

Benefits of the Mediterranean Diet in the Prevention of Non-communicable Diseases as the Epidemic of the 21st century

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Abstract

Non-communicable diseases are known as the epidemic of the 21st century. In Romania, these are responsible for almost 91% of all the deaths. A balanced diet and regular physical activity (at least 30 minutes throughout the day) are the keys to a healthy and long living life. Mediterranean diet is shown to be the optimal diet for preventing non-communicable diseases and preserving good health. The concept of the Mediterranean diet is defined by the food pyramid, which is meant to provide an overall impression of healthy food choices, rather than to define recommended weights of certain foods or proportions of energy obtained from them. In Romania the concept of Mediterranean diet is unknown to most ordinary people. Even in medicine field there are few doctors who really know about this diet and its effects on patients' health. Our purpose in writing this article was to draw a warning signal about the impact of Mediterranean diet on the health of people, in hope that through media, the importance of a healthy and active life in raising quality of life and decreasing morbidity and mortality can be fully understood.

Keywords: fruits, health, Mediterranean diet, non-communicable diseases, vegetables

Fruits and vegetables are important elements of a healthy, balanced diet, be it as part of a main meal or as a snack. They bring us vitamins, minerals and fiber, some energy (mainly in the form of sugar), which are potentially beneficial for our health.

World Health Organization (WHO) recommends eating ≥ 400 g per day of fruits and vegetables, (excluding potatoes and other starchy tubers). This quantity refers to five servings of fruits and vegetables of 80 g a day. It is recommended also that the proportion of fruit and vegetables to be equal (World Health Organization, 2010).

Nevertheless, the recommendation is not achieved in many countries. In EU there are differences among countries too. For example, some countries, like Denmark, recommend higher amounts (≥ 600 g per day) of fruits and vegetables consumption (Yngve A *et al.*, 2005).

In Europe, there was reported a slight 2.6% raise in the consumption pattern to 382 g/capita/day for fresh fruits and vegetables, still below the WHO 400 g per day minimum recommendation. Specifically, the per capita fruit consumption in 2011 stands at 197.08 g/capita/day on average for the EU-27. It has increased by 3% in 2011 compared with 2010, but it also shows a decrease by 3% in 2011 compared with the average consumption of the previous five years (2006-2010). Per capita vegetable consumption in 2011 stands at 185.52 g/capita/day for the EU-27. It has increased by 2% in 2011 compared with

2010 but declined by 3% in 2011 compared with the average consumption in the previous five years (Freshfel Consumption Monitor, 2012).

In Romania, according to Romanian National Institute of Statistics, the consumption of fruits and vegetables in equivalent of fresh products is about 230 kg per year per capita. Also, the vegetables consumption is about three times higher than the fruits (INS. Anuarul statistic al României, 2011).

Compared with EU countries the total consumption of fruits and vegetables products in Romania is among the highest. Greece has the highest fruits and vegetables supply, followed by Belgium, Cyprus and Romania (INS. Anuarul statistic al României, 2011).

Epidemiological studies (Harding *et al.*, 2008; Mirmiran *et al.*, 2009; WCRF Panel, 2007) have shown that high intakes of fruits and vegetables are associated with a lower risk of chronic disease, particularly, cardiovascular diseases, type 2 diabetes and certain cancers-of the mouth, pharynx, larynx, esophageal, stomach and lungs.

In Romania, as shown in the WHO 2011 Non Communicable Disease (NCD) Country Profiles (World Health Organization, 2011), NCDs are estimated to account for 91% of all deaths. The highest mortality rates are due to cardiovascular diseases and diabetes (60% of total deaths, all ages), followed by cancers (19%) and chronic respiratory diseases (3%).

The Mediterranean diet has been reported to be the optimal diet for preventing non-communicable diseases and preserving good health (Martinez-Gonzalez *et al.*, 2009). Some large epidemiologic studies conducted in different cohorts evidenced an association between a greater adherence to Mediterranean diet, a reduced risk of mortality, and the incidence of major chronic diseases (Knoops *et al.*, 2004; Mitrou *et al.*, 2007).

The Mediterranean-style diet is not a specific diet, but rather a collection of eating habits traditionally followed by people in the different countries bordering the Mediterranean Sea (Sofi *et al.*, 2010).

