properties, being pointed out as the most beneficial fat for daily use. Its consumption is advisable, either to season or to cook (Pinho et al, 2016; Sikalidis et al, 2021). Dairy products and fish are present in this dietary pattern in a moderate amount, as well as wine, particularly at meal times. The consumption of white meat and eggs balances the low consumption in frequency and quantity of red meat and sausages, as well as sugar. The richness of fruit and vegetables assumes a relevant presence in the Mediterranean Food Pattern, either in the form of salads, soups or in other food preparations. Sharing meals and traditions together with moderate physical exercise, favored by the mild climate, completes the model of healthy living (Sousa, 2013; Davis et al, 2015; Pinho et al, 2016; INE, 2017). Stews correspond to the main cooking techniques used, a traditional component associated with the various soups and broths, where the addition of vegetables and legumes is preferred, with a small amount of meat or fish, seasoned essentially with olive oil and aromatic herbs (Sousa, 2013; Valagão, 2014; Pinho et al, 2016).

The results obtained in the present study, through survey B, stand out positively in what concerns the simplicity and variety of cooking methods. However, it was found that pre-prepared and ready-to-eat meals are consumed by 65.5% of participants once a week and that fried foods are consumed once a week by 42.7% of households.

A factor to be highlighted here is that the “freshness of the food” and the “family preference” are the reasons that most influence the choice/purchase of food on a daily basis. However, the family budget is mentioned by 32.5% of the participants as a limiting factor to the purchase of certain foods, namely fish, meat, fruits, and vegetables. Similarly, data from the DGS report (DGS, 2016; DGE, 2021) indicates that in 2014, despite the majority of people inquired (71.4%) said that “there were no changes in the consumption of any food considered essential in the last 3 months owing to economic difficulties for its acquisition”, 26.6% answered affirmatively to this question. Truninger (2019) verified an identical result to that of the present study where the biggest drops in food consumption of families in a situation of food insecurity were verified in the consumption of fish (49.1%) and meat (44.2%). There was also a considerable decrease in the con-

sumption of vegetables (33.3%) and fruit (33.2%). In addition, the DGS and DGE reports (DGS, 2016; DGE, 2021) referred to 2014 and since then with the pandemic situation all over the world, food insecurity became higher.

In the present study, it was also found that the purchase of food products is mostly done once a week, preferably in dedicated stores (butcher, fishmonger, fruit store, etc.) and in supermarkets close to home. Traditionally, the city where this study took place offers residents a wide range of fairs and markets, which include a variety of fresh and seasonal food products. The results obtained about this issue may have been influenced by the limitations on trade, imposed by the DGS due to the Covid-19 pandemic, namely with the end of fairs and municipal markets.

Some limitations were imposed in the course of this study. The main ones being related to the fact that it was carried out during the pandemic period of Covid 19, which may have impaired the characterization of eating and consumption habits and lifestyles of students and their families with higher accuracy. The size of the sample in survey B was also a constraint, given that only 19.6% of parents from the total number of participating students gave their contribution. Low adherence may be related to the fact that the questionnaire was carried out online, and it was not possible to make a follow-up as it happened for questionnaire A. Another plausible reason may be related to the possible lack of access or familiarity with the internet.

Conclusion

Considering that eating habits play a central role in maintaining good levels of health, it is at school age that special attention should be paid, not only because there is a close relationship between a balanced diet and school performance, but also because it is in this group that it is worth to introduce eating habits that promote healthy lifestyles. Considering also that the health problems related to unhealthy eating habits and the lack of physical activity are extensive and costly to society, it will be more effective to promote healthy eating models, such as the Mediterranean Diet, preventing some diseases related to lifestyles, instead of overloading the National Health Service and the family budget with treatments that sometimes are expensive also from a psychological point of view. This study reinforced the results of previous investigations, reiterating the extreme importance of a set of systematic and long-term concerted actions by various national, local, and regional actors, in order to create conditions for healthy diets beginning at school age.

The main conclusion of the present study is that the students participating in this study showed good adherence to the

Mediterranean Dietary Pattern with 52.25% having a high adherence and 46.47% having an intermediate level of adherence. We also concluded that the students consider having a good knowledge about this theme, which is gratifying and reflects the efforts that schools and other agents have made over the years to promote the knowledge about the importance of this type of dietary pattern in health promotion.

Compliance with Ethical Standards

Conflict of interests: The author declares that for this article they have no actual, potential, or perceived conflict of interest.

Ethics committee approval: Verbal consent was witnessed and formally recorded. The study was preceded by an informal meeting with the Director of the School to present the project and obtain authorization for the application of the questionnaires. The young people who participated in this study had informed consent, previously signed by their parents, and voluntarily expressed their willingness to participate, although they could drop out at any time if they so wished.