The diet was first described in the 1960s by Ancel Keys (Keys *et al.*, 1959) and emphasizes a consumption of fat primarily from foods high in monounsaturated fatty acids and mainly olive oil and encourages daily consumption of fruits, vegetables, low fat dairy products and whole grains, weekly consumption of fish, poultry, tree nuts, legumes, monthly consumption of red meat, as well as a moderate consumption of alcohol (mainly wine during meals), but the proportions of macronutrients may vary.

There is no single Mediterranean diet although the dietary patterns that prevail in the Mediterranean region have many common characteristics. Total lipid intake may be high as in Greece (around 40% of total energy intake), or moderate as in Italy (around 30% of total energy intake) (Kastorini and Panagiotakos, 2010).

Although Greece and the Mediterranean countries are usually considered to be areas of medium-high death rates (14.0-18.0 per 1000 inhabitants), death rates on the island of Crete have been below this level continuously since before 1930 (Allbaugh, 1953). No other area in the Mediterranean basin has had as low a death rate as Crete, according to data compiled by the United Nations in their demographic yearbook for 1948. It was 11.3-13.7 per 1000 inhabitants before World War II and; 10.6 in 1946-1948 (Allbaugh, 1953).

The diet of Crete represents the traditional diet of Greece before 1960. The diet of Crete or the traditional diet of Greece resembles the Paleolithic diet in terms of:

- fiber,
- antioxidants,
- saturated fat,
- monounsaturated fat and
- the ratio of (n-6) to (n-3) fatty acids (0.79 in Paleolithic and 1.00-2.00 in Greece before 1960) (Eaton *et al.*, 1998; Simopoulos and Robinson, 1999).

Actually the ratio of (n-6) to (n-3) fatty acids in developed countries is higher, In United States is 16.74; United Kingdom and north Europe is 10; and is lowest in Japan 4, but not like in Crete (Sanders, 2000; Sugano and Hirahara, 2000).

Unfortunately, Western diets today deviate from the Paleolithic diet and are associated with high rates of cardiovascular disease, diabetes, obesity and cancer. The re-

sults of the Seven Countries Study (the first study designed to establish credible data on cardiovascular disease prevalence rates in contrasting populations like United States, Finland, The Netherlands, Italy, former Yugoslavia, Japan and Greece) are interesting because they show that the population of Crete had the lowest rates of cardiovascular disease and cancer, followed by the population of Japan. The investigators concluded that the reason for these low rates must be the high olive oil intake and the low saturated fat intake of the Mediterranean diet (Keys, 1970).

Crete had a high fat diet (37% of energy from fat), and the people from Crete ate a large amount of vegetables (including wild plants), fruits, nuts and legumes, all rich sources of folate, calcium, glutathione, antioxidants, vitamins E and C and minerals. Purslane is a wild plant, frequently used in cooking by Crete population and is rich in α linoleic acid and vitamins E, C, glutathione. Also in the Greece diet before 1960 the n-3 fatty acids were included in every meal: breakfast, lunch, dinner, and favourite snack was figs stuffed with walnuts.

The patterns for Mediterranean diet were defined in 1993 at the International Conference on the Diets of the Mediterranean, having also been previously defined in other meetings. They are comprised of:

- Abundant plant foods (fruits, vegetables, breads, other forms of cereals, beans, nuts, and seeds);
- Minimally processed, seasonally fresh, and locally grown foods;
- Fresh fruits as the typical daily dessert with sweets based on nuts, olive oil, and concentrated sugars or honey consumed during feast days;
- Olive oil as the principal source of dietary lipids;
- Dairy products (mainly cheese and yogurt) consumed in low to moderate amounts;
- Fewer than four eggs consumed per week;
- Red meat consumed in low frequency and amounts; and
- Wine consumed in low to moderate amounts, generally with meals (Serra-Majem *et al.*, 2006).

One of the purposes of this 1993 International Conference was to develop a food guide pyramid that reflects Mediterranean dietary traditions that have historically been associated with good health (see Fig. 1). Today, the concept of the Mediterranean diet is well defined and is represented by the food pyramid.

This Mediterranean diet pyramid is designed to convey a general sense of the relative proportions and frequency of servings of foods and food groups that contribute to this overall dietary pattern. The pyramid is meant to provide an overall impression of healthy food choices, rather than to define recommended weights of certain foods or proportions of energy obtained from them (Willett *et al.*, 1995).

Cereals, vegetables and fruits are the three most important elements of main meals in the Mediterranean diet.

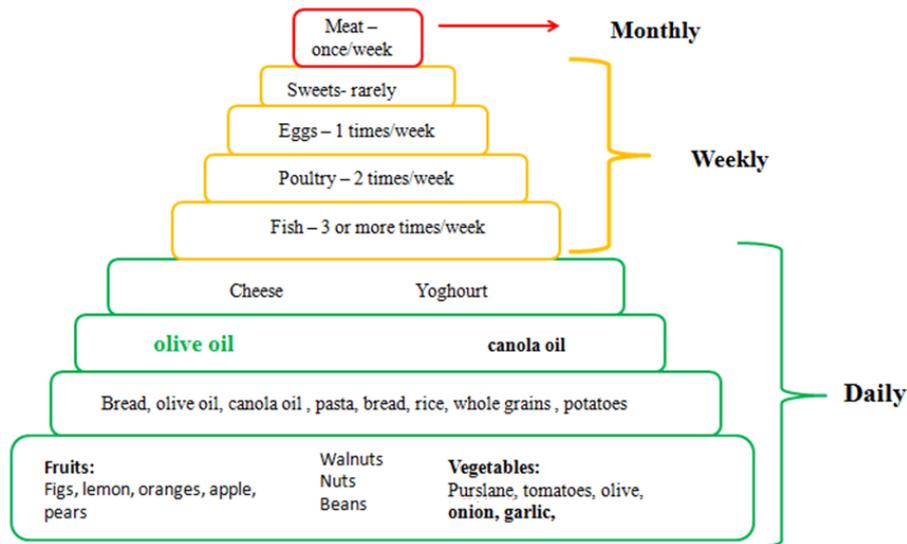


Fig. 1. Mediterranean diet-food guide pyramid

Cereals, considered the most important food source in the world, in form of bread, pasta, rice, couscous and other are preferred as whole grain, since processing normally removes fibre and some valuable nutrients like Mg, Fe or vitamins.

Fruits and vegetables are leading sources of several essential nutrients such as vitamins A and C, potassium, and folate. In addition, diets rich in fruits and vegetables are associated with decreased risk of chronic disease. Now, with obesity the most prevalent nutrition-related health problem worldwide, the role of fruits and vegetables in helping peoples maintain a healthy weight, or lose excess weight, is receiving attention. Eating more fruits and vegetables is common weight-control advice. Generally, fruits and vegetables have fewer calories per serving than most foods, making them a good substitute for higher-calorie foods. Most are high in dietary-fibre, which promotes a feeling of fullness and may make it easier for individuals to limit their calorie intake.

In the traditional Mediterranean diet, plant foods constitute the core of a daily intake, whereas animal foods are more peripheral (Willett *et al.*, 1995). This diet provides all of the known essential micronutrients, fibre, and because it includes modest amounts of animal sources food, even vitamin B-12 and iron, with a low content of saturated fat. Olives, nuts and seeds are good sources of healthy lipids, proteins, vitamins, minerals and fiber and they make a very healthy snack choice. Herbs and spices are good sources of micronutrients and antioxidant compounds, also allowing reduction in salt use (salt being one of the main contributing factors to the development of hypertension among predisposed individuals) (Willett *et al.*, 1995).

Also, minimal processing, seasonal use and freshness of foods would be expected to maximize contents of dietary fibre, antioxidants, other micronutrients, and nonnutritive substances found in plant foods, reducing the risks for chronic diseases, such as cardiovascular diseases, diabetes

mellitus, metabolic syndrome and some types of cancers (Willett *et al.*, 1995).

Olive oil is an important part of the Mediterranean diet. Olive oil is located at the centre of the pyramid; it should be the principal source of dietary lipids because of its high nutritional quality (especially extra virgin olive oil). Its unique composition gives it a high resistance to elevated temperatures, and it is recommended for both cooking and dressings (Bach-Faig *et al.*, 2011). It contains a large proportion of monounsaturated fat, is relatively low in saturated fat and is source of the antioxidant vitamin E (Bach-Faig *et al.*, 2011).

There are some reasons why olive oil is preferable to other fats in general, to fats from other plant sources and even to high amounts of carbohydrates in the diet:

1) Oleic acid is considered to be antithrombotic compared with saturated fatty acids (Ulbricht and Southgate, 1991);

2) Diets high in monounsaturated fat are less likely compared to those high in polyunsaturated fat to be involved in the oxidation of low-density lipoproteins (LDLs), decreasing the risk of atherogenesis and coronary heart disease (Reaven *et al.*, 1991);

3) Substitution of olive oil for carbohydrates in certain short-term clinical studies has been shown to increase concentration of high-density lipoproteins (HDLs), without increasing LDLs and should be expected, therefore to reduce coronary risk (Mensink and Katan, 1987);

4) Olive oil has been used by Mediterranean people for thousands of years, with no evidence of harm (Willett *et al.*, 1995);

5) Olive oil facilitates the typical consumption of large amount of vegetables and legumes throughout much of the Mediterranean region by enhancing taste and energy density (Willett *et al.*, 1995).