Funding disclosure: -

Acknowledgments: -

Disclosure: -

References

- Abreu, M. (2014).** A Dieta Mediterrânica em Portugal: Cultura, Alimentação e Saúde in Universidade do Algarve. Faro (Ed) *Integração de tratamentos convencionais e emergentes na conservação e promoção da qualidade de produtos hortofrutícolas*, (192-201).
- Agathão, B.T., Cunha, D.B., Sichieri, R., Lopes, C.S. (2021).** The role of family meal frequency in common mental disorders in children and adolescents over eight months of follow-up. *PLoS ONE*, 16(2), e0243793
<https://doi.org/10.1371/journal.pone.0243793>
- Almeida, C, Azevedo, J, Gregorio, MJ, Barros, R, Severo, M., Padrão, P. (2021).** Parental practices, preferences, skills and attitudes on food consumption of pre-school children: Results from Nutriscience Project. *PLoS ONE*, 16(5), e0251620.
<https://doi.org/10.1371/journal.pone.0251620>
- Altavilla, C., Caballero-Pérez, P. (2019).** An update of the KIDMED questionnaire, a Mediterranean Diet Quality Index in children and adolescents. *Public Health Nutrition*, 22(14), 2543-2547.

<https://doi.org/10.1017/S1368980019001058>

Bellisle, F. (2009). Infrequently asked questions about the Mediterranean diet. *Public Health Nutrition*, 12(9a), 1644-1647.

<https://doi.org/10.1017/S1368980009990498>

Bôto, J., Pinto, E., Mateus, M. (2019). Hábitos alimentares, de saúde e adesão à dieta mediterrânica dos jovens da região do Algarve. *Acta Portuguesa de Nutrição*. Associação Portuguesa de Nutrição, Faro. Available from:

https://actaportuguesadenutricao.pt/edicoes/httpsactaportuguesadenutricao-ptwp-content/uploads20200602_artigo-original-pdf/ (accessed 31.08.2021)

Caradonna, F., Consiglio, O., Luparello, C., Gentile, C. (2020). Science and healthy meals in the World: Nutritional epigenomics and nutrigenetics of the Mediterranean Diet. *Nutrients*, 12, 1748.

<https://doi.org/10.3390/nu12061748>

Davis, C., Bryan, J., Hodgson, J., Murphy, K. (2015). Definition of the Mediterranean Diet; a Literature Review. *Nutrients*, 7, 9139-9153.

<https://doi.org/10.3390/nu7115459>

D’Innocenzo, S., Biagi, C., Lanari, M. (2019). Obesity and the Mediterranean Diet: A Review of Evidence of the Role and Sustainability of the Mediterranean Diet. *Nutrients*, 11, 1306.

<https://doi.org/10.3390/nu11061306>

Direção-Geral da Educação (2021). Aprendizagens essenciais – Ensino Básico. Available from:

<https://www.dge.mec.pt/aprendizagens-essenciais-ensino-basico> (accessed 02.09.2021)

Direção-Geral da S. (2012). Programa Nacional da Promoção da Alimentação Saudável - Orientações Programáticas. DGS (Eds.) Lisboa 2012

Direção-Geral da S. (2016). Padrão Alimentar Mediterrânico: Promotor de Saúde. DGS (Eds) Lisboa 2016

Graça, P. (2014). O Futuro da Alimentação: Ambiente, Saúde e Economia. *Fundação Caloust Gulbenkian, O padrão alimentar do Mediterrâneo e o acesso a alimentos saudáveis* 2014, 204-210.

Graça, P. (2015). Alimentação Saudável em números - 2015. *Programa Nacional para a Promoção da Alimentação Saudável*. DGS. Lisboa 2016.

Graça, P. (2020). *Como comem os portugueses – alimentação*, Fundação Francisco Manuel dos Santos e Pedro Graça (Eds). Lisboa 2020.

Esaulenko, I.J., Nastaushcheva, T.L., Zhdanova, O.A., Logvinova, I.L., Ippolitova, L.I., Minakova, O.V. (2016). Regular meals at school as a factor of physical development of children and adolescents: Results of a cohort study. *Current Pediatrics*, 15(4), 364-370.

<https://doi.org/10.15690/vsp.v15i4.1587>

Ferreira, M. (2014). A Dieta Mediterrânica em Portugal: Cultura, Alimentação e Saúde in Universidade do Algarve (Eds) *As Plantas Aromáticas e Medicinais (PAM) na Dieta Mediterrânica: porquê, quando e como?* 203-215

Ferreira, M., Guiné, R.F., Leitão, A.L., Duarte, J., Andrade, J., Amaral, O. (2021). Eating habits and food literacy: Study involving a sample of Portuguese adolescents. *Open Agriculture*, 6, 286-295.

<https://doi.org/10.1515/opag-2021-0011>

Fundación Dieta Mediterránea (2021). Pirâmide e Decálogo da DM. Available from:

<https://dietamediterranea.com/nutricion-saludable-ejercicio-fisico/> (accessed 16.08.2021)

Hanemaayer, R., Neufeld, H.T., Anderson, K., Haines, J., Gordon, K., Lickers, K.R.L., Xavier, A., Peach, L., Peeters, M. (2022). Exploring the environmental determinants of food choice among Haudenosaunee female youth. *BMC Public Health*, 22, 1156.

<https://doi.org/10.1186/s12889-022-13434-z>

Inchley, J., Currie, D., Budisavljevic, S., Torsheim, T., Jåstad, A., Cosma, A. (2020) (Eds). Spotlight on adolescent health and well-being. Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada. International report. Volume 1. Key findings. Copenhagen: WHO Regional Office for Europe. Licence: CC BY-NC-SA 3.0 IGO

INE (2017). I.P. Inquérito às Despesas das Famílias 2015/2016. INE (Eds). Lisboa 2017.

Kanjilal, M., Kumar, U., Gupta, G.K., Agrawal, D., Arya, R., Batra, J. (2021). Dietary Habits and their Impact on the

Physical Status of School Going Adolescents in Delhi: A Cross-sectional Study. *Journal of Clinical & Diagnostic Research*, 15(7), 42-47.

<https://doi.org/10.7860/JCDR/2021/48202.15158>

Lacatusu, C.-M., Grigorescu, E.-D., Floria, M., Onofriescu, A., Bogdan-Mircea Mihai, B.-M. (2019). The Mediterranean Diet: From an environment-driven food culture to an emerging medical prescription. *International Journal of Environmental Research and Public Health*, 16, 942.

<https://doi.org/10.3390/ijerph16060942>

Lima, R. (2018). Orientações sobre ementas e refeitórios escolares - *Direção-Geral da Educação*

Lopes, P. (2006). A Modernidade Alimentar, in *(E)volução Simbólica do Acto Alimentar*. Edições Colibri pp.74.

Mateus, M.P.D.C.A.N. (2012). Adesão ao padrão alimentar mediterrânico em jovens no Algarve. *Programa Doutoral em Ciências do Consumo Alimentar e Nutrição. Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto*. Porto.

Matos, M.G., Social, E.A. (2018). Relatório do Estudo HBSC 2018: A saúde dos adolescentes portugueses após a recessão—Dados nacionais do estudo HBSC 2018. Lisboa: Aventura Social.

Ntanasi, E., Yannakoulia, M., Kosmidis, M.-H., Anastasiou, C.A., Dardiotis, E., Hadjigeorgiou, G., Sakka, P., Scarmeas, N. (2018). Adherence to Mediterranean Diet and Frailty. *Journal of the American Medical Directors Association*, 19(4), 315-322.

<https://doi.org/10.1016/j.jamda.2017.11.005>

Pinho, I., Rodrigues, S., Franchini, B., Graça, P. (2016). Padrão alimentar mediterrânico: promotor de saúde. *Programa Nacional para a Promoção da Alimentação Saudável*. Lisboa.

Rei, M., Severo, M., Rodrigues, S. (2021). Reproducibility and validity of the Mediterranean Diet Quality Index (KIDMED Index) in a sample of Portuguese adolescents. *British Journal of Nutrition*, 126 (11), 1737-1748.

<https://doi.org/10.1017/S0007114521000532>

Rito, A.I., Ana Dinis, A., Rascôa, C., Maia, A., Mendes, S., Camila Stein-Novais, C., Lima, J. (2018). Mediterranean Diet Index (KIDMED) Adherence, socioeconomic determinants, and nutritional status of Portuguese children: The eat mediterranean program. *Portuguese Journal of Public Health*, 36, m141-149.

<https://doi.org/10.1159/000495803>

Serra-Majem, L., Ribas, L., Ngo, J., Ortega, R.M., Garcia, A., Perez-Rodrigo, C., Aranceta, J. (2004). Food, youth and the Mediterranean diet in Spain. Development of KIDMED, Mediterranean Diet Quality Index in children and adolescents. *Public Health Nutrition*, 7, 931-935.

<https://doi.org/10.1079/PHN2004556>

Serra-Majem, L., Trichopoulou, A, La Cruz, J., Cervera, P., Alvarez, A., Vecchia, C., Lemtouni, A., Trichopoulos, D. (2014). Does the definition of the Mediterranean diet need to be updated? *Public Health Nutrition*, 7(7), 927-929.

<https://doi.org/10.1079/PHN2004564>

Sikalidis, A.K., Kelleher, A.H., Kristo, A.S. (2021). Mediterranean Diet, *Encyclopedia*, 1, 371-387.

<https://doi.org/10.3390/encyclopedia1020031>

Sousa, B. (2013). Recomendações para uma alimentação diária mais saudável. *Revista Factores de Risco*, 30, 36-39.

Truninger, M. (2019). Alimentação em Tempos de Crise: consumo e Segurança Alimentar nas Famílias Portuguesas. *ICS Imprensa de Ciências Sociais*. Lisboa.

Valagão, M. (2014). A Dieta Mediterrânica em Portugal: Cultura, Alimentação e saúde. *Identidade alimentar mediterrânica de Portugal e do Algarve*, 27-41.