Also, following Mediterranean diet, all butter, margarine or vegetable oils and shortenings should be used only

in small amounts or on special occasions, and olive oil should replace (not be added to) those products (Willett *et al.*, 1995).

Dairy products (especially yogurt and cheese) consumed in low to moderate amount are included in the Mediterranean diet. Although their richness in Ca is important for bone and heart health, dairy products can be a major source of saturated fat. For example, grating small amounts of cheese over pasta is one way to incorporate these foods in a healthful and yet good tasting manner, while keeping overall consumption of dairy products low to moderate. Moreover, the recent introduction of low and nonfat dairy products on the global market suggests the possibility that consumption of dairy foods could be increased with none or little adverse health effects for individuals (Willett *et al.*, 1995).

As we stated above, Mediterranean diet is not a vegetarian one. Modest amount of animal foods (especially red meat) can be consumed, with no evident risk to adult health. We all know that high intakes of beef, pork, lamb are associated with an increased incidence of chronic diseases such as coronary heart disease and some types of cancer (like colon or prostate) (Willett, 1994). Weekly consumption of low to moderate amounts of fish and up to four whole eggs per capita per week (including here also eggs used in baking and preparing foods) are compatible with excellent health (Willett, 1994).

In the context of the Mediterranean diet pyramid, wine can be consumed with moderation (one or two glasses per day per men and one glass per day for women), reducing risk of coronary heart disease and overall mortality (Klatsky *et al.*, 1992).

A daily intake of 1.5-2 l of water (equivalent to six to eight glasses) should be guaranteed. Proper hydration is essential to maintaining the corporal water equilibrium, although needs may vary among people due to age, physical activity, personal circumstances and weather conditions. It should be consumed freely, bottled or from the tap, when hygienic circumstances allow it. In addition to water, sugar-free herbal infusions and tea, and low-sodium and low-fat broths may help to complete the requirements (Bach-Faig *et al.*, 2011).

In addition to all of these recommendations, one very important fact should also be reminded: regular physical activity (at least 30 minutes throughout the day) is one of the most important things we can do for our health. It can help control our weight, reduces the risk of cardiovascular disease, type 2 diabetes and metabolic syndrome, reduces the risk of some cancers, strengthens our muscles and bones, improves mental health and mood, the ability to do daily activities and last, but not least increases our chance of living longer.

In 2010, the Mediterranean diet was recognized as an Intangible Cultural Heritage of Humanity by UNESCO (UNESCO, 2010).

Today we face a modern antithesis in food and lifestyle: fast versus slow; industrialization of food versus fresh or organic ingredients; globalization versus regionalization; preservation versus freshness; king-size versus balance, etc. In the Mediterranean diet, emphasis is placed on small portions, freshness, equilibrium, and the pleasure of eating. This is what is so good about such a diet. Food has become a medicine linked to a concept of beauty, harmony, and equilibrium (Ferrari and Rapezzi, 2011).

In Cluj-Napoca, our team developed a protocol and won a grant to implement a pilot study: MEDIPA-The effect of comprehensive lifestyle intervention on physiology and pathophysiology of Obstructive Sleep Apnea Syndrome associated with Obesity and Metabolic Syndrome.

The aim of this pilot project is to study changes in obstructive sleep apnea ventilatory parameters and metabolic syndrome components following an intervention addressing physical activity and eating habits (Mediterranean diet pattern) compared to a control group, and to assess the value of the intervention (behavioral strategies to promote physical activity and eating a Mediterranean diet pattern) on pathophysiological mechanisms underlying metabolic disturbances in patients with obstructive sleep apnea and metabolic syndrome. This project started at the beginning of 2013 and is still ongoing.

To conclude this paper, we can state that the beauty of the traditional Mediterranean diet is that, unlike restrictive fat diets, it celebrates cooking and eating simple, wholesome, minimally processed foods as well as being active, enjoying delicious meals with friends and family, and drinking wine in moderation with those meals.

